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Descriptions of the black oreo and smooth oreo
fisheries in OEO 1, 3A, 4, and 6
for the 1977–78 to the 2007–08 fishing years

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EXECUTIVE SUMMARY

Coburn, R.P.; McMillan, P.J. (2009). Descriptions of the black oreo and smooth oreo fisheries in OEO 1, 3A, 4, and 6 for the 1977–78 to the 2007–08 fishing years.

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Descriptions of black oreo and smooth oreo fisheries are presented with data from the 1977–78 to 2007–08 fishing years. The analyses summarise Ministry of Fisheries commercial tow-by-tow estimated catch data. All tows used in the analyses either targeted or caught unspecified oreo (OEO), black oreo (BOE), or smooth oreo (SSO). A mix of different target species was used (OEO, SSO, or BOE) in several fisheries, and oreos were also caught as a bycatch of orange roughy target fishing in OEO 1, OEO 6, and OEO 4. Inferring trends in oreo target catch rate is therefore difficult.

Notable changes included:

- Pukaki Rise oreo target tows doubled from 511 t to 1069 t from 2001–02 to 2007–08.
- Pukaki Rise catch of smooth oreo decreased from 1921 to 1112 t, but black oreo catch increased from 939 to 2950 t from 2001–02 to 2007–08.
- Bounty Plateau oreo target tows decreased from 410 to 95 t from 2004–05 to 2007–08.
- Bounty Plateau smooth oreo catch decreased from 2085 to 322 t from 2004–05 to 2007–08 (negligible black oreo catch).

A summary of results for oreo fisheries with at least one year where reported annual estimated catch was more than about 1000 t from 1977–78 to 2007–08 is provided below. The fisheries are ordered from large to small, based on the average annual estimated catch from the three most recent years (2005–06 to 2007–08).

Fishery	Largest annual catch (t) (FY)	Annual catch trends over time	Average recent annual catch (t)	Unstandardised average recent catch rate (t/tow)	Catch limit (t)
(a) Black oreo					
Pukaki Rise	3 200 (80–81) 3 100 (06–07)	Declined. Fishing resumed in 1994–95. Recently increased.	2 900	3.7	
OEO 3A	15 400 (80–81)	Declined, then about 3000 t for 17 years, then declined.	1 300	6.5	†1 700
OEO 4	5 000 (80–81)	Declined.	700	–	
Southland	2 100 (83–84)	Fluctuated. Overall declined.	200	1.9	
Snares	2 300 (92–93)	Declined.	100	1.8	
Puysegur	1 800 (91–92)	Declined due to fishery closure.	less than 100	–	
(b) Smooth oreo					
OEO 4	7 600 (87–88)	Remained constant.	5 800	9.7	
Pukaki Rise	2 300 (00–01)	Fluctuated. May have peaked.	1 300	3.1	
OEO 3A	5 900 (87–88)	Declined.	1 100	6.1	1 400
Bounty Plateau	2 100 (04–05)	Fluctuated. May have peaked.	900	4.4	
Southland	4 200 (85–86)	Fluctuated, then declined.	300	2.2	400
Macquarie Ridge	1 300 (01–02)	Fluctuated, then declined.	300	3.3	
Puysegur	1 000 (93–94)	Declined due to fishery closure.	less than 100	–	

–, too few target tows to estimate a catch rate, or the recent fishery is small (100 t or less). Recent is 2005–06 to 2007–08. † default value calculated by subtracting the smooth oreo catch limit (1400 t) from the TACC (3100 t).

1. BACKGROUND

Smooth oreo (*Pseudocyttus maculatus*) and black oreo (*Allocyttus niger*) have been commercially fished in New Zealand waters since 1972, making this probably the longest-established New Zealand deepwater fishery. The largest oreo fishery is on the South Chatham Rise, but other areas with substantial oreo catch occur throughout the New Zealand Exclusive Economic Zone (EEZ) as a result of target oreo fishing or as bycatch in orange roughy fisheries. This report summarises commercial oreo catch data for the main oreo fisheries around New Zealand. This work was undertaken by NIWA as part of the Ministry of Fisheries Project OEO2008/01 (Oreo stock assessment).

2. OBJECTIVE

Overall objective

To carry out a stock assessment of black oreo (*Allocyttus niger*) and smooth oreo (*Pseudocyttus maculatus*), including estimating biomass and sustainable yields.

Project OEO200801 had four objectives, but only objective 1 is the subject of this report.

Specific objective

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 2007–08 fishing year.

3. METHODS

The last published descriptive analyses of oreo catch and effort data was by Coburn & McMillan (2006), but the analyses were updated in unpublished reports (Projects OEO200602 and OEO200701). The current analyses are updated by including new data from the 2007–08 fishing year for OEO 1, OEO 3A, OEO 4, and OEO 6. The oreo management areas are shown in Figure 1.

Analyses focused on the fisheries in OEO 1 and OEO 6 because of the recent development of fisheries in these areas and because there is no or little research information available for these fisheries. In contrast, the oreo fisheries on the Chatham Rise in OEO 3A and OEO 4 have been the subject of research surveys and stock assessment for a number of years. Within each management area, regions of fishing activity were characterised as “fisheries” and were analysed separately. This was done to simplify the analysis and does not imply biological stocks. For OEO 1 the fisheries defined 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 (includes the east plus the west), and Macquarie Ridge (see Figure 6). Fisheries within OEO 3A and OEO 4 were not identified because these areas were the subject of previous separate unstandardised and standardised CPUE analyses (Doonan et al. 1995, 2003, 2004, 2008, Coburn et al. 1999, 2001a, 2001b, 2006, Hicks et al. 2002).

3.1 Data sources

Commercial tow-by-tow estimated catch data (from TCEPR forms) 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.

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

3.2 Standard data analysis

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

In the figures the patterns of oreo fishing over time in the EEZ were analysed by summing the number of trawls that caught or targeted oreos, the catches of black oreo, and the catches of smooth oreo from each 0.4 x 0.4 degree cell. The number of tows-per-cell were plotted as a circle at the centre of each cell where the circle area was proportional to the number of tows. All tows from 1977–78 to 2007–08 (with a threshold value of 10 tows per cell) were summed to provide a picture of fishing over the extent of the known fishery. Tows from the last three fishing years, 2005–06 to 2007–08, with a threshold value of 5 tows per cell, were also analysed to provide an indication of recent activity. The cumulative catches of black oreo and smooth oreo per cell were plotted separately as a circle at the centre of each cell where the circle area was proportional to the tonnes caught. All tows from 1977–78 to 2007–08 (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, 2005–06 to 2007–08, with a threshold value of 5 t per cell, were also analysed to provide an indication of recent activity.

The tables contain the following.

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

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

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

3.3 Summary plots

Mean annual estimated catch and the mean annual unstandardised CPUE of black oreo and smooth oreo separately from each fishery are shown for the last three fishing years (2005–06 to 2007–08). Recent trends in total catch and catch distribution for the main oreo fisheries were examined in more detail. These fisheries were selected if the catch of black oreo or smooth oreo was relatively large, i.e., averaged about 1000 t per annum for the last three fishing years. The analyses are presented for black oreo then smooth oreo, with each fishery ranked in order of decreasing total catch in the last three fishing years. For black oreo the fisheries included Pukaki Rise, OEO 3A (minus catches from

Southland) and OEO 4. For smooth oreo the fisheries included OEO 4, Bounty Plateau, Pukaki Rise, and OEO 3A (minus catches from Southland). A series of plots for each fishery present the estimated catch history, the distribution of accumulated catch from a 13 fishing year (reference) period following the introduction of GPS (1992–93 to 2004–05), and the accumulated catch from the last three fishing years (2005–06 to 2007–08). The accumulated catch plots are intended to enable comparison of the spatial distribution of catch between the two time periods for each fishery only, i.e., not between different fisheries.

4. RESULTS

4.1 TACC and catch summaries

The estimated catch of black oreo and smooth oreo for each of the oreo QMAs (1, 3A, 4 & 6) and the TACCs are shown in Figures 2–5. In OEO 1 (Figure 2) black oreo dominated early catches but smooth oreo has predominated since about 1995–96. A combined oreo TACC of 4000 t was introduced in 1986–87 based on average annual catches from the previous few years, but this was raised during a phase of “exploratory fishing” until 1998–99 when it was reduced to about 5000 t. The TACC has rarely been taken and in recent years there was a wide gap between catch and the TACC. In 2007–08 the TACC was dropped to 2500 t. OEO 1 contains several oreo fisheries but most catches have been from the Southland fishery. The only stock assessment for oreos in OEO 1 have been those for Southland smooth oreo by Coburn et al. (2003, 2008) who used standardised CPUE as an index of abundance.

In OEO 3A (Figure 3) early catches were dominated by black oreo but since about 1984–85 catches have been similar for both black oreo and smooth oreo. A combined oreo TACC of 10 000 t was introduced in 1982–83 based on average annual catch from the previous few years. Catches failed to match the TACC from about 1992–93 onwards and stock assessments suggested that catch levels should be reduced. The 10 000 t TACC was reduced in steps from 1996–97 to the current 3255 t. Recent catches have generally been close to the TACC and recent stock assessments suggest these catch levels are sustainable in the short to medium term. OEO 3A has large black oreo and smooth oreo fisheries on the southwest flank of the Chatham Rise plus a smaller (Waitaki) oreo fishery in the southwest which is included in the Southland fishery in this report. The main OEO 3A oreo fisheries have been the subject of previous MFish funded research survey and stock assessment, e.g., Doonan et al. (2004).

In OEO 4 (Figure 4) catches in the first few years were dominated by black oreo, probably because it was the species preferred by the Soviet vessels which took most of the oreo catch at that time. A combined oreo TACC of 7000 t was introduced in 1982–83 based on average annual catch. The TACC remained at about 7000 t until 2001–02 when it was reduced slightly because stock assessments indicated some uncertainty in the sustainability of the catch. Subsequent stock assessment reduced the uncertainty and the TACC was increased back to 7000 t in 2003–04. Catches have met or exceeded the TACC since about 1983–84. OEO 4 has a large smooth oreo fishery on the southeast flank of Chatham Rise, and this plus the small black oreo fishery have been the subject of previous MFish funded research surveys and stock assessments, e.g., Doonan et al. (2008).

In OEO 6 (Figure 5) early catches were dominated by black oreo taken mainly by Soviet licensed and charter vessels. There was little fishing between 1985–86 and 1992–93 when New Zealand vessels increased fishing in the area. Since 1992–93 smooth oreo has been the predominant species taken except for the last two years (2006–08) when black oreo was dominant. A combined oreo TACC of 3000 t was introduced in 1986–87 based on average annual catch. This was arbitrarily doubled to 6000 t in 1996–97 during a phase of “exploratory fishing”. Catches since the TACC increase have been consistently close to the TACC. OEO 6 contains several oreo fisheries but most recent catches have been from the Pukaki Rise fishery. Stock assessments for oreos in OEO 6 include Pukaki Rise smooth oreo (Coburn et al. 2007, Mackenzie 2007), and Bounty Plateau smooth oreo (Mackenzie & Coburn, 2009). These assessments used standardised CPUE as an index of abundance because no research surveys of oreo abundance have been carried out in OEO 6.

4.2 Data summary and distribution plots

Estimated catch from tow-by-tow data averaged 79% of reported landed catch for OEO 1, 77% for OEO 3A, 93% for OEO 4, and 91% for OEO 6 over the last 10 fishing years (1998–99 to 2007–08) (Tables 1 and 2). Total reported landings of oreos (black oreo and smooth oreo combined) and TACs for OEO 1, 6, 3A, and 4 are given in Tables 3 and 4.

The plot of the number of trawls that caught or targeted oreos for all fishing years (1977–78 to 2007–08) shows that most of the trawls were in OEO 3A, OEO 4, Southland, Pukaki Rise, Puysegur, Macquarie Ridge, Snares, Wairarapa, Bounty Plateau, and Auckland Island hills (Figure 6). The distribution of trawls for the last three fishing years (2005–06 to 2007–08) has a similar overall pattern, but the highest density of effort was in OEO 4, south and east of Chatham Island, and was also relatively high in Pukaki Rise and Bounty Plateau (Figure 7).

The plot of black oreo catches from 1977–78 to 2007–08 showed the importance of OEO 3A, with smaller contributions from OEO 4, Pukaki Rise, Southland, Puysegur, and Snares (Figure 8). The Pukaki Rise fishery was the largest black oreo fishery in the last three fishing years and displaced OEO 3A as the largest fishery in 2002–03 (Figure 9).

Smooth oreo catches from 1977–78 to 2007–08 showed the importance of OEO 4, OEO 3A, and to a lesser extent Southland, with smaller contributions from other areas (Figure 10). In the last three years OEO 4 was still the most important followed by Bounty Plateau, Pukaki Rise, OEO 3A, Southland, and Macquarie Ridge (Figure 11).

Comparison of the plots of the number of trawls that caught or targeted oreos (see Figures 6 and 7) with the plots of catches of black oreo and smooth oreo (Figures 8–11) shows that although there were substantial numbers of trawls in areas such as Wairarapa, the Kaikoura coast, and the north and northeast slopes of the Chatham Rise, catches of oreos from those areas were relatively small.

4.3 Standard data analysis

4.3.1 OEO 1 – Southland

Area

This 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 6). This fishery includes part of OEO 3A due to fishing extending north past the OEO 1-OEO 3A boundary line at 46° S.

Nation

This area was fished by foreign licensed and joint venture vessels before 1986–87, with Soviet vessels taking most of the catch from 1977–78 to 1987–88. New Zealand dominated from 1990–91 onwards except for 2005–06 when Ukraine vessels predominated (Table 5).

Vessels

Changes in catch by vessel tonnage reflected the change from large Soviet vessels (over 2000 t) at the beginning of the fishery to small and medium New Zealand vessels later on. Ten or more vessels caught oreos in seven fishing years. Fewer than four medium and large vessels fished in 2005–06 to 2007–08, reflected in a substantial drop in effort (Table 6).

Target species

The main target species was unspecified oreo, but a small percentage of oreo was caught by tows that targeted orange roughy (a high of 13% in 1988–89). The target species was mainly black oreo in the 1970s and early 1980s but switched to mainly smooth oreo in the mid 1980s to early 1990s, then to mainly unspecified oreo from 1993–94 on (Table 7). There were fewer than 200 target tows per year in the last four years compared to a high of 750 in 2001–02.

Catch and catch rate

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

Black oreo catch rates from 1983–84 to 1986–87, when black oreo was the main target species, showed a downward trend. The remaining black oreo catch history has insufficient target tows to comment on long-term trends in CPUE. A relatively unbroken series of target tows for smooth oreo from 1984–85 on shows a fluctuating target catch rate, although the last 10 fishing years had low values compared with earlier fishing years. Target catch rate of unspecified oreo and all oreo from 1991–92 to 2006–07 also fluctuated, but generally trended downward (Table 9). The number of all oreo target tows declined substantially from 750 in 2001–02 to 109 in 2007–08.

Summary

This is primarily a target oreo fishery on flat bottom and dropoffs along the east continental slope of the South Island from Timaru to Long Point. It is the largest of the oreo fisheries in OEO 1 with data from 8278 oreo target tows. Peak catch was 5302 t in 1985–86 but catches declined substantially and were less than 1000 t per annum in the last three years. Catch rates of smooth oreo were mostly higher in the mid 1980s and early 1990s than in recent fishing years, but the number of target oreo tows also declined substantially in the last four years. Catch rates of black oreo declined in the mid 1980s, but there are too few target tows to analyse at other times. Industry has adopted a voluntary code of practice limiting catches of smooth oreo to 400 t per year, although their area definition differs slightly from that used in this report (Clement and Associates Ltd 2007).

4.3.2 OEO 1 – Puysegur

Area

This fishery is contained between 46° 25.2' S, 47° 30.5' S, 164° 46.0' E, and 166° 29.5' E (see Figure 6).

Nation

Fishing between 1989–90 and 2002–03, and in 2005–06, was carried out only by New Zealand vessels with vessels from Japan before that and mainly from Ukraine in 2003–04, 2004–05, and 2006–07. There was no reported fishing in 2007–08 (Table 10).

Vessels

Fewer than four vessels per year fished in the last 11 years (Table 11).

Target species

Oreos were largely a bycatch of the orange roughy fishery from 1989–90 to 1996–97, except in 1990–91 when tows catching oreos mainly targeted black oreo and unspecified oreo. The fishery for orange roughy was closed in 1997–98 although some vessels reported target orange roughy tows in 2004–05 and 2005–06. There were no reported tows in 2007–08 (Table 12).

Catch and catch rate

Catches of black oreo were higher than those for smooth oreo up to 1992–93, but smooth oreo predominated for all subsequent years except 2003–04 and 2004–05. Peak oreo catch of 2430 t was in 1991–92 (Table 13). Catch per tow data from target tows are available only for a few years, from few tows, and are variable. There was no reported catch in 2007–08 (Table 14).

Summary

This fishery occurred on the hills and slopes of the Puysegur Bank until it was closed in 1997–98. Oreos were caught at first as the main bycatch of the orange roughy fishery. The first reported target fishing for orange roughy was in 1989–90. Oreo catch switched from mainly black oreo to mainly

smooth oreo after 1992–93. Catch dropped to 19 t in the 1997–98 fishing year as a result of the voluntary closure of the orange roughy fishery, but climbed to 322 t in 1999–2000. Oreo target catch rates were variable, and were low for smooth oreo compared with other smooth oreo fisheries. There were catches of 271, 221, 107, and 17 t reported from 2003–04 to 2006–07 in spite of the voluntary closure of the fishery. There was no reported catch or effort in the 2007–08 year.

4.3.3 OEO 1 – Snares

Area

This fishery is contained between 47° 41.9' S, 48° 24.6' S, 164° 29.1' E, and 165° 42.5' W (see Figure 6).

Nation

This fishery was carried out entirely by New Zealand vessels except in 2003–04, 2004–05, and 2006–07 when Ukrainian vessels fished (Table 15).

Vessels

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

Target species

Oreos were caught mainly as a bycatch of orange roughy target fishing in early years, but this switched in later years to target fishing for oreos. Unspecified oreo and smooth oreo were the main targets since 2000–01 with variable numbers of tows per year, but there were 179 black oreo target tows in 2007–08 (Table 17).

Catch and catch rate

Black oreo was the main oreo species reported caught in the first eight years, with catches divided between black oreo and smooth oreo in remaining years, except for 2007–08 which was mostly black oreo (Table 18). Catch peaked in 1992–93 at 2298 t of black oreo and 720 t of smooth oreo, but catches from the later years were much lower with only 4, 28, 83, and 8 t recorded from 2003–04 to 2006–07. Catch rose again to 19 t smooth oreo and 330 t black oreo. The practice of recording unspecified oreo as target species for most of the series and small numbers of tows in some years resulted in insufficient data to infer long-term trends in target CPUE for black oreo and smooth oreo, but catch rates of about 2 t/tow for all OEO in 2007–08 are much lower than the 8 t/tow reported in the high catch 1992–93 year (Table 19).

Summary

This is a hill fishery for orange roughy and oreos west of the Snares Islands. The fishery was started in 1990–91 by New Zealand vessels and is closely associated with the Puysegur fishery. Initially, most oreos were caught as a bycatch of orange roughy fishing, with a large black oreo catch, but there was a switch to mainly target fishing for oreos from 1996–97 on. Black oreo catch peaked at 2298 t in 1992–93. This fishery has declined with very few target tows and almost zero catches from 2002–03 to 2006–07 but effort increased in 2007–08 with a modest oreo catch of 349 t (330 t black oreo). There are insufficient data to infer trends in target CPUE for black oreo and smooth oreo.

4.3.4 OEO 1 – Wairarapa

Area

This fishery is contained within the polygon defined by 41° 17.4' S, 175° 18.4' E; 42° 4.7' S, 175° 20.4' E; 42° 3.2' S, 176° 38.1' E; 41° 26.6' S, 177° 49.7' E; 40° 43.5' S, 177° 57.9' E; 40° 24.9' S, 176° 15.6' E (see Figure 6).

Nation

New Zealand vessels landed all the catch from 1983–84 on (Table 20).

Vessels

Most of the vessels were under 1000 t (Table 21).

Target species

Oreos were caught mainly during target fishing for orange roughy, but with some target fishing for OEO and SSO from 1995–96 to 2005–06 (Table 22).

Catch and catch rate

Smooth oreo was the main species caught. Annual catches were less than 200 t from 1980–81 to 1999–2000, jumped to 813 t in 2000–01, then fell to less than 100 t in each of the last five years (Table 23). Catch rates were low in most years with a brief period of higher rates from 2000–01 to 2002–03 (Table 24).

Summary

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

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

Area

This area comprises the remainder of oreo management area OEO 1 north of 45° S (see Figure 6).

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

Fishing was predominantly by vessels under 1000 t (Table 26).

Target species

Oreos were caught mainly during target fishing for orange roughy and other species. The highest number of oreo target tows in this series was 190 in 1996–97, and there were no reported target tows in the last two years, 2006–08 (Table 27).

Catch and catch rate

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

Summary

This area is a catch-all for any other oreo fishing outside the main OEO 1 fisheries defined above. Oreos were caught over a wide area, mainly as a bycatch of orange roughy fishing on the west coasts of the North and South Islands, the Challenger Plateau, and the east coast of the North Island. A fishery developed within this area, concentrating on deep hills on the abyssal plain north of the mid Chatham Rise, but this is not reported in detail due to the commercial sensitivity of these data. Some unspecified oreo and smooth oreo target fishing by New Zealand vessels started from 1995–96 onwards. There were very small catches (3–16 t) in the last five years and there were no reported target tows in the last two years, 2006–08. Insufficient data are available to characterise separate fisheries within this area, or to infer trends in CPUE for black oreo and smooth oreo.

4.3.6 OEO 6 – Auckland Island hills

Area

This fishery lies north of the Auckland Islands between 49° 25.9' S, 51° 37.5' S, 164° 11.3' E, and 167° 11.9' E (see Figure 6).

Nation

There was Soviet fishing in 1981–82 and 1985–86, but New Zealand vessels predominated 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, but fewer than four vessels per year fished in the last nine years (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, 1999–2000, and from 2002–03 onwards. In other years oreo was mostly caught as a bycatch of orange roughy target fishing. There were just 29 oreo target tows in 2007–08 (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. Catch and effort had declined in recent years but catch increased from 9 t in 2006–07 to 198 t in 2007–08 (Table 33) and effort from 5 tows (all OEO) in 2006–07 to 29 in 2007–08. There are insufficient data to derive long-term trends in CPUE (Table 34).

Summary

This is a target hill fishery for smooth oreo and orange roughy and was carried out mainly by New Zealand vessels from 1992–93 on. The highest smooth oreo catch was 658 t in 1998–99. Since then catches and effort have generally declined but 2007–08 had the largest catch (198 t) since 2003–04. There are insufficient target catch rate data to derive long-term trends in CPUE.

4.3.7 OEO 6 – Bounty Plateau

Area

This fishery lies between 46° 29.3' S, 47° 60.0' S, 176° 23.8' E, and 178° 8.4' W (see Figure 6).

Nation

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

Vessels

Most vessels fishing in this area were over 1000 t, except from 1995–96 to 1997–98 when vessels under 1000 t predominated. The maximum number of vessels was nine in 1998–99 and there have been four or more vessels per year fishing since 1997–98, except for 2007–08 which dropped below four (Table 36).

Target species

Soviet vessels targeted black oreo and smooth oreo, in 1980–81 and 1983–84. New Zealand vessels targeted mainly smooth oreo and unspecified oreo, but there was some targeting of orange roughy from 1994–95 on. The number of target oreo tows declined in the last three years with only 95 reported in 2007–08, compared to a high of 410 in 2004–05 (Table 37).

Catch and catch rate

Soviet vessels reported catches of 628 t of black oreo and 525 t of smooth oreo in 1983–84. New Zealand vessels reported very small catches of black oreo but at times substantial catches of smooth oreo. The highest annual catch of smooth oreo (2085 t) was reported in 2004–05, but catch declined to 322 t in 2007–08 (Table 38). Increased numbers of target tows for smooth oreo and unspecified oreo were reported from 2002–03 on, but effort declined sharply after 2004–05. From 1994–95 onwards, target CPUE for smooth oreo and unspecified oreo were variable, but were mostly relatively high (Table 39).

Summary

This 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 2100 t in 2004–05. Effort and catch declined in the last three years, possibly as a result of increased effort on the Pukaki Rise fishery. Relatively high levels of target CPUE for smooth oreo and unspecified oreo were observed from 1994–95 on.

4.3.8 OEO 6 – Pukaki Rise

Area

This fishery lies within a polygon with corners at: 46° 26.1' S, 174° 59.2' E; 48° 31.8' S, 176° 60.0' E; 50° 59.6' S, 176° 60.0' E; 50° 59.6' S, 172° 58.4' E; 49° 0.1' S, 168° 58.0' E (see Figure 6).

Nation

This fishery involved mainly Soviet vessels from 1978–79 to 1983–84. New Zealand vessels took most of the catch from 1988–89 on (Table 40).

Vessels

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

Target species

Soviet vessels mostly targeted black oreo from 1980–81 to 1983–84. New Zealand vessels targeted orange roughy in 1995–96 and 1996–97, and then switched to mainly unspecified oreo or smooth oreo. In 2006–07 21% reported black oreo as the target and this increased to 55% in 2007–08. The number of oreo target tows has increased steadily from 511 in 2001–02 to 1069 in 2007–08 (Table 42).

Catch and catch rate

There were two years (1980–81 and 1981–82) of substantial catch of black oreo by Soviet vessels. Substantial catches of black oreo and smooth oreo were reported by New Zealand vessels from 1995–96 on. Catch of smooth oreo peaked at 2309 t in 2000–01 and has since declined. Catch of black oreo peaked in 2006–07 at 3063 t (Table 43). Smooth oreo target CPUE was relatively high from 1995–96 on. Black oreo target CPUE was relatively high from 1997–98 to 2007–08. The all oreo target CPUE was relatively high between 1995–96 and 2007–08 (Table 44).

Summary

This flat bottom and dropoff target oreo fishery along the northeast slope of the Pukaki Rise was fished by Soviet vessels from 1978–79 to 1985–86, mainly catching black oreo. Peak black oreo catch was 3144 t in 1980–81. Substantial New Zealand fishing began in 1995–96. The target species was orange roughy in 1995–96 and 1996–97, then switched to OEO or SSO and to mostly BOE in 2007–08. The fishery for smooth oreo peaked at 2309 t in 2000–01, but the black oreo catch increased in recent years to 3063 t in 2006–07. Target CPUE values for all OEO, SSO, and BOE were moderate from 1997–98 onward.

4.3.9 OEO 6 – Macquarie Ridge

Area

This fishery is contained between 48° 59.2' S, 162° 57.7' E; 51° 17.5' S, 160° 48.5' E; 52° 34.1' S, 162° 31.5' E; 48° 59.2' S, 165° 44.5' E, (see Figure 6).

Nation

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

Vessels

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

Target species

Target fishing for oreos increased from 1996–97 on, peaked at 338 tows in 2000–01, then declined substantially to 13 tows in 2006–07. There was an increase in 2007–08 with 170 target tows reported (Table 47).

Catch and catch rate

Substantial catches of smooth oreo were made from 1996–97 onward, with a peak of 1253 t in 2001–02, then a decline to 18 t in 2006–07, with an increase to 548 t in 2007–08 (Table 48). Target CPUE for unspecified oreo, all oreo, and smooth oreo was variable, but effort declined substantially in recent years (Table 49).

Summary

A New Zealand fishery developed from 1996–97 on, and peaked at 1351 t (OEO) in 2000–01, but catch and effort declined substantially from 2003–04 to 2006–07 with a slight increase in 2007–08.

4.3.10 OEO 3A – Southwest Chatham Rise (minus Southland)

Area

Chatham Rise west of 176° E, excluding the part of OEO 3A that falls within the Southland fishery (see Figure 6).

Nation

Fishing was dominated by Soviet vessels up to 1986–87, and then by New Zealand vessels (Table 50).

Vessels

Soviet vessels were mainly large (over 2000 t) and New Zealand vessels were a mix of small (under 1000 t) and medium sized (under 2000 t). There were up to 26 vessels per year in OEO 3A in the early years, but this dropped to 8–15 from 2000–01 to 2007–08 (Table 51).

Target species

Catches of oreo were taken mainly by Soviet vessels that initially targeted unspecified oreo, then black oreo, then black oreo and smooth oreo. Catches of oreo were taken by New Zealand vessels that targeted smooth oreo initially, then unspecified oreo and smooth oreo. From 1998–99 to 2000–01 there was an increased proportion of black oreo target fishing (and a decrease in the smooth oreo target fishing) because of a voluntary catch limit of 1400 t of smooth oreo introduced in 1998–99. From 1997–98 to 2007–08 14–35% of the oreo catch was taken while trawling for species other than oreos or orange roughy (Table 52).

Catch and catch rate

Black oreo dominated catches from 1979–80 to 1983–84, reflecting the Soviet preference for that species. Smooth oreo then predominated in all but four of the fishing years from 1984–85 to 1997–98. Since 1998–99 the catch of smooth oreo was probably constrained by the 1400 t voluntary catch limit (Ministry of Fisheries 2009) (Table 53).

Target catch per tow for black oreo declined over the first 10 years (1979–80 to 1988–89), but fluctuated in later fishing years. Smooth oreo catch per tow declined from 1979–80 to 1996–97 then stabilised (Table 54).

Summary

This fishery is a flat bottom, dropoff, and hill fishery which mostly targets oreo. It is a large (reported oreo catch of 14 832 t in 1980–81) and long-established (from about 1972 to the present) deepwater fishery. It was dominated by Soviet vessels in the early years, but is now almost entirely fished by New Zealand vessels. The TACC was reduced in five steps from 10 106 t in 1995–96 to 3255 t in 2003–04 based on stock assessment results. The catch failed to reach the TACC in 1994–95 and 1995–96 but was close to the TACC in the remaining years. Catch and catch rates seem to have stabilised in recent years with catch constrained by the TACC and voluntary species catch limit.

4.3.11 OEO 4 – South-east Chatham Rise

Area

Chatham Rise east of 176° E (see Figure 6).

Nation

Predominantly fished by Soviet vessels up to 1984–85 and New Zealand thereafter (Table 55).

Vessels

Soviet vessels were mainly large (over 2000 t) and New Zealand vessels a mix of small (under 1000 t) and medium sized (under 2000 t). There were up to 20 vessels per year in early years but 5–17 from 1989–90 to 2007–08 (Table 56).

Target species

Soviet vessels initially targeted unspecified oreo, then black oreo, smooth oreo, and increasingly orange roughly. Catches of oreo by New Zealand vessels mostly targeted orange roughly (Table 57).

Catch and catch rate

Black oreo catches were predominant only from 1978–79 to 1980–81, with smooth oreo then more important. Smooth oreo catches decreased in 2001–02 because the TACC was reduced, but the TACC was restored to the previous level in 2003–04 and catches increased again (Table 58).

Target catch per tow for black oreo fluctuated from 1978–79 to 1988–89, and since that time there have been very few target tows. Target catch per tow for smooth oreo declined in the early years (1979–80 to 1990–91), fluctuated in the intermediate years, but was high (8–12 t/tow) in the last seven years (Table 59).

Summary

This fishery is a flat bottom, dropoff, and hill fishery with oreo mainly taken as bycatch in orange roughly fishing. It is a large (reported oreo catch of 10 269 t in 1980–81) and long-established (from about 1972 to the present) deepwater fishery. It was dominated by Soviet vessels in the early years, but is now almost entirely fished by New Zealand vessels. The catch was close to the TACC in most years since 1983–84. In 2001–02 and 2002–03 the TACC was reduced as a result of stock assessment results, but a more optimistic assessment saw the TACC restored to the previous level in 2003–04. Catches rates for smooth oreo have remained steady at values that are higher than other New Zealand smooth oreo fisheries.

4.3 Summary plots

The mean annual estimated catches of black oreo and smooth oreo for each fishery in the last three fishing years (2005–06 to 2007–08) are shown in Figure 12. There were three black oreo fisheries close to or over 1000 t per annum: Pukaki Rise (2900 t), OEO 3A (1300 t) and OEO 4 (700 t). Smooth oreo fisheries close to or more than 1000 t per annum ranked from large to small included: OEO 4 (5800 t), Pukaki Rise (2900 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 (2005–06 to 2007–08) are shown in Figure 13. OEO 3A (6.5 t/tow) had the highest black oreo catch rates followed by Pukaki Rise (3.7). The smooth oreo catch rate in OEO 4 (9.7 t/tow) was highest followed by OEO 3A (6.1), Bounty Plateau (4.4), Macquarie Ridge (3.3), Pukaki Rise (3.1), and Southland (2.2).

Black oreo

The largest fishery in the last three years was Pukaki Rise (Figure 14). The fishery operated in the early to mid 1980s but was not fished again until the mid 1990s. The distribution of catches in the last three fishing years compared to the post-GPS period suggests that favoured fishing areas have altered slightly with more catch taken in the southeast (Figures 15 and 16).

The second largest fishery was OEO 3A (Figure 17). This was formerly the largest fishery in the EEZ, i.e., 15 400 t reported in 1980–81, and is the longest established (before 1977–78). Catches declined steeply in the mid 1980s then fluctuated until the late 1990s when catch limits were reduced. The distribution of catches from this fishery in the post-GPS period (1992–93 to 2004–05) and for the last three fishing years (2005–06 to 2007–08) appears to be similar (Figure 18).

The third largest fishery in the last three years was OEO 4. Catch was mostly taken as a bycatch to orange roughy target fishing. The catch history has been fairly stable over the last 10 years (Figure 19). The spatial distribution over the last three years (2005–06 to 2007–08) is similar to that over the post-GPS reference period (1992–93 to 2004–05) (Figures 20 & 21).

Smooth oreo

OEO 4 is the largest and longest-established of the smooth oreo fisheries, with a build up of catches in the 1980s followed by relatively steady levels (Figure 22). 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 23 and 24).

The Pukaki Rise smooth oreo fishery had some small catches in the mid 1980s but the modern fishery started in the mid 1990s. Catches peaked in 2000–01 (2309 t) and subsequently declined (Figure 25). The distribution of catches in the last three fishing years compared to the post-GPS period suggests that favoured fishing areas have altered slightly over time, with more catch in the north-east and southeast (Figures 26 and 27).

The OEO 3A (minus the catches from Southland) smooth oreo fishery is one of the longest-established fisheries with large catches in the early and late 1980s to early 1990s. Catches subsequently declined and were further constrained by reduced catch limits since 1999–2000 (Figure 28). Comparison of the catch distributions suggests little change in the last three fishing years compared to the post-GPS period (Figure 29).

The Bounty Plateau smooth oreo fishery is a relatively recent fishery with the highest catch in 2004–05 (Figure 30). Comparison of the catch distributions suggested a slight expansion of catches to the west in the last three fishing years compared to the post-GPS period (Figure 31).

5. ACKNOWLEDGMENT

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

Fishing year	OEO 1 total oreo catch		OEO 6 total oreo catch		% of tow-by-tow data	
	Reported	Tow by tow	Reported	Tow by tow	OEO 1	OEO 6
1978-79*	2 808	2 818	17	3	100	-
1979-80*	143	130	18	20	91	-
1980-81*	467	480	283	0	103	0
1981-82*	21	1	4 380	3 221	-	74
1982-83*	162	15	765	1 929	9	252
1983-83#	39	0	354	436	-	123
1983-84†	3 241	3 424	3 568	3 092	106	87
1984-85†	1 480	1 747	2 044	1 853	118	91
1985-86†	5 390	5 724	126	126	106	100
1986-87†	532	296	0	0	56	-
1987-88†	1 193	1 047	197	249	88	126
1988-89†	432	266	0	0	62	-
1989-90†	2 069	1 628	0	0	79	-
1990-91†	4 563	3 373	288	304	74	106
1991-92†	4 156	3 292	33	17	79	-
1992-93†	5 739	5 404	815	599	94	74
1993-94†	4 910	4 395	983	872	90	89
1994-95†	1 483	1 137	2 528	2 232	77	88
1995-96†	4 783	3 824	4 435	3 823	80	86
1996-97†	5 181	4 168	5 645	5 188	81	92
1997-98†	2 681	2 518	5 222	4 819	94	92
1998-99†	4 102	3 537	5 287	4 726	84	88
1999-00†	3 711	3 215	5 914	5 392	87	91
2000-01†	4 852	3 257	5 932	5 320	67	90
2001-02†	4 197	3 442	5 737	5 453	82	95
2002-03†	3 034	2 301	6 115	5 634	76	92
2003-04†	1 703	1 342	5 811	5 316	79	91
2004-05†	1 025	764	5 744	5 466	75	95
2005-06†	850	635	6 463	5 923	75	92
2006-07†	903	752	5 926	5 285	83	89
2007-08†	947	820	5 902	5 204	86	88

Reported data source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2006-07. *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

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

Fishing year	OEO 3A total oreo catch		OEO 4 total oreo catch		Percentage captured in tow by tow data	
	Reported	Tow by tow	Reported	Tow by tow	OEO 3A	OEO 4
1978-79*	1 366	1 360	8 041	8 150	100	101
1979-80*	10 958	8	680	652	0	96
1980-81*	14 832	15 076	10 269	5 057	102	49
1981-82*	12 750	21 497	9 296	8 625	169	93
1982-83#	8 576	6 494	3 927	7 217	76	184
1983-83†	4 409	9 163	3 209	6 041	208	188
1983-84†	9 190	9 099	6 104	6 158	99	101
1984-85†	8 284	6 755	6 390	6 420	82	100
1985-86†	5 331	4 721	5 883	5 826	89	99
1986-87†	7 222	7 099	6 830	6 813	98	100
1987-88†	9 049	8 938	8 674	8 539	99	98
1988-89†	10 191	8 586	8 447	7 524	84	89
1989-90†	9 286	7 857	7 348	5 804	85	79
1990-91†	9 827	8 743	6 936	6 114	89	88
1991-92†	10 072	9 407	7 457	6 493	93	87
1992-93†	9 290	8 504	7 976	6 241	92	78
1993-94†	9 106	9 039	8 319	6 869	99	83
1994-95†	6 600	6 175	7 680	6 488	94	84
1995-96†	7 786	7 690	6 806	5 834	99	86
1996-97†	6 991	7 086	6 962	6 135	101	88
1997-98†	6 336	5 709	7 010	6 373	90	91
1998-99†	5 763	5 319	6 931	6 502	92	94
1999-00†	5 859	3 985	7 034	6 522	68	93
2000-01†	4 577	3 729	7 358	6 854	81	93
2001-02†	3 923	3 180	4 864	4 379	81	90
2002-03†	3 070	2 172	5 402	4 979	71	92
2003-04†	2 856	1 993	6 735	6 331	70	94
2004-05†	3 061	2 313	7 390	6 871	76	93
2005-06†	3 333	2 341	6 829	6 268	70	92
2006-07†	3 073	2 221	7 211	6 779	72	94
2007-08†	3 092	2 871	7 038	6 762	93	96

Reported data source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2006-07. *, 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 2006–07 and TACs (t) from 1986–87 to 2007–08.

Fishing year	OEO 1		OEO 6	
	Landings	TAC	Landings	TAC
1978–79*	2 808	–	17	–
1979–80*	143	–	18	–
1980–81*	467	–	283	–
1981–82*	21	–	4 380	–
1982–83*	162	–	765	–
1983–83#	39	–	354	–
1983–84†	3 241	–	3 568	–
1984–85†	1 480	–	2 044	–
1985–86†	5 390	–	126	–
1986–87†	532	4 000	0	3 000
1987–88†	1 193	4 000	197	3 000
1988–89†	432	4 233	7	3 000
1989–90†	2 069	5 033	0	3 000
1990–91†	4 563	5 033	288	3 000
1991–92†	4 156	5 033	33	3 000
1992–93†	5 739	6 044	815	3 000
1993–94†	4 910	6 044	983	3 000
1994–95†	1 483	6 044	2 528	3 000
1995–96†	4 783	6 044	4 435	3 000
1996–97†	5 181	6 044	5 645	6 000
1997–98†	2 681	6 044	5 222	6 000
1998–99†	4 102	5 033	5 287	6 000
1999–00†	3 711	5 033	5 914	6 000
2000–01†	4 852	5 033	5 932	6 000
2001–02†	4 197	5 033	5 737	6 000
2002–03†	3 034	5 033	6 115	6 000
2003–04†	1 703	5 033	5 811	6 000
2004–05†	1 025	5 033	5 744	6 000
2005–06†	850	5 033	6 463	6 000
2006–07†	903	5 033	5 926	6 000
2007–08†	947	2 500	5 902	6 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2006–07.

*, 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 2006–07 and TACs (t) from 1982–83 to 2007–08.

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	3 100	5 402	5 460
2003–04†	2 856	3 100	6 735	7 000
2004–05†	3 061	3 100	7 390	7 000
2005–06†	3 333	3 100	6 828	7 000
2006–07†	3 073	3 100	7 211	7 000
2007–08†	3 092	3 100	7 038	7 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2006–07.
 *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

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

	UN	NZ	JAP	KOR	NOR	RUS	UKR
1977-78	31	0	0	0	0	69	0
1978-79	0	0	0	0	0	100	0
1979-80	0	0	0	0	0	100	0
1980-81	0	0	0	0	0	100	0
1981-82	0	0	100	0	0	0	0
1982-83	0	0	0	0	0	0	0
1983-84	0	0	0	5	0	95	0
1984-85	0	0	6	47	0	47	0
1985-86	0	0	4	22	0	74	0
1986-87	0	17	0	35	0	48	0
1987-88	0	36	19	4	0	41	0
1988-89	0	81	0	19	0	0	0
1989-90	0	42	0	10	49	0	0
1990-91	0	58	0	7	35	0	0
1991-92	0	100	0	0	0	0	0
1992-93	0	100	0	0	0	0	0
1993-94	0	100	0	0	0	0	0
1994-95	0	84	0	16	0	0	0
1995-96	0	77	0	22	0	0	0
1996-97	0	84	0	16	0	0	0
1997-98	0	88	0	12	0	0	0
1998-99	0	100	0	0	0	0	0
1999-00	0	75	0	25	0	0	0
2000-01	0	99	0	1	0	0	0
2001-02	0	100	0	0	0	0	0
2002-03	0	100	0	0	0	0	0
2003-04	0	100	0	0	0	0	0
2004-05	0	92	0	0	0	0	8
2005-06	0	37	0	0	0	0	63
2006-07	0	97	0	0	0	0	3
2007-08	0	100	0	0	0	0	0

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

	UN	< 1 000 t	1000-2000 t	> 2 000 t	n
1977-78	7	0	0	93	8
1978-79	0	0	0	100	–
1979-80	0	0	0	100	–
1980-81	0	100	0	0	–
1981-82	0	0	0	100	–
1982-83	0	0	0	0	–
1983-84	0	5	0	95	8
1984-85	0	47	6	47	9
1985-86	0	22	4	74	11
1986-87	0	52	0	48	7
1987-88	0	14	26	60	6
1988-89	0	74	26	0	5
1989-90	0	98	2	0	7
1990-91	0	55	45	0	6
1991-92	0	94	5	0	13
1992-93	0	84	15	0	14
1993-94	0	51	49	0	9
1994-95	0	79	21	0	6
1995-96	0	64	36	0	15
1996-97	0	94	6	0	12
1997-98	0	84	16	0	13
1998-99	0	83	15	2	12
1999-00	0	55	45	0	8
2000-01	0	8	92	0	8
2001-02	0	26	74	0	7
2002-03	0	12	88	0	6
2003-04	0	25	75	0	6
2004-05	0	34	58	8	6
2005-06	0	0	37	63	–
2006-07	0	2	95	3	–
2007-08	0	13	87	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	406	314	77	0	0	0	23
1978-79	29	28	0	0	97	0	3
1979-80	86	85	84	3	12	0	1
1980-81	1	0	0	0	0	0	100
1981-82	1	0	0	0	0	0	100
1982-83	1	1	0	0	100	0	0
1983-84	502	498	0	55	45	0	1
1984-85	244	241	0	36	62	0	1
1985-86	800	797	6	71	23	0	0
1986-87	101	101	0	43	57	0	0
1987-88	226	220	0	85	12	0	3
1988-89	31	27	10	55	23	13	0
1989-90	164	161	6	92	0	0	2
1990-91	156	150	16	79	1	0	4
1991-92	474	466	34	61	3	1	0
1992-93	356	336	29	64	1	5	0
1993-94	226	209	61	23	9	6	1
1994-95	172	163	85	7	3	4	1
1995-96	341	317	64	14	14	7	0
1996-97	535	531	51	39	10	0	1
1997-98	263	249	59	34	1	5	1
1998-99	410	404	60	31	7	0	1
1999-00	496	460	31	58	3	0	7
2000-01	399	393	73	19	7	1	1
2001-02	760	750	64	29	5	0	1
2002-03	566	563	83	12	4	0	1
2003-04	338	334	66	19	14	0	1
2004-05	173	173	62	32	6	0	0
2005-06	64	63	83	16	0	0	2
2006-07	136	135	41	38	21	0	1
2007-08	109	109	61	9	30	0	0

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

	Catch (t)		
	OEO	SSO	BOE
1977-78	2 747	0	0
1978-79	0	13	113
1979-80	410	1	67
1980-81	0	0	0
1981-82	0	0	0
1982-83	0	0	0
1983-84	0	1 268	2 106
1984-85	0	883	1 004
1985-86	0	4 244	1 058
1986-87	0	156	148
1987-88	0	915	138
1988-89	0	196	69
1989-90	0	586	187
1990-91	1	661	389
1991-92	150	3 454	1 182
1992-93	234	860	238
1993-94	43	632	228
1994-95	5	456	389
1995-96	113	1 087	744
1996-97	23	610	1 625
1997-98	10	663	251
1998-99	1	1 050	404
1999-00	0	978	440
2000-01	0	1 773	152
2001-02	10	2 235	518
2002-03	1	1 659	491
2003-04	6	741	343
2004-05	0	405	80
2005-06	0	249	77
2006-07	0	277	255
2007-08	0	283	93

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1977–78	6.59	314	–	0	–	0	6.59	314
1978–79	–	0	–	0	3.91	28	4.39	28
1979–80	6.59	72	0.19	3	0.20	10	5.61	85
1980–81	–	0	–	0	–	0	–	0
1981–82	–	0	–	0	–	0	–	0
1982–83	–	0	–	0	0	1	0	1
1983–84	–	0	3.37	274	5.69	224	6.75	498
1984–85	–	0	6.71	89	5.47	152	7.81	241
1985–86	3.68	51	6.83	566	3.48	180	6.65	797
1986–87	–	0	1.74	43	2.26	58	3.02	101
1987–88	–	0	4.57	192	2.39	28	4.76	220
1988–89	0.12	3	7.51	17	7.09	7	7.32	27
1989–90	8.61	10	3.85	151	–	0	4.80	161
1990–91	10.02	25	4.98	124	0	1	6.99	150
1991–92	9.27	163	8.97	291	4.27	12	10.17	466
1992–93	4.69	105	2.69	229	4.28	2	3.66	336
1993–94	4.94	138	2.07	51	1.69	20	4.16	209
1994–95	5.54	146	1.22	12	1.40	5	5.20	163
1995–96	6.57	219	2.13	49	5.36	49	5.87	317
1996–97	4.25	273	1.61	206	4.24	52	4.24	531
1997–98	3.32	156	2.59	90	4.67	3	3.32	249
1998–99	3.59	248	2.57	129	1.20	27	3.57	404
1999–00	2.84	155	2.36	289	1.08	16	2.98	460
2000–01	5.76	290	1.71	76	2.25	27	4.86	393
2001–02	3.69	489	2.48	221	2.57	40	3.65	750
2002–03	3.57	469	4.95	70	3.31	24	3.81	563
2003–04	2.98	223	2.67	65	3.91	46	3.25	334
2004–05	2.66	107	2.84	55	1.75	11	2.80	173
2005–06	5.94	53	0.22	10	–	0	5.16	63
2006–07	2.69	56	2.29	51	3.61	28	3.87	135
2007–08	4.49	66	3.66	10	0.54	33	3.45	109

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

	NZ	JAP	UKR
1983–84	0	100	0
1984–85	0	0	0
1985–86	0	100	0
1986–87	0	100	0
1987–88	0	0	0
1988–89	0	0	0
1989–90	100	0	0
1990–91	100	0	0
1991–92	100	0	0
1992–93	100	0	0
1993–94	100	0	0
1994–95	100	0	0
1995–96	100	0	0
1996–97	100	0	0
1997–98	100	0	0
1998–99	100	0	0
1999–00	100	0	0
2000–01	100	0	0
2001–02	100	0	0
2002–03	100	0	0
2003–04	0	0	100
2004–05	13	0	87
2005–06	100	0	0
2006–07	0	0	100
2007–08	0	0	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1983–84	0	0	0	100	–
1984–85	0	0	0	0	0
1985–86	0	0	100	0	–
1986–87	100	0	0	0	–
1987–88	0	0	0	0	0
1988–89	0	0	0	0	0
1989–90	0	0	100	0	–
1990–91	0	1	99	0	–
1991–92	0	45	55	0	12
1992–93	0	67	16	18	12
1993–94	0	14	61	25	6
1994–95	0	13	87	0	–
1995–96	0	53	47	0	6
1996–97	0	19	81	0	5
1997–98	0	100	0	0	–
1998–99	0	99	0	1	–
1999–00	0	100	0	0	–
2000–01	0	99	1	0	–
2001–02	0	0	0	100	–
2002–03	0	0	100	0	–
2003–04	0	0	0	100	–
2004–05	0	0	13	87	–
2005–06	0	0	100	0	–
2006–07	0	0	0	100	–
2007–08	0	0	0	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
2003-04	66	66	100	0	0	0	0
2004-05	77	61	78	1	0	21	0
2005-06	41	2	0	5	0	95	0
2006-07	11	11	100	0	0	0	0
2007-08	0	0	0	0	0	0	0

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

	Catch (t)		
	OEO	SSO	BOE
1983-84	0	0	0
1984-85	0	0	0
1985-86	0	0	0
1986-87	0	0	0
1987-88	0	0	0
1988-89	0	0	0
1989-90	0	178	660
1990-91	15	403	1 687
1991-92	147	477	1 806
1992-93	271	417	1 214
1993-94	18	1 022	884
1994-95	0	459	69
1995-96	0	445	165
1996-97	3	244	126
1997-98	19	0	0
1998-99	6	190	0
1999-00	0	168	154
2000-01	0	246	2
2001-02	0	0	0
2002-03	0	0	0
2003-04	0	121	150
2004-05	0	110	111
2005-06	0	84	23
2006-07	0	10	7
2007-08	0	0	0

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1989–90	–	0	0.50	6	–	0	0.50	6
1990–91	13.50	56	0.53	22	8.35	81	10.40	159
1991–92	0	2	0.86	44	4.81	8	3.66	54
1992–93	2.98	69	1.95	42	7.29	32	4.69	143
1993–94	5.41	17	0.50	3	–	0	4.75	20
1994–95	4.57	48	–	0	–	0	4.57	48
1995–96	7.75	43	0.28	8	–	0	6.73	51
1996–97	6.60	43	–	0	–	0	6.60	43
1997–98	4.62	4	–	0	–	0	4.62	4
1998–99	17.74	11	–	0	–	0	17.74	11
1999–00	7.58	25	1.61	59	–	0	3.84	84
2000–01	–	0	7.64	32	–	0	7.69	32
2001–02	–	0	–	0	–	0	–	0
2002–03	–	0	–	0	–	0	–	0
2003–04	4.10	66	–	0	–	0	4.10	66
2004–05	3.23	60	6.31	1	–	0	3.28	61
2005–06	–	0	4.83	2	–	0	4.83	2
2006–07	1.54	11	–	0	–	0	1.54	11
2007–08	–	0	–	0	–	0	–	0

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

	NZ	UKR
1990–91	100	0
1991–92	100	0
1992–93	100	0
1993–94	100	0
1994–95	100	0
1995–96	100	0
1996–97	100	0
1997–98	100	0
1998–99	100	0
1999–00	100	0
2000–01	100	0
2001–02	100	0
2002–03	100	0
2003–04	0	100
2004–05	78	22
2005–06	100	0
2006–07	0	100
2007–08	100	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1990–91	0	0	100	0	–
1991–92	0	43	57	0	–
1992–93	0	30	62	8	5
1993–94	0	9	46	45	6
1994–95	0	22	76	2	5
1995–96	0	46	54	0	4
1996–97	0	18	82	0	–
1997–98	0	66	34	0	4
1998–99	0	64	36	0	5
1999–00	0	10	90	0	–
2000–01	0	0	100	0	–
2001–02	0	90	10	1	4
2002–03	0	15	85	0	4
2003–04	0	0	0	100	–
2004–05	0	0	78	22	4
2005–06	0	0	100	0	–
2006–07	0	0	0	100	–
2007–08	0	97	3	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	73	73	100	0	0	0	0
2003–04	3	3	100	0	0	0	0
2004–05	18	14	78	0	0	22	0
2005–06	25	25	100	0	0	0	0
2006–07	3	3	100	0	0	0	0
2007–08	180	179	0	1	99	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	77	66
2003-04	0	1	3
2004-05	0	13	15
2005-06	0	16	67
2006-07	0	4	4
2007-08	0	19	330

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1990-91	19.50	8	0.09	2	-	0	15.64	10
1991-92	-	0	8.08	9	-	0	17.65	9
1992-93	6.98	143	1.55	38	7.52	63	7.93	244
1993-94	10.32	53	3.96	10	2.90	5	9.19	68
1994-95	5.33	33	-	0	1.26	3	5.00	36
1995-96	9.17	47	0.91	12	2.92	4	7.43	63
1996-97	9.78	61	0.17	6	3.00	1	9.20	68
1997-98	2.76	47	2.02	11	2.00	3	2.68	61
1998-99	5.24	58	4.37	19	1.64	8	4.96	85
1999-00	3.36	53	3.46	60	2.00	5	4.55	118
2000-01	2.24	61	-	0	3.15	3	2.31	64
2001-02	5.93	55	1.31	9	4.25	2	5.53	66
2002-03	1.96	73	-	0	-	0	1.96	73
2003-04	1.30	3	-	0	-	0	1.30	3
2004-05	1.76	14	-	0	-	0	1.76	14
2005-06	3.31	25	-	0	-	0	3.31	25
2006-07	2.33	3	-	0	-	0	2.33	3
2007-08	-	0	0.1	1	1.85	178	1.95	179

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

	NZ	JAP	RUS
1980-81	0	0	100
1981-82	0	11	89
1982-83	89	11	0
1983-84	100	0	0
1984-85	100	0	0
1985-86	100	0	0
1986-87	100	0	0
1987-88	100	0	0
1988-89	100	0	0
1989-90	100	0	0
1990-91	100	0	0
1991-92	100	0	0
1992-93	100	0	0
1993-94	100	0	0
1994-95	100	0	0
1995-96	100	0	0
1996-97	100	0	0
1997-98	100	0	0
1998-99	100	0	0
1999-00	100	0	0
2000-01	100	0	0
2001-02	100	0	0
2002-03	100	0	0
2003-04	100	0	0
2004-05	100	0	0
2005-06	100	0	0
2006-07	100	0	0
2007-08	100	0	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1980–81	0	100	0	0	–
1981–82	0	0	0	100	–
1982–83	0	19	71	11	7
1983–84	0	100	0	0	6
1984–85	0	100	0	0	7
1085–86	0	100	0	0	6
1986–87	0	100	0	0	5
1987–88	0	100	0	0	4
1988–89	0	100	0	0	5
1989–90	0	99	1	0	6
1990–91	0	100	0	0	7
1991–92	0	100	0	0	7
1992–93	0	100	0	0	6
1993–94	0	100	0	0	11
1994–95	0	100	0	0	9
1995–96	0	100	0	0	7
1996–97	0	99	1	0	9
1997–98	0	100	0	0	6
1998–99	0	100	0	0	7
1999–00	0	100	0	0	5
2000–01	0	100	0	0	4
2001–02	0	100	0	0	6
2002–03	0	100	0	0	5
2003–04	0	100	0	0	4
2004–05	0	100	0	0	5
2005–06	0	100	0	0	4
2006–07	0	100	0	0	4
2007–08	0	100	0	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1980-81	1	0	0	0	0	0	100
1981-82	48	0	0	0	0	100	0
1982-83	137	1	1	0	0	79	20
1983-84	956	0	0	0	0	93	7
1984-85	472	6	0	1	0	95	4
1985-86	75	20	0	27	0	64	9
1986-87	165	1	1	0	0	68	31
1987-88	76	0	0	0	0	86	14
1988-89	80	2	0	3	0	94	4
1989-90	122	58	0	48	0	48	5
1990-91	193	33	5	12	0	78	5
1991-92	320	22	1	6	0	89	4
1992-93	308	43	0	14	0	84	2
1993-94	288	10	0	3	0	77	19
1994-95	250	14	0	5	0	90	4
1995-96	181	62	22	12	0	58	8
1996-97	155	78	39	12	0	25	25
1997-98	160	101	51	13	0	31	6
1998-99	136	50	23	14	0	51	12
1999-00	163	68	17	25	0	49	9
2000-01	236	168	28	43	0	25	4
2001-02	122	102	56	28	0	12	4
2002-03	122	84	17	52	0	23	8
2003-04	54	37	13	56	0	24	7
2004-05	86	30	8	27	0	48	17
2005-06	75	20	13	13	0	53	20
2006-07	58	6	0	9	2	78	12
2007-08	69	3	0	4	0	77	19

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

	Catch (t)		
	OEO	SSO	BOE
1980-81	0	1	0
1981-82	0	24	0
1982-83	151	28	1
1983-84	158	51	0
1984-85	13	62	4
1985-86	0	45	0
1986-87	0	74	2
1987-88	0	27	1
1988-89	0	25	1
1989-90	0	180	0
1990-91	2	138	9
1991-92	2	112	15
1992-93	2	138	1
1993-94	13	85	11
1994-95	8	88	2
1995-96	9	59	1
1996-97	9	34	5
1997-98	3	82	1
1998-99	0	70	3
1999-00	2	129	6
2000-01	15	813	42
2001-02	0	344	9
2002-03	0	332	8
2003-04	0	69	0
2004-05	1	71	2
2005-06	11	13	0
2006-07	1	16	0
2007-08	0	20	0

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1982–83	1.07	1	–	0	–	0	1.07	1
1983–84	–	0	–	0	–	0	–	0
1984–85	–	0	1.32	6	–	0	1.32	6
1985–86	–	0	1.38	20	–	0	1.38	20
1986–87	0.02	1	–	0	–	0	0.02	1
1987–88	–	0	–	0	–	0	–	0
1988–89	–	0	0.45	2	–	0	0.45	2
1989–90	–	0	1.68	58	–	0	1.68	58
1990–91	0.45	9	1.93	24	–	0	1.53	33
1991–92	0.20	2	0.90	20	–	0	0.84	22
1992–93	–	0	0.86	43	–	0	0.86	43
1993–94	–	0	0.34	10	–	0	0.34	10
1994–95	0.10	1	0.56	13	–	0	0.53	14
1995–96	0.49	40	0.47	22	–	0	0.50	62
1996–97	0.26	60	0.70	18	–	0	0.39	78
1997–98	0.37	81	1.51	20	–	0	0.06	101
1998–99	0.82	31	0.56	19	–	0	0.74	50
1999–00	1.12	28	2.11	40	–	0	1.72	68
2000–01	8.09	66	3.16	102	–	0	5.12	168
2001–02	3.65	68	2.60	34	–	0	3.39	102
2002–03	3.86	21	4.01	63	–	0	3.97	84
2003–04	0.61	7	1.97	30	–	0	1.71	37
2004–05	0.05	7	2.86	23	–	0	2.22	30
2005–06	0.51	10	0.51	10	–	0	0.52	20
2006–07	–	0	0.53	5	0	1	0.53	6
2007–08	–	0	0.77	3	–	0	0.77	3

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

	UN	AUS	BZE	DOM	JAP	KOR	NOR	PAN	RUS
1977-78	0	0	0	0	0	100	0	0	0
1978-79	58	0	0	0	40	1	0	0	0
1979-80	0	0	0	0	99	1	0	0	0
1980-81	0	0	0	0	88	12	0	0	0
1981-82	0	0	0	0	18	1	0	0	80
1982-83	0	0	0	99	0	1	0	0	0
1983-84	0	0	0	10	3	0	0	0	87
1984-85	0	0	0	80	20	0	0	0	0
1985-86	0	0	0	100	0	0	0	0	0
1986-87	0	0	0	98	1	1	0	0	0
1987-88	0	0	0	53	47	0	0	0	0
1988-89	0	0	0	98	1	0	0	0	0
1989-90	0	0	0	94	0	6	0	0	0
1990-91	0	0	0	88	1	0	11	0	0
1991-92	0	0	0	100	0	0	0	0	0
1992-93	0	0	0	98	0	0	2	0	0
1993-94	0	0	0	100	0	0	0	0	0
1994-95	0	0	0	100	0	0	0	0	0
1995-96	0	0	0	100	0	0	0	0	0
1996-97	0	0	0	100	0	0	0	0	0
1997-98	0	0	0	100	0	0	0	0	0
1998-99	0	0	0	99	0	0	0	1	0
1999-00	0	0	0	100	0	0	0	0	0
2000-01	0	0	0	100	0	0	0	0	0
2001-02	0	0	0	88	0	0	0	11	0
2002-03	0	4	0	96	0	0	0	0	0
2003-04	0	36	0	64	0	0	0	0	0
2004-05	0	0	2	98	0	0	0	0	0
2005-06	0	0	0	100	0	0	0	0	0
2006-07	0	0	0	100	0	0	0	0	0
2007-08	0	0	0	100	0	0	0	0	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	0	100	0	0	–
1978–79	58	1	40	0	5
1979–80	0	1	99	0	–
1980–81	0	12	70	18	–
1981–82	0	1	17	82	–
1982–83	0	100	0	0	–
1983–84	0	10	0	90	4
1984–85	0	80	0	20	13
1985–86	0	97	3	0	8
1986–87	0	99	0	1	10
1987–88	0	99	1	0	10
1988–89	0	58	41	1	13
1989–90	0	46	54	0	9
1990–91	0	53	47	1	12
1991–92	0	77	23	0	7
1992–93	0	97	3	0	13
1993–94	0	85	0	14	14
1994–95	0	97	3	0	13
1995–96	0	95	5	0	9
1996–97	0	83	17	0	10
1997–98	0	94	6	0	9
1998–99	0	86	14	1	10
1999–00	0	100	0	0	9
2000–01	0	70	30	0	5
2001–02	0	27	62	11	7
2002–03	0	98	2	0	6
2003–04	0	90	10	0	7
2004–05	0	86	14	0	8
2005–06	0	100	0	0	7
2006–07	0	95	0	5	6
2007–08	0	100	0	0	5

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	11	0	0	0	0	0	100
1978-79	189	0	0	0	0	0	100
1979-80	186	0	0	0	0	0	100
1980-81	9	0	0	0	0	0	100
1981-82	95	0	0	0	0	6	94
1982-83	20	0	0	0	0	30	70
1983-84	230	2	0	1	0	71	28
1984-85	368	0	0	0	0	55	45
1985-86	293	11	0	3	0	83	13
1986-87	255	0	0	0	0	84	16
1987-88	304	2	0	1	0	83	16
1988-89	103	11	1	7	3	69	20
1989-90	63	8	3	10	0	84	3
1990-91	93	5	1	4	0	88	6
1991-92	108	1	1	0	0	94	5
1992-93	156	3	1	1	0	94	4
1993-94	256	3	1	0	0	89	9
1994-95	224	1	0	0	0	77	22
1995-96	179	62	34	1	0	47	18
1996-97	333	190	39	18	0	32	11
1997-98	183	76	36	6	0	49	9
1998-99	160	37	6	17	1	66	11
1999-00	252	33	3	10	0	75	12
2000-01	317	38	0	9	3	82	6
2001-02	129	1	0	1	0	87	12
2002-03	146	22	3	12	0	66	19
2003-04	112	25	21	2	0	70	8
2004-05	124	2	0	2	0	72	27
2005-06	104	4	1	3	0	70	26
2006-07	80	0	0	0	0	90	10
2007-08	59	0	0	0	0	97	3

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

	Catch (t)		
	OEO	SSO	BOE
1977-78	1	0	0
1978-79	0	0	11
1979-80	0	0	5
1980-81	0	0	0
1981-82	0	7	6
1982-83	7	0	0
1983-84	6	28	23
1984-85	8	14	8
1985-86	4	55	6
1986-87	0	38	3
1987-88	1	21	3
1988-89	7	32	16
1989-90	0	66	6
1990-91	1	41	27
1991-92	1	113	40
1992-93	8	89	17
1993-94	13	94	11
1994-95	11	7	45
1995-96	9	119	1
1996-97	54	693	3
1997-98	4	121	2
1998-99	2	165	15
1999-00	10	164	12
2000-01	0	344	5
2001-02	1	34	3
2002-03	0	238	2
2003-04	0	13	1
2004-05	0	14	2
2005-06	2	5	1
2006-07	1	3	0
2007-08	0	3	0

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

	OEO	n	SSO	n	BOE	n	All OEO	n
1983–84	–	0	12.04	2	–	0	18.68	2
1984–85	–	0	–	0	–	0	–	0
1985–86	–	0	0.27	10	0.38	1	0.37	11
1986–87	–	0	–	0	–	0	–	0
1987–88	–	0	0.69	2	–	0	0.69	2
1988–89	9.30	1	1.35	7	2.79	3	2.54	11
1989–90	5.70	2	1.50	6	–	0	2.63	8
1990–91	8.00	1	1.45	4	–	0	3.36	5
1991–92	0.30	1	–	0	–	0	0.30	1
1992–93	6.00	2	0.72	1	–	0	4.24	3
1993–94	2.30	2	0	1	–	0	1.87	3
1994–95	1.00	1	–	0	–	0	1	1
1995–96	1.06	61	22.00	1	–	0	1.40	62
1996–97	1.11	131	9.73	59	–	0	3.78	190
1997–98	0.49	65	7.23	11	–	0	1.47	76
1998–99	2.25	9	4.55	27	10.00	1	4.14	37
1999–00	0.68	7	5.64	26	–	0	4.89	33
2000–01	30.00	1	6.71	29	0.44	8	6.00	38
2001–02	–	0	0.60	1	–	0	0.60	1
2002–03	20.98	4	5.41	18	–	0	8.24	22
2003–04	0	23	0	2	–	0	0	25
2004–05	–	0	0.42	2	–	0	0.42	2
2005–06	0.02	1	0.78	3	–	0	0.59	4
2006–07	–	0	–	0	–	0	–	0
2007–08	–	0	–	0	–	0	–	0

Table 30: Auckland Island hills. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 & 25 for abbreviations.

	BZE	NZ	RUS
1981–82	0	0	100
1982–83	0	0	0
1983–84	0	0	0
1984–85	0	0	0
1985–86	0	0	100
1986–87	0	0	0
1987–88	0	0	0
1988–89	0	0	0
1989–90	0	0	0
1990–91	0	100	0
1991–92	0	0	0
1992–93	0	100	0
1993–94	0	100	0
1994–95	0	100	0
1995–96	0	100	0
1996–97	0	100	0
1997–98	0	100	0
1998–99	1	99	0
1999–00	0	100	0
2000–01	0	100	0
2001–02	0	100	0
2002–03	0	100	0
2003–04	0	100	0
2004–05	0	100	0
2005–06	0	100	0
2006–07	0	100	0
2007–08	0	100	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1981–82	0	0	0	100	–
1982–83	0	0	0	0	0
1983–84	0	0	0	0	0
1984–85	0	0	0	0	0
1985–86	0	0	0	100	–
1986–87	0	0	0	0	0
1987–88	0	0	0	0	0
1988–89	0	0	0	0	0
1989–90	0	0	0	0	0
1990–91	0	0	100	0	–
1991–92	0	0	0	0	0
1992–93	0	15	0	85	–
1993–94	0	11	0	88	–
1994–95	0	56	44	0	4
1995–96	0	100	0	0	4
1996–97	0	74	4	22	6
1997–98	0	68	31	0	4
1998–99	0	22	78	0	5
1999–00	0	2	98	1	–
2000–01	0	0	100	0	–
2001–02	0	1	98	0	–
2002–03	0	0	99	0	–
2003–04	0	0	96	4	–
2004–05	0	0	100	0	–
2005–06	0	0	100	0	–
2006–07	0	0	100	0	–
2007–08	0	0	100	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1981-82	6	5	0	50	33	0	17
1982-83	0	0	0	0	0	0	0
1983-84	0	0	0	0	0	0	0
1984-85	0	0	0	0	0	0	0
1985-86	3	2	0	0	67	0	33
1986-87	0	0	0	0	0	0	0
1987-88	0	0	0	0	0	0	0
1988-89	0	0	0	0	0	0	0
1989-90	0	0	0	0	0	0	0
1990-91	2	0	0	0	0	100	0
1991-92	0	0	0	0	0	0	0
1992-93	68	54	0	79	0	18	3
1993-94	103	9	0	9	0	91	0
1994-95	260	166	33	31	0	36	0
1995-96	177	29	5	11	0	84	0
1996-97	109	24	11	11	0	78	0
1997-98	153	23	15	0	0	85	0
1998-99	218	77	29	6	0	64	0
1999-00	168	90	45	8	0	44	2
2000-01	81	34	27	15	0	58	0
2001-02	85	43	40	11	0	49	0
2002-03	97	73	66	9	0	25	0
2003-04	58	41	67	3	0	28	2
2004-05	12	8	50	17	0	33	0
2005-06	6	6	100	0	0	0	0
2006-07	5	5	100	0	0	0	0
2007-08	47	29	0	62	0	38	0

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

	Catch (t)		
	OEO	SSO	BOE
1981-82	0	10	35
1982-83	0	0	0
1983-84	0	0	0
1984-85	0	0	0
1985-86	0	30	2
1986-87	0	0	0
1987-88	0	0	0
1988-89	0	0	0
1989-90	0	0	0
1990-91	0	0	0
1991-92	0	0	0
1992-93	0	315	0
1993-94	28	274	1
1994-95	0	555	4
1995-96	0	508	1
1996-97	10	267	0
1997-98	5	318	3
1998-99	0	658	1
1999-00	0	552	0
2000-01	0	200	0
2001-02	0	365	1
2002-03	0	268	0
2003-04	0	198	0
2004-05	0	42	0
2005-06	0	14	0
2006-07	0	9	0
2007-08	0	198	0

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1981–82	–	0	3.33	3	15	2	9	5
1982–83	–	0	–	0	–	0	–	0
1983–84	–	0	–	0	–	0	–	0
1984–85	–	0	–	0	–	0	–	0
1985–86	–	0	–	0	0.37	2	15.18	2
1986–87	–	0	–	0	–	0	–	0
1987–88	–	0	–	0	–	0	–	0
1988–89	–	0	–	0	–	0	–	0
1989–90	–	0	–	0	–	0	–	0
1990–91	–	0	–	0	–	0	–	0
1991–92	–	0	–	0	–	0	–	0
1992–93	–	0	4.56	54	–	0	4.56	54
1993–94	–	0	4.03	9	–	0	4.03	9
1994–95	1.58	85	1.04	81	–	0	1.32	166
1995–96	2.28	9	2.88	20	–	0	2.69	29
1996–97	0.80	12	6.34	12	–	0	3.57	24
1997–98	2.14	23	–	0	–	0	2.14	23
1998–99	3.43	64	1.06	13	–	0	3.03	77
1999–00	3.31	76	2.34	14	–	0	3.16	90
2000–01	5.02	22	0.85	12	–	0	3.55	34
2001–02	4.30	34	10.39	9	–	0	5.57	43
2002–03	3.50	64	2.47	9	–	0	3.38	73
2003–04	3.13	39	14.50	2	–	0	3.69	41
2004–05	5.38	6	0.20	2	–	0	4.09	8
2005–06	2.25	6	–	0	–	0	2.25	6
2006–07	1.84	5	–	0	–	0	1.84	5
2007–08	–	0	6.37	29	–	0	6.37	29

Table 35: Bounty Plateau. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 & 25 for abbreviations.

	UN	BZE	NZ	JAP	RUS	UKR
1980-81	13	0	0	0	87	0
1981-82	0	0	0	0	0	0
1982-83	0	0	0	0	0	0
1983-84	0	0	0	0	100	0
1984-85	0	0	0	0	0	0
1985-86	0	0	0	0	0	0
1986-87	0	0	0	0	0	0
1987-88	0	0	0	100	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	100	0	0	0
1990-91	0	0	100	0	0	0
1991-92	0	0	0	0	0	0
1992-93	0	0	100	0	0	0
1993-94	0	0	100	0	0	0
1994-95	0	0	100	0	0	0
1995-96	0	0	100	0	0	0
1996-97	0	0	100	0	0	0
1997-98	0	0	100	0	0	0
1998-99	0	18	82	0	0	0
1999-00	0	0	100	0	0	0
2000-01	0	0	100	0	0	0
2001-02	0	0	100	0	0	0
2002-03	0	0	100	0	0	0
2003-04	0	0	98	0	0	2
2004-05	0	0	99	0	0	1
2005-06	0	0	92	0	0	8
2006-07	0	0	100	0	0	0
2007-08	0	0	100	0	0	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1980–81	UN				
1981–82	0	0	0	100	–
1982–83	0	0	0	0	–
1983–84	0	0	0	0	–
1984–85	0	0	0	100	4
1985–86	0	0	0	0	–
1986–87	0	0	0	0	–
1987–88	0	0	0	0	–
1988–89	0	0	0	100	–
1989–90	0	0	100	0	–
1990–91	0	0	100	0	–
1991–92	0	0	0	0	–
1992–93	0	0	100	0	–
1993–94	0	13	0	87	–
1994–95	0	23	77	0	6
1995–96	0	77	23	0	4
1996–97	0	64	36	0	–
1997–98	0	49	30	21	6
1998–99	0	41	59	0	9
1999–00	0	41	59	0	4
2000–01	0	26	74	0	5
2001–02	0	5	95	0	4
2002–03	0	7	93	0	5
2003–04	0	3	94	2	5
2004–05	0	0	99	1	5
2005–06	0	0	92	8	4
2006–07	0	5	95	0	4
2007–08	0	0	100	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1980-81	8	8	38	62	0	0	0
1981-82	0	0	0	0	0	0	0
1982-83	2	2	0	0	100	0	0
1983-84	60	59	0	43	55	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	1	0	0	0	0	0	100
1990-91	7	7	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	172	162	94	0	0	6	0
1997-98	211	130	40	21	0	38	0
1998-99	344	253	20	53	1	26	0
1999-00	148	109	42	32	0	26	1
2000-01	136	95	33	37	0	30	0
2001-02	152	130	11	74	0	13	1
2002-03	278	231	62	22	0	17	0
2003-04	274	245	75	15	0	11	0
2004-05	432	410	57	38	0	5	0
2005-06	361	334	57	36	0	7	0
2006-07	220	212	39	56	1	4	0
2007-08	97	95	34	63	1	1	1

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

	Catch (t)		
	OEO	SSO	BOE
1980–81	3	0	0
1981–82	0	0	0
1982–83	0	0	0
1983–84	0	534	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	55	544	8
1998–99	0	1 072	12
1999–00	0	794	1
2000–01	0	492	2
2001–02	0	931	1
2002–03	48	1 366	2
2003–04	53	1 244	7
2004–05	0	2 085	15
2005–06	0	1 639	50
2006–07	0	595	6
2007–08	0	322	0

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1980–81	1.07	3	0.1	5	–	0	0.46	8
1981–82	–	0	–	0	–	0	–	0
1982–83	–	0	–	0	0	2	0	2
1983–84	–	0	15.11	26	15.63	33	19.44	59
1984–85	–	0	–	0	–	0	–	0
1985–86	–	0	0	1	0	1	0	2
1986–87	–	0	–	0	–	0	–	0
1987–88	–	0	8.84	2	–	0	8.84	2
1988–89	–	0	–	0	–	0	–	0
1989–90	–	0	–	0	–	0	–	0
1990–91	–	0	2.92	7	–	0	14.08	7
1991–92	–	0	–	0	–	0	–	0
1992–93	8.1	10	–	0	–	0	8.1	10
1993–94	55	1	16.61	23	–	0	18.21	24
1994–95	11.19	68	5.67	87	–	0	8.09	155
1995–96	5.28	119	14.11	8	–	0	5.86	127
1996–97	3.45	162	–	0	–	0	3.45	162
1997–98	1.55	85	2.56	45	–	0	1.9	130
1998–99	6.77	70	2.18	181	1.25	2	3.47	253
1999–00	5.56	62	8.11	47	–	0	6.66	109
2000–01	3.51	45	3.86	50	–	0	3.7	95
2001–02	3.31	17	6.44	113	–	0	6.04	130
2002–03	4.96	171	8.55	60	–	0	5.89	231
2003–04	5.03	205	6.19	40	–	0	5.22	245
2004–05	4.9	247	5.35	163	–	0	5.09	410
2005–06	4.23	204	5.96	130	–	0	4.9	334
2006–07	2.24	85	3.21	124	0.17	3	2.79	212
2007–08	2.78	33	3.74	61	0	1	3.39	95

Table 40: Pukaki Rise. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 & 25 for abbreviations.

	UN	DOM	JAP	KOR	NOR	RUS	UKR
1978-79	26	0	0	0	0	74	0
1979-80	0	0	0	0	0	100	0
1980-81	68	0	0	0	0	32	0
1981-82	19	0	0	0	0	81	0
1982-83	0	0	0	0	0	100	0
1983-84	0	0	0	37	0	63	0
1984-85	0	0	1	77	0	22	0
1985-86	0	0	0	67	0	33	0
1986-87	0	0	0	0	0	0	0
1987-88	0	0	100	0	0	0	0
1988-89	0	100	0	0	0	0	0
1989-90	0	50	0	0	50	0	0
1990-91	0	99	0	0	1	0	0
1991-92	0	96	0	0	4	0	0
1992-93	0	99	0	0	1	0	0
1993-94	0	39	0	0	61	0	0
1994-95	0	100	0	0	0	0	0
1995-96	19	81	0	0	0	0	0
1996-97	0	100	0	0	0	0	0
1997-98	1	99	0	0	0	0	0
1998-99	0	100	0	0	0	0	0
1999-00	0	100	0	0	0	0	0
2000-01	0	100	0	0	0	0	0
2001-02	0	100	0	0	0	0	0
2002-03	0	100	0	0	0	0	0
2003-04	0	95	0	0	0	0	5
2004-05	0	98	0	1	0	0	2
2005-06	0	100	0	0	0	0	0
2006-07	0	99	0	0	0	0	1
2007-08	0	100	0	0	0	0	0

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1978–79	0	0	0	100	–
1979–80	0	0	0	100	–
1980–81	0	1	0	99	8
1981–82	0	0	0	100	5
1982–83	0	0	0	100	6
1983–84	0	37	0	63	9
1984–85	0	77	0	23	5
1985–86	0	67	0	33	–
1986–87	0	0	0	0	–
1987–88	0	0	0	100	–
1988–89	0	100	0	0	–
1989–90	0	42	58	0	–
1990–91	0	57	43	0	–
1991–92	0	0	100	0	–
1992–93	0	43	57	0	5
1993–94	0	40	0	60	–
1994–95	0	0	100	0	–
1995–96	0	7	74	19	–
1996–97	0	24	66	11	6
1997–98	0	16	76	8	6
1998–99	0	37	63	0	8
1999–00	0	65	35	0	5
2000–01	0	32	68	0	6
2001–02	0	26	74	0	5
2002–03	0	25	75	0	5
2003–04	0	12	83	6	6
2004–05	0	10	78	12	8
2005–06	0	5	95	0	6
2006–07	0	1	98	1	4
2007–08	0	0	100	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1978-79	15	8	27	0	27	0	47
1979-80	2	0	0	0	0	0	100
1980-81	596	580	4	1	93	0	3
1981-82	481	479	12	3	84	0	0
1982-83	109	109	0	0	100	0	0
1983-84	172	164	4	34	57	1	4
1984-85	299	215	0	3	69	0	28
1985-86	28	28	0	14	86	0	0
1986-87	0	0	0	0	0	0	0
1987-88	14	14	0	100	0	0	0
1988-89	1	0	0	0	0	100	0
1989-90	6	4	0	67	0	0	33
1990-91	9	3	11	22	0	11	56
1991-92	6	0	0	0	0	33	67
1992-93	20	6	20	5	5	45	25
1993-94	3	1	33	0	0	0	67
1994-95	37	31	78	5	0	5	11
1995-96	347	94	22	5	0	67	6
1996-97	612	100	14	2	0	83	0
1997-98	606	417	57	6	7	30	1
1998-99	486	429	67	12	9	12	0
1999-00	695	663	49	32	15	4	0
2000-01	753	725	44	45	7	2	1
2001-02	533	511	79	7	10	2	2
2002-03	693	679	66	14	19	1	1
2003-04	731	706	79	10	7	3	0
2004-05	831	733	61	23	4	12	0
2005-06	909	829	77	11	3	9	0
2006-07	1 107	989	49	19	21	10	1
2007-08	1 167	1069	23	13	55	8	0

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

	Catch (t)		
	OEO	SSO	BOE
1978-79	6	0	15
1979-80	0	0	0
1980-81	62	2	3 151
1981-82	0	41	1 841
1982-83	0	0	423
1983-84	0	555	997
1984-85	0	309	1 548
1985-86	0	14	46
1986-87	0	0	0
1987-88	0	232	0
1988-89	0	0	0
1989-90	0	0	0
1990-91	0	12	16
1991-92	0	1	14
1992-93	0	51	20
1993-94	0	2	8
1994-95	0	119	210
1995-96	0	1 174	1 151
1996-97	53	1 493	1 898
1997-98	104	1 194	1 920
1998-99	0	1 225	1 055
1999-00	4	2 069	981
2000-01	3	2 309	1 048
2001-02	0	1 921	939
2002-03	1	1 236	1 557
2003-04	0	1 518	1 387
2004-05	0	1 303	1 521
2005-06	1	1 345	2 585
2006-07	0	1 592	3 063
2007-08	0	1 112	2 950

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1978–79	1.34	4	–	0	0	4	0.67	8
1979–80	–	0	–	0	–	0	–	0
1980–81	2.83	22	0.26	5	5.59	553	5.44	580
1981–82	2.40	59	1.24	14	4.14	406	3.92	479
1982–83	–	0	–	0	3.88	109	3.88	109
1983–84	1.84	7	5.09	59	6.78	98	9.35	164
1984–85	–	0	1.08	10	3.65	205	4.00	215
1985–86	–	0	0.70	4	1.86	24	2.13	28
1986–87	–	0	–	0	–	0	–	0
1987–88	–	0	16.54	14	–	0	16.54	14
1988–89	–	0	–	0	–	0	–	0
1989–90	–	0	0.04	4	–	0	0.04	4
1990–91	11.4	1	3.25	2	–	0	7.48	3
1991–92	–	0	–	0	–	0	–	0
1992–93	9.50	4	10.00	1	1.45	1	8.25	6
1993–94	4.00	1	–	0	–	0	4.00	1
1994–95	11.34	29	0.02	2	–	0	10.61	31
1995–96	9.10	78	6.06	16	–	0	8.65	94
1996–97	7.26	85	4.35	15	–	0	7.11	100
1997–98	6.52	343	1.35	34	2.14	40	5.97	417
1998–99	5.45	327	1.60	57	5.84	45	5.15	429
1999–00	5.47	341	3.16	220	3.18	102	4.49	663
2000–01	5.73	333	2.78	340	3.26	52	4.53	725
2001–02	5.81	419	1.86	39	3.58	53	5.57	511
2002–03	4.63	454	1.47	96	2.97	129	4.11	679
2003–04	4.30	581	2.37	76	2.72	49	4.08	706
2004–05	3.23	508	3.15	191	2.15	34	3.74	733
2005–06	4.55	702	2.93	99	3.16	28	4.69	829
2006–07	4.25	545	3.80	213	4.60	231	4.62	989
2007–08	3.85	272	2.12	154	3.38	643	3.79	1 069

Table 45: Macquarie Ridge. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 & 25 for abbreviations.

	BZE	NZ
1990–91	0	100
1991–92	0	0
1992–93	0	100
1993–94	0	100
1994–95	0	100
1995–96	0	100
1996–97	0	100
1997–98	0	100
1998–99	11	89
1999–00	0	100
2000–01	0	100
2001–02	0	100
2002–03	0	100
2003–04	0	100
2004–05	0	100
2005–06	0	100
2006–07	0	100
2007–08	0	100

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

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1990–91	0	0	100	0	–
1991–92	0	0	0	0	0
1992–93	0	76	24	4	–
1993–94	0	7	89	0	–
1994–95	0	0	100	0	–
1995–96	0	100	0	0	4
1996–97	0	100	0	0	–
1997–98	0	89	11	0	–
1998–99	0	49	51	0	6
1999–00	0	5	95	0	–
2000–01	0	0	100	0	–
2001–02	0	7	93	0	–
2002–03	0	7	93	0	–
2003–04	0	0	100	0	–
2004–05	0	0	100	0	–
2005–06	0	0	100	0	–
2006–07	0	0	100	0	–
2007–08	0	0	100	0	–

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

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1990–91	19	18	95	0	0	5	0
1991–92	0	0	0	0	0	0	0
1992–93	24	8	21	13	0	67	0
1993–94	12	0	0	0	0	100	0
1994–95	16	15	88	6	0	6	0
1995–96	32	29	13	78	0	9	0
1996–97	183	145	37	43	0	21	0
1997–98	182	159	64	23	0	13	0
1998–99	206	178	54	31	1	14	0
1999–00	256	234	64	28	0	9	0
2000–01	405	338	50	33	0	16	0
2001–02	297	279	53	41	0	6	0
2002–03	349	328	79	15	0	6	0
2003–04	230	215	69	24	0	7	0
2004–05	193	190	29	69	0	2	0
2005–06	93	90	97	0	0	3	0
2006–07	13	13	100	0	0	0	0
2007–08	173	170	0	92	6	2	0

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

	Catch (t)		
	OEO	SSO	BOE
1990-91	0	46	128
1991-92	0	0	0
1992-93	0	80	49
1993-94	0	98	23
1994-95	0	38	15
1995-96	0	122	17
1996-97	220	615	45
1997-98	189	442	24
1998-99	0	531	158
1999-00	0	1 007	53
2000-01	0	1 240	75
2001-02	0	1 253	37
2002-03	0	1 083	79
2003-04	0	810	99
2004-05	0	431	88
2005-06	0	293	3
2006-07	0	18	2
2007-08	0	548	68

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1990-91	8.81	18	-	0	-	0	8.81	18
1991-92	-	0	-	0	-	0	-	0
1992-93	6.20	5	0.20	3	-	0	3.95	8
1993-94	-	0	-	0	-	0	-	0
1994-95	3.18	14	0	1	-	0	2.97	15
1995-96	6.48	4	3.43	25	-	0	4.08	29
1996-97	3.67	67	6.31	78	-	0	5.23	145
1997-98	3.48	117	4.55	42	-	0	3.76	159
1998-99	3.00	112	3.47	64	1.35	2	3.37	178
1999-00	5.29	163	1.99	71	-	0	4.33	234
2000-01	3.30	203	3.84	135	-	0	3.54	338
2001-02	3.46	158	5.30	121	-	0	4.32	279
2002-03	3.46	277	3.53	51	-	0	3.50	328
2003-04	3.54	158	4.44	56	9	1	4.07	215
2004-05	2.13	56	2.34	134	-	0	2.65	190
2005-06	3.26	90	-	0	-	0	3.26	90
2006-07	1.55	13	-	0	-	0	1.55	13
2007-08	-	0	3.27	159	3.1	11	3.59	170

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

	UN	NZ	JAP	KOR	NOR	PAN	RUS	UKR
1977-78	3	0	0	0	0	0	97	0
1978-79	99	0	1	0	0	0	0	0
1979-80	2	0	1	0	0	0	97	0
1980-81	4	0	0	0	0	0	96	0
1981-82	0	0	1	0	0	0	99	0
1982-83	0	1	1	1	0	0	98	0
1983-84	0	2	6	6	0	0	86	0
1984-85	0	6	16	4	0	0	73	0
1985-86	0	17	16	16	0	0	51	0
1986-87	0	26	5	14	0	0	55	0
1987-88	0	48	17	9	0	0	26	0
1988-89	0	67	11	9	0	0	13	0
1989-90	0	91	2	7	0	0	0	0
1990-91	0	96	0	1	3	0	1	0
1991-92	0	97	0	3	0	0	0	0
1992-93	0	100	0	0	0	0	0	0
1993-94	0	96	0	4	0	0	0	0
1994-95	0	96	0	4	0	0	0	0
1995-96	3	93	0	3	0	0	0	0
1996-97	0	96	0	4	0	0	0	0
1997-98	0	98	0	2	0	0	0	0
1998-99	0	86	0	14	0	1	0	0
1999-00	0	99	0	1	0	0	0	0
2000-01	0	100	0	0	0	0	0	0
2001-02	0	100	0	0	0	0	0	0
2002-03	0	99	0	0	0	1	0	0
2003-04	0	97	0	0	0	1	0	3
2004-05	0	96	0	0	0	0	0	4
2005-06	0	94	0	0	0	0	0	6
2006-07	0	96	0	0	0	0	0	4
2007-08	0	100	0	0	0	0	0	0

Table 51: OEO 3A, excluding data from the Southland fishery. Percentage of oreo catch (combined) by vessel tonnage class by fishing year. UN, unknown tonnage class, n is the number of vessels. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	0	0	0	100	4
1978–79	0	1	0	99	–
1979–80	1	11	0	88	16
1980–81	4	21	0	75	21
1981–82	0	19	0	81	10
1982–83	0	27	1	72	12
1983–84	0	27	15	59	19
1984–85	0	24	15	60	22
1985–86	0	38	15	48	26
1986–87	0	25	16	59	22
1987–88	0	29	29	41	22
1988–89	0	26	50	24	25
1989–90	0	36	62	2	19
1990–91	0	55	44	1	18
1991–92	0	47	52	0	16
1992–93	0	50	35	14	17
1993–94	0	61	35	4	18
1994–95	0	45	55	0	17
1995–96	0	66	31	3	22
1996–97	0	83	17	0	19
1997–98	0	93	5	1	21
1998–99	0	78	19	3	18
1999–00	0	63	36	1	16
2000–01	0	56	43	0	13
2001–02	0	49	51	0	11
2002–03	0	56	43	2	13
2003–04	0	66	27	7	15
2004–05	0	50	44	6	12
2005–06	0	45	49	7	8
2006–07	0	49	47	4	10
2007–08	0	59	39	1	9

Table 52: OEO 3A, excluding data from the Southland fishery. Number of tows where oreos were caught, number of oreo target tows, and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	179	168	94	0	0	0	6
1978-79	4	1	25	0	0	0	75
1979-80	1 786	1 336	19	9	46	0	25
1980-81	3 152	2 655	21	2	61	1	15
1981-82	1 033	973	4	6	84	3	3
1982-83	1 811	1 551	0	8	78	10	4
1983-84	2 343	1 863	0	19	61	9	12
1984-85	1 496	1 029	1	24	44	22	9
1985-86	1 430	728	1	27	23	43	6
1986-87	1 768	1 315	0	28	46	22	3
1987-88	2 004	1 561	1	39	38	19	3
1988-89	1 677	1 270	19	36	21	22	2
1989-90	1 740	1 297	7	61	6	23	3
1990-91	2 231	1 685	8	63	4	16	9
1991-92	1 046	482	13	19	14	47	7
1992-93	1 455	986	34	28	6	31	2
1993-94	1 968	1 214	40	10	12	34	4
1994-95	1 435	1 026	55	12	4	23	6
1995-96	2 171	1 832	69	9	6	9	7
1996-97	2 173	1 759	64	10	6	11	8
1997-98	1 983	1 407	47	24	0	11	18
1998-99	1 442	1 015	33	9	29	16	14
1999-00	1 310	783	34	3	22	16	24
2000-01	1 082	768	42	9	20	10	19
2001-02	802	471	45	6	8	15	26
2002-03	564	229	32	4	4	26	34
2003-04	652	259	24	10	6	24	36
2004-05	546	308	36	9	12	27	17
2005-06	460	244	25	9	19	21	26
2006-07	492	237	25	15	8	17	35
2007-08	634	346	20	12	23	20	25

Table 53: OEO 3A, excluding data from the Southland fishery. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1977-78	1 360	0	0
1978-79	8	0	0
1979-80	511	5 882	8 683
1980-81	4 065	1 998	15 434
1981-82	0	795	5 698
1982-83	7	2 293	6 862
1983-84	103	3 524	5 463
1984-85	53	3 812	2 748
1985-86	0	2 639	2 082
1986-87	0	3 105	3 982
1987-88	0	5 894	3 038
1988-89	1	5 871	2 715
1989-90	25	5 462	2 363
1990-91	13	4 554	4 160
1991-92	24	2 808	2 189
1992-93	661	2 963	3 856
1993-94	206	4 253	3 782
1994-95	173	3 404	2 049
1995-96	797	3 089	3 152
1996-97	502	2 730	3 423
1997-98	43	3 887	1 529
1998-99	8	2 183	3 043
1999-00	3	1 209	2 762
2000-01	19	1 278	2 394
2001-02	2	1 237	1 885
2002-03	3	963	1 019
2003-04	50	796	1 014
2004-05	1	1 137	1 160
2005-06	0	1 005	1 336
2006-07	9	989	1 213
2007-08	0	1 397	1 469

Table 54: OEO 3A, excluding data from the Southland fishery. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1977–78	7.87	168	–	0	–	0	7.87	168
1978–79	7.53	1	–	0	–	0	7.53	1
1979–80	7.62	346	15.53	166	5.07	824	9.12	1 336
1980–81	8.95	666	4.70	75	6.43	1 914	7.42	2 655
1981–82	7.18	44	2.50	58	6.30	871	6.59	973
1982–83	–	0	8.16	147	4.58	1 404	5.78	1 551
1983–84	13.39	2	3.69	434	3.25	1 427	4.63	1 863
1984–85	1.30	13	7.43	353	2.91	663	6.12	1 029
1985–86	3.93	9	4.43	389	3.27	330	5.52	728
1986–87	–	0	3.97	503	3.38	812	5.15	1 315
1987–88	5.43	17	5.61	776	2.29	768	5.23	1 561
1988–89	4.26	319	6.78	600	2.92	351	5.60	1 270
1989–90	6.29	125	3.35	1 067	4.27	105	4.78	1 297
1990–91	8.13	181	2.54	1 413	4.78	91	4.83	1 685
1991–92	8.11	138	7.72	194	4.93	150	8.53	482
1992–93	7.58	501	2.52	403	2.95	82	6.80	986
1993–94	6.50	794	2.38	188	5.54	232	6.09	1 214
1994–95	5.53	789	1.91	178	4.63	59	5.14	1 026
1995–96	3.66	1 506	1.92	186	3.36	140	3.66	1 832
1996–97	3.42	1 400	1.86	220	6.02	139	3.61	1 759
1997–98	3.16	931	3.56	467	6.00	9	3.64	1 407
1998–99	5.22	475	2.43	128	3.75	412	4.98	1 015
1999–00	4.10	447	4.03	43	3.73	293	4.52	783
2000–01	3.78	455	3.13	102	4.57	211	4.40	768
2001–02	4.58	358	5.45	50	8.61	63	5.70	471
2002–03	7.13	180	5.69	24	8.42	25	7.56	229
2003–04	5.11	154	4.20	67	7.08	38	6.12	259
2004–05	4.59	194	5.91	50	7.70	64	6.92	308
2005–06	8.24	115	5.31	40	6.87	89	9.12	244
2006–07	7.31	122	5.44	76	10.63	39	8.67	237
2007–08	5.67	125	7.12	77	5.16	144	7.79	346

Table 55: OEO 4. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 & 25 for abbreviations. POL, Poland.

	UN	NZ	JAP	KOR	NOR	POL	RUS	UKR
1977-78	41	0	0	0	0	0	59	0
1978-79	2	0	2	0	0	0	96	0
1979-80	0	0	1	0	0	0	99	0
1980-81	0	0	1	0	0	2	97	0
1981-82	0	0	1	0	0	0	99	0
1982-83	0	17	9	0	0	0	74	0
1983-84	0	25	23	4	0	0	48	0
1984-85	0	31	29	5	0	0	34	0
1985-86	0	42	32	5	0	0	21	0
1986-87	0	59	25	0	0	0	16	0
1987-88	0	76	15	6	0	0	4	0
1988-89	0	84	11	2	0	0	4	0
1989-90	0	95	5	0	0	0	0	0
1990-91	0	98	0	2	0	0	0	0
1991-92	0	99	0	0	1	0	0	0
1992-93	0	100	0	0	0	0	0	0
1993-94	0	100	0	0	0	0	0	0
1994-95	0	97	0	0	3	0	0	0
1995-96	0	99	0	0	1	0	0	0
1996-97	0	100	0	0	0	0	0	0
1997-98	0	98	0	0	2	0	0	0
1998-99	0	99	0	0	1	0	0	0
1999-00	0	96	0	3	0	0	0	0
2000-01	0	100	0	0	0	0	0	0
2001-02	0	100	0	0	0	0	0	0
2002-03	0	100	0	0	0	0	0	0
2003-04	0	96	0	0	0	0	0	4
2004-05	0	92	0	5	0	0	0	3
2005-06	0	96	0	0	0	0	0	4
2006-07	0	96	0	0	0	0	0	4
2007-08	0	100	0	0	0	0	0	0

Table 56: OEO 4. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	34	0	0	66	9
1978–79	2	0	0	98	8
1979–80	0	1	0	99	7
1980–81	0	3	0	97	12
1981–82	0	5	1	94	11
1982–83	0	6	22	72	17
1983–84	0	6	39	55	15
1984–85	0	12	49	39	20
1985–86	0	22	43	35	20
1986–87	0	24	46	30	19
1987–88	0	22	64	15	18
1988–89	0	23	62	15	15
1989–90	1	32	63	5	10
1990–91	0	57	42	0	11
1991–92	0	52	47	1	6
1992–93	0	56	44	0	6
1993–94	0	48	46	6	8
1994–95	0	54	35	10	11
1995–96	0	53	43	4	8
1996–97	0	63	19	18	7
1997–98	0	64	19	17	10
1998–99	0	70	16	13	17
1999–00	0	45	46	8	12
2000–01	0	35	62	3	12
2001–02	0	28	71	0	8
2002–03	0	31	66	3	13
2003–04	0	27	61	12	11
2004–05	0	35	60	4	12
2005–06	0	16	68	16	9
2006–07	0	24	59	17	7
2007–08	0	13	86	0	5

Table 57: OEO 4. Number of tows where oreos were caught, number of oreo target tows, and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	872	856	98	0	0	0	2
1978-79	297	149	11	0	39	14	36
1979-80	567	345	49	8	5	5	34
1980-81	2 144	1 065	34	2	14	25	25
1981-82	1 442	1 255	16	22	49	9	4
1982-83	1 738	674	0	23	16	60	1
1983-84	1 420	844	0	39	20	36	5
1984-85	2 088	868	0	29	13	55	3
1985-86	1 918	721	0	27	10	59	3
1986-87	2 254	996	0	31	13	52	3
1987-88	2 546	922	0	30	6	55	9
1988-89	2 949	484	3	11	3	83	1
1989-90	2 119	585	1	26	0	68	4
1990-91	1 756	456	4	21	0	69	6
1991-92	1 709	249	2	13	0	76	9
1992-93	1 472	177	4	8	0	87	1
1993-94	2 216	67	1	2	0	96	1
1994-95	2 032	140	3	4	0	88	5
1995-96	1 361	238	6	11	0	80	3
1996-97	1 521	454	11	19	0	65	5
1997-98	2 042	399	13	6	0	71	10
1998-99	2 236	596	11	15	1	59	14
1999-00	1 901	473	4	21	0	67	8
2000-01	1 911	389	3	18	0	73	7
2001-02	1 874	233	9	4	0	85	2
2002-03	2 527	141	2	3	0	86	9
2003-04	2 523	286	6	5	0	81	8
2004-05	2 325	372	6	10	0	78	6
2005-06	2 254	331	7	7	0	82	3
2006-07	2 142	465	12	9	0	73	5
2007-08	1 911	438	6	16	0	71	6

Table 58: OEO 4. Catch of unspecified oreo, smooth oreo, and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1977-78	8 150	0	0
1978-79	0	106	546
1979-80	1 549	626	2 882
1980-81	2 710	898	5 017
1981-82	0	3 623	3 594
1982-83	60	3 864	2 117
1983-84	15	4 863	1 280
1984-85	8	4 758	1 654
1985-86	0	4 846	980
1986-87	0	5 659	1 154
1987-88	0	7 644	895
1988-89	0	6 430	1 094
1989-90	26	5 339	439
1990-91	65	5 256	793
1991-92	7	4 790	1 696
1992-93	1 053	3 844	1 344
1993-94	548	4 765	1 556
1994-95	109	5 760	619
1995-96	42	5 428	364
1996-97	1	5 603	531
1997-98	3	5 677	693
1998-99	7	5 650	845
1999-00	19	5 877	626
2000-01	43	6 008	803
2001-02	3	3 861	515
2002-03	26	4 091	862
2003-04	260	5 098	973
2004-05	5	6 014	852
2005-06	303	5 202	763
2006-07	5	5 978	796
2007-08	0	6 171	592

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

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1977–78	9.32	856	–	0	–	0	9.32	856
1978–79	3.49	33	–	0	2.88	116	3.66	149
1979–80	10.62	275	14.21	44	7.66	26	10.85	345
1980–81	6.33	724	8.84	37	4.96	304	6.45	1 065
1981–82	5.74	235	5.57	316	4.23	704	5.63	1 255
1982–83	–	0	3.95	397	3.72	277	4.96	674
1983–84	–	0	4.81	558	2.89	286	5.20	844
1984–85	–	0	3.75	607	1.82	261	3.76	868
1985–86	14.84	5	4.32	525	2.53	191	4.49	721
1986–87	2.58	3	4.15	708	2.27	285	3.91	996
1987–88	1.60	2	4.70	765	2.30	155	4.80	922
1988–89	3.33	91	4.62	318	7.13	75	4.84	484
1989–90	3.65	28	3.49	557	–	0	3.65	585
1990–91	8.76	79	3.80	375	5.68	2	4.85	456
1991–92	11.77	26	5.27	219	4.00	4	6.10	249
1992–93	6.77	56	7.10	120	0	1	7.09	177
1993–94	4.34	26	2.55	38	2.67	3	3.46	67
1994–95	5.00	64	10.21	76	–	0	7.84	140
1995–96	7.11	83	9.16	154	0	1	8.46	238
1996–97	6.84	161	5.80	292	13.55	1	6.22	454
1997–98	5.68	269	8.90	130	–	0	6.77	399
1998–99	5.36	252	6.80	328	6.05	16	6.44	596
1999–00	5.74	71	8.06	400	0	2	8.15	473
2000–01	10.58	50	9.45	336	13.67	3	10.19	389
2001–02	7.06	165	12.36	68	–	0	8.73	233
2002–03	10.16	54	11.27	86	0.09	1	11.22	141
2003–04	6.78	150	11.03	132	4.83	4	9.29	286
2004–05	9.84	144	9.80	228	–	0	10.21	372
2005–06	8.48	166	11.03	165	–	0	9.94	331
2006–07	8.70	266	8.87	199	–	0	8.95	465
2007–08	9.12	119	9.46	313	3.88	6	9.6	438

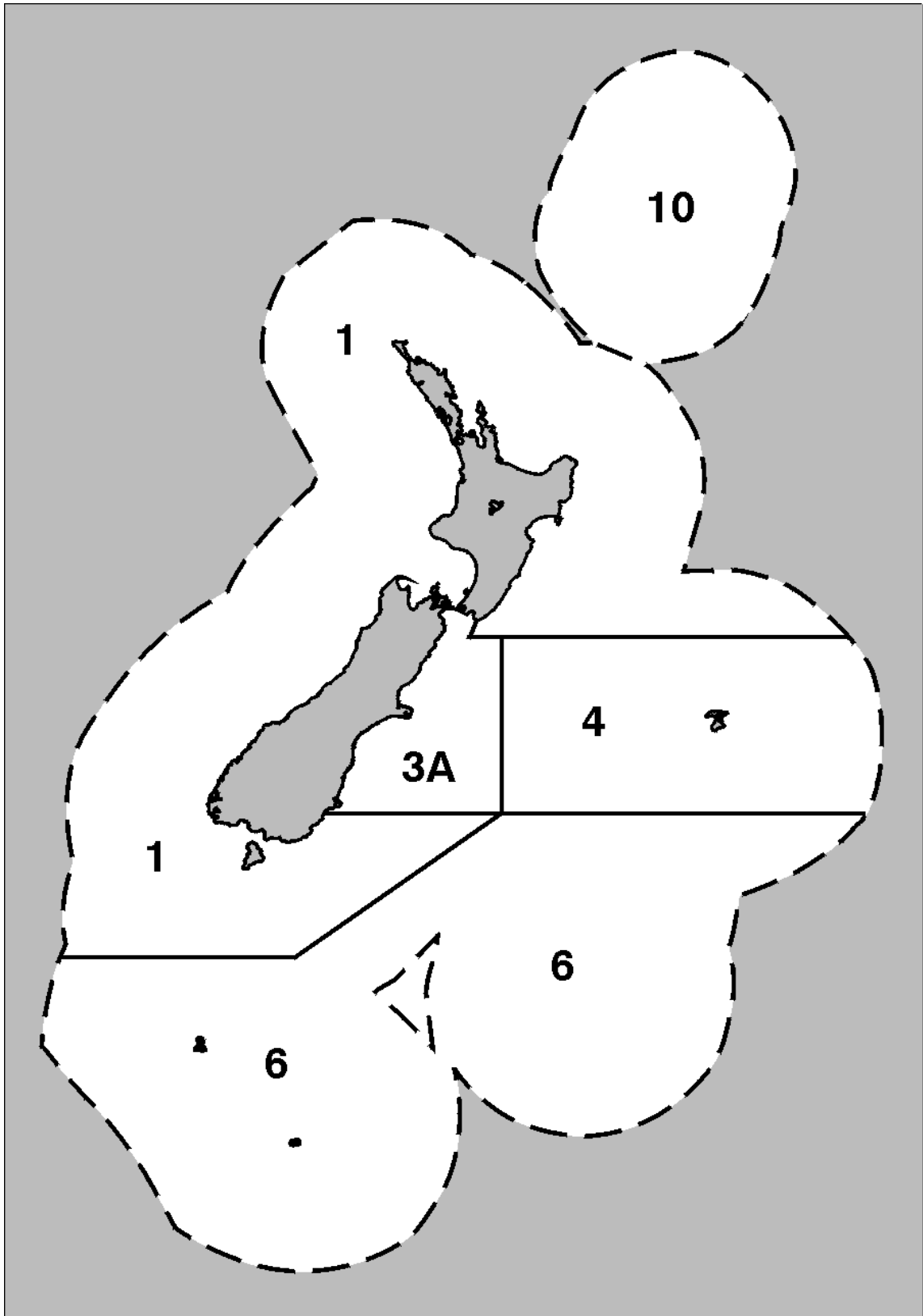


Figure 1: Oreo management areas (thick black lines). The dashed line is the 200 n. mile EEZ.

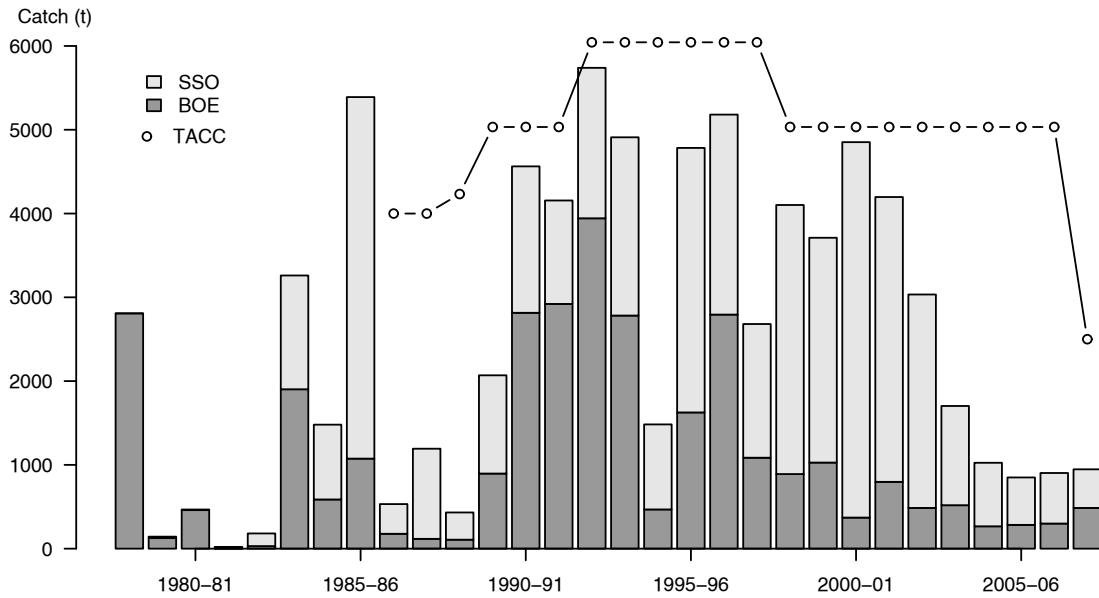


Figure 2: OEO 1 TACC and reported catches by species. The data are from Tables 2 and 3 of the oreo section of Ministry of Fisheries (2009). Catches are from Table 2 reported landings, and species breakdowns are from Table 3. Fishing years to 1982–83 are 1 April to 31 March; years from 1983–84 are 1 October to 30 September.

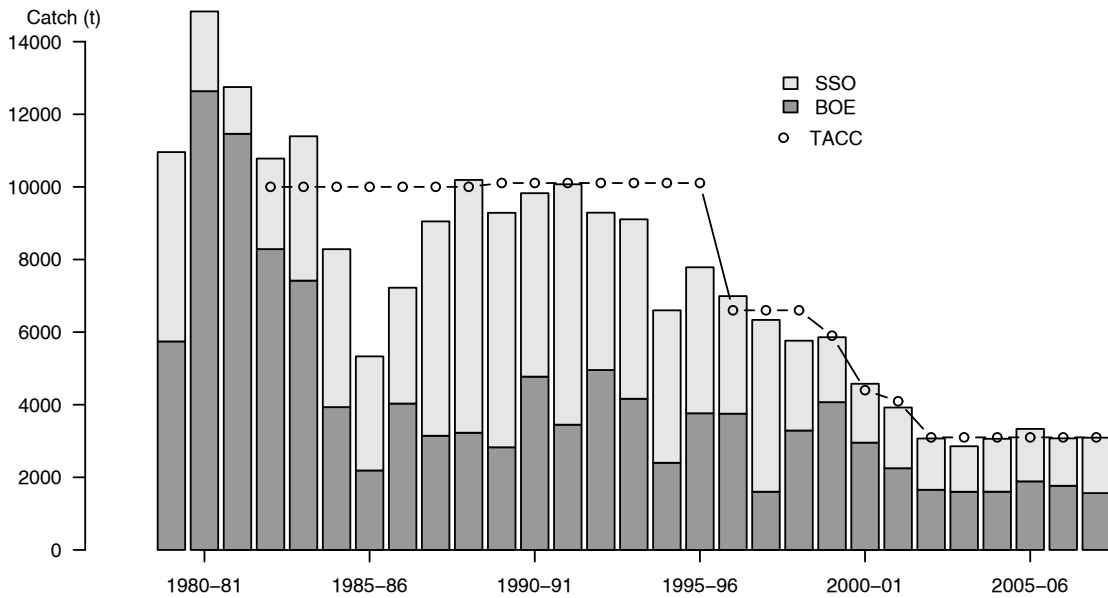


Figure 3: OEO 3A TACC and reported catches by species. The data are from Tables 2 and 3 of the Oreo section of Ministry of Fisheries (2009). Catches are from Table 2 reported landings, and species breakdowns are from Table 3. Fishing years to 1982–83 are 1 April to 31 March; years from 1983–84 are 1 October to 30 September.

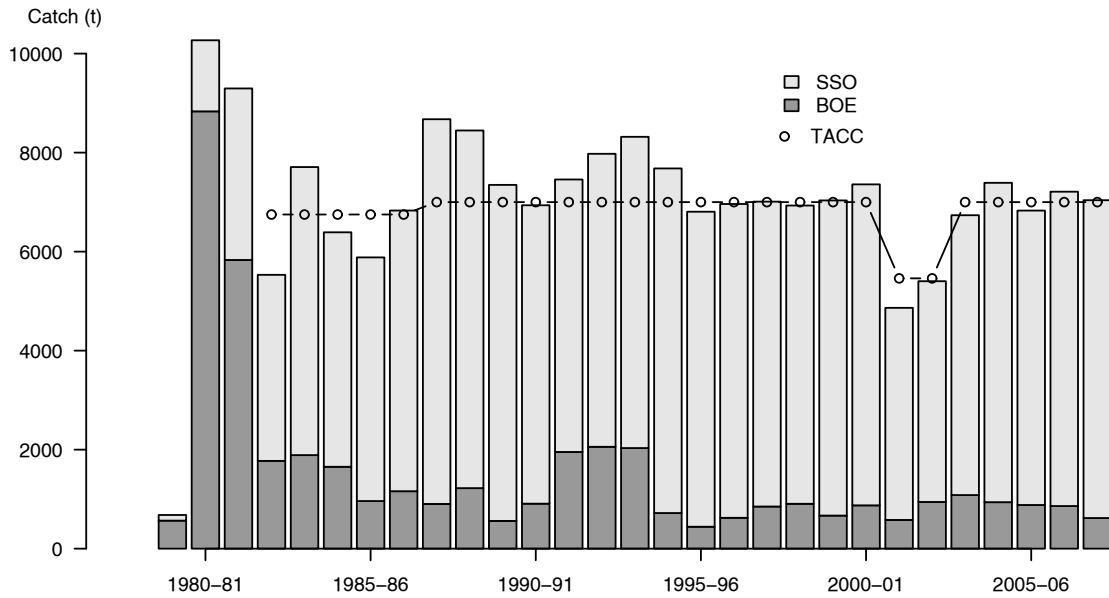


Figure 4: OEO 4 TACC and reported catches by species. The data are from Tables 2 and 3 of the Oreo section of Ministry of Fisheries (2009). Catches are from Table 2 reported landings, and species breakdowns are from Table 3. Fishing years to 1982–83 are 1 April to 31 March; years from 1983–84 are 1 October to 30 September.

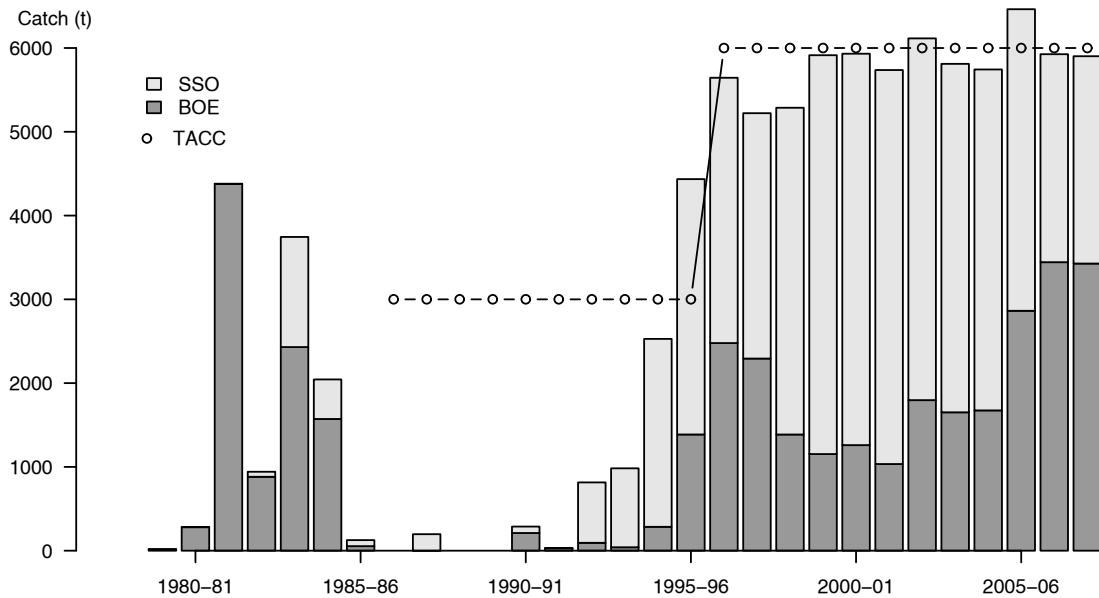


Figure 5: OEO 6 TACC and reported catches by species. The data are from Tables 2 and 3 of the Oreo section of Ministry of Fisheries (2009). Catches are from Table 2 reported landings, and species breakdowns are from Table 3. Fishing years to 1982–83 are 1 April to 31 March; years from 1983–84 are 1 October to 30 September.

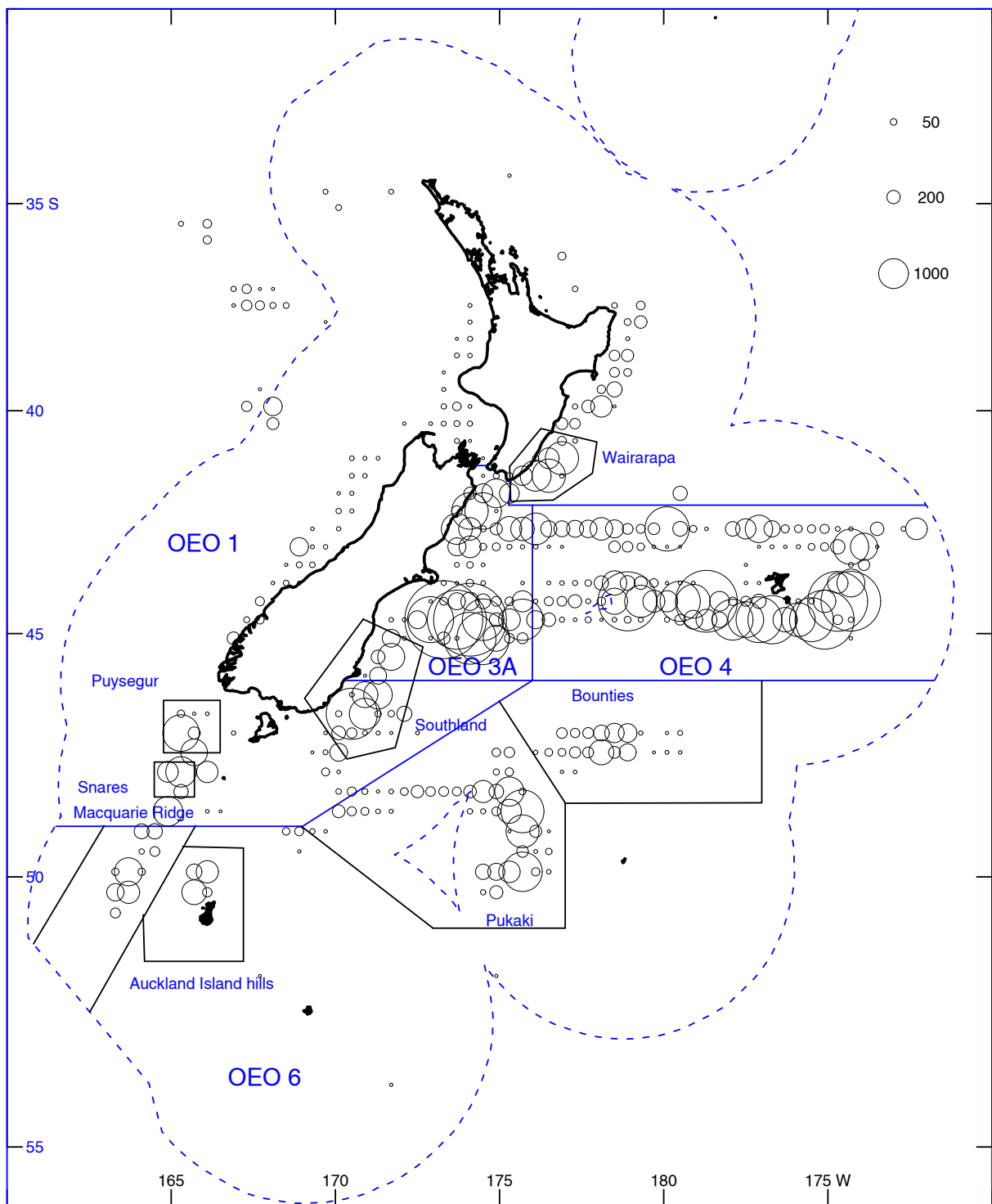


Figure 6: The number of trawls that caught or targeted oreos from 1977–78 to 2007–08 summed for each 0.4 x 0.4 degree cell (for 10 or more trawls per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of trawls per cell. Fewer than 10 trawls per cell were not plotted. Boundaries of OEO 1, OEO 3A, OEO 4, OEO 6 (solid lines), and fisheries (polygons marked with solid lines) defined in the text. The dashed line marks the EEZ boundary.

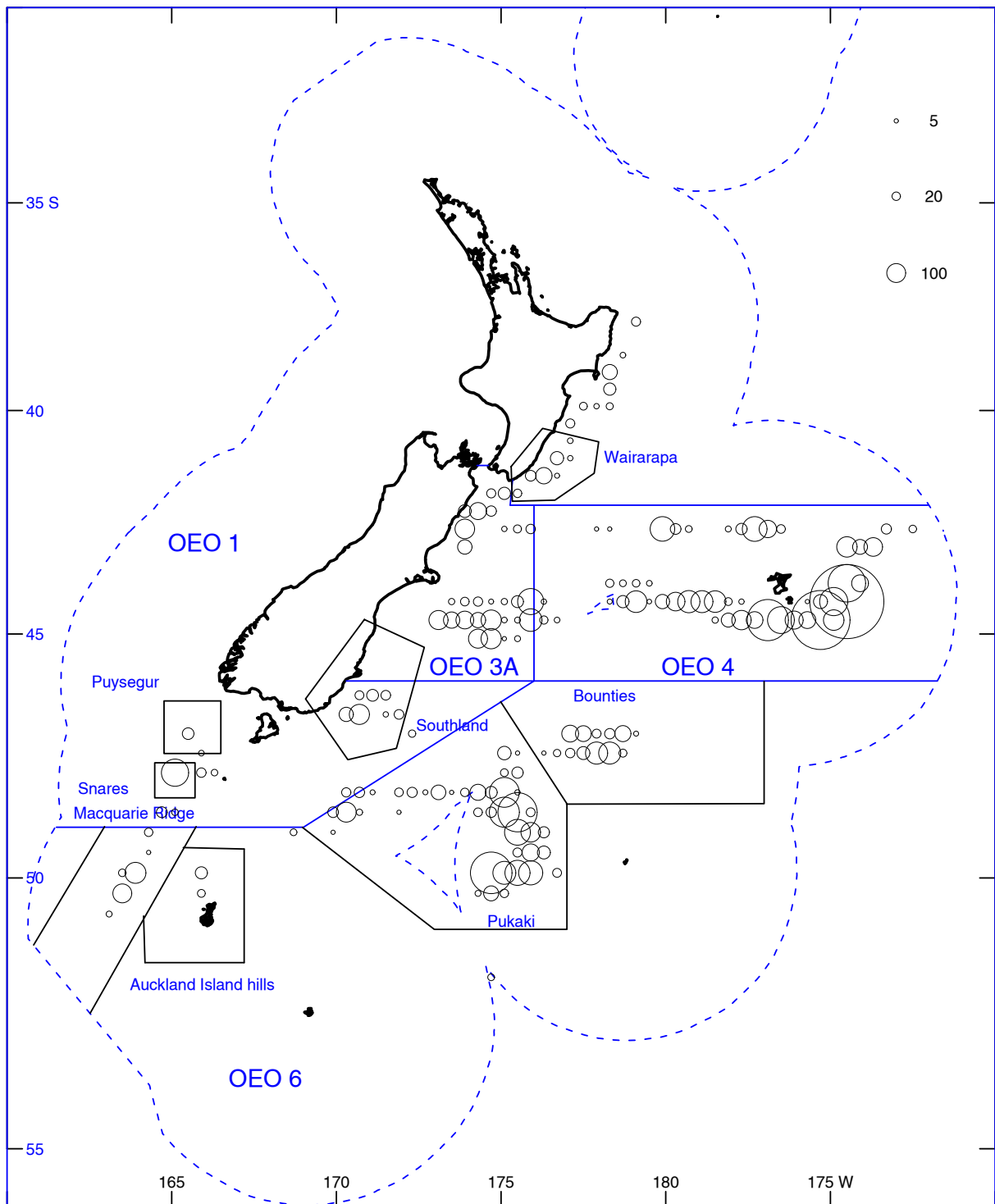


Figure 7: The number of trawls that caught or targeted oreos from 2005–06 to 2007–08 summed for each 0.4 x 0.4 degree cell (for 5 or more trawls per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of trawls per cell. Fewer than 5 trawls per cell were not plotted.

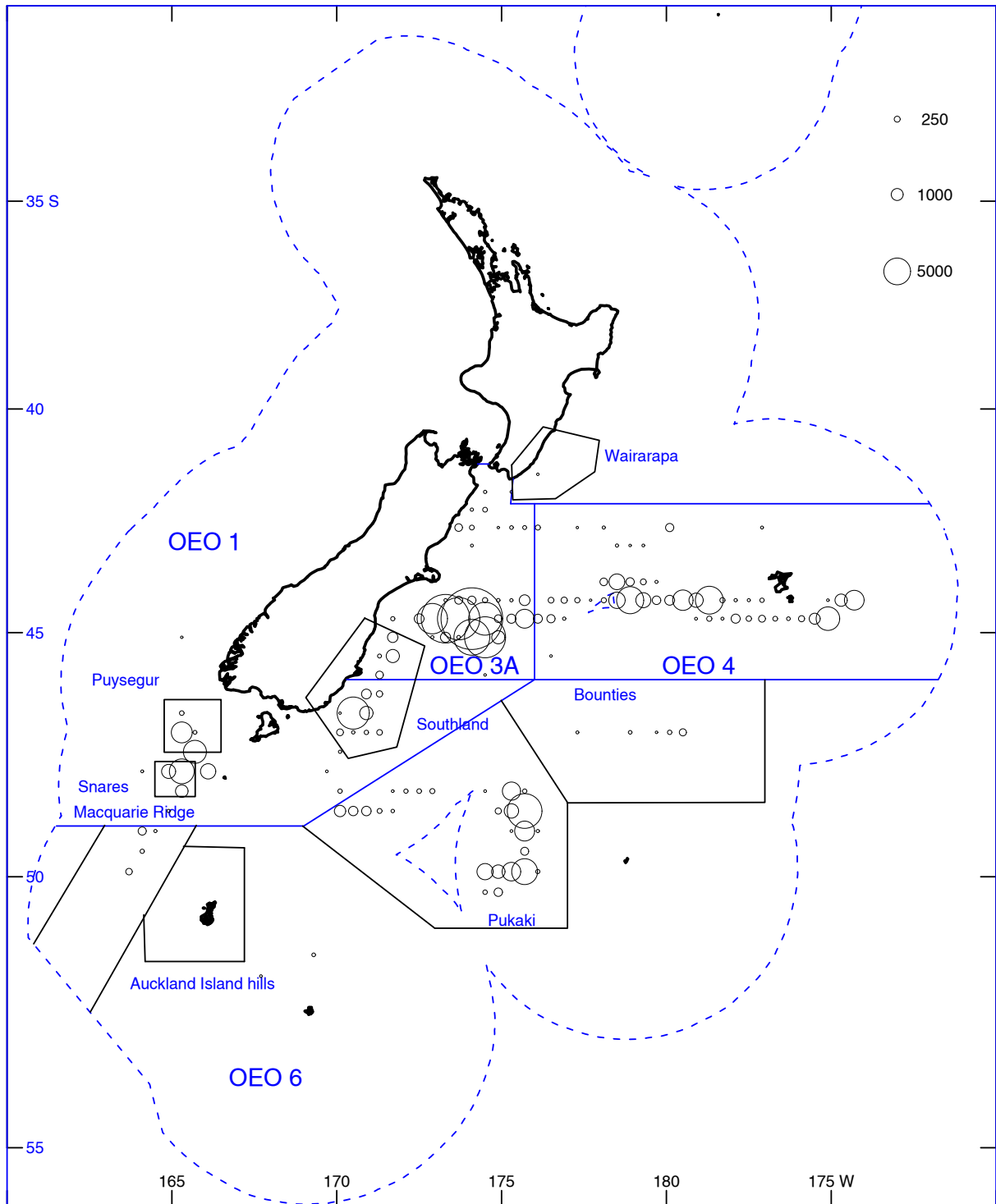


Figure 8: Black oreo catches (t) from 1977–78 to 2007–08 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

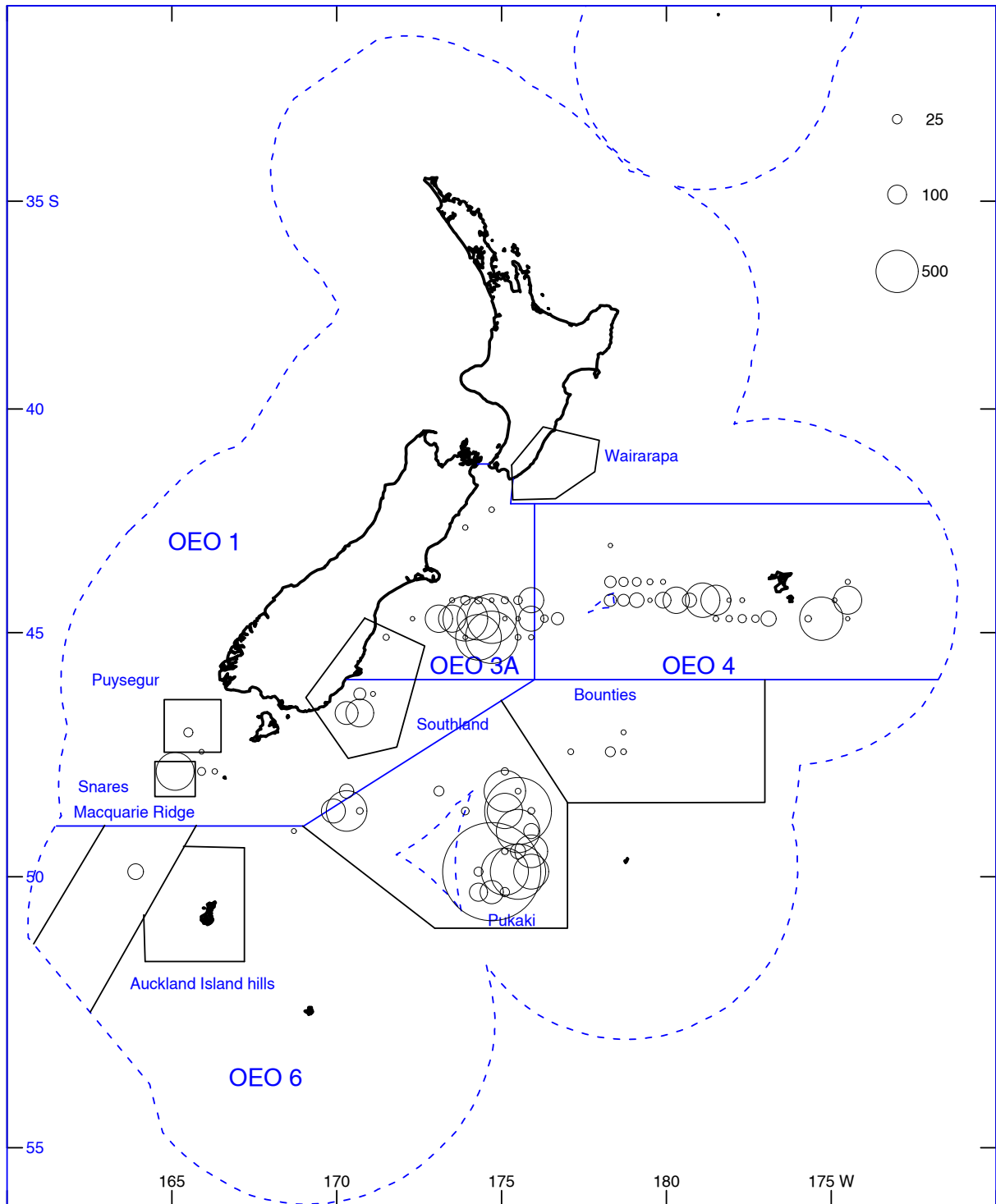


Figure 9: Black oreo catches (t) from 2005–06 to 2007–08 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

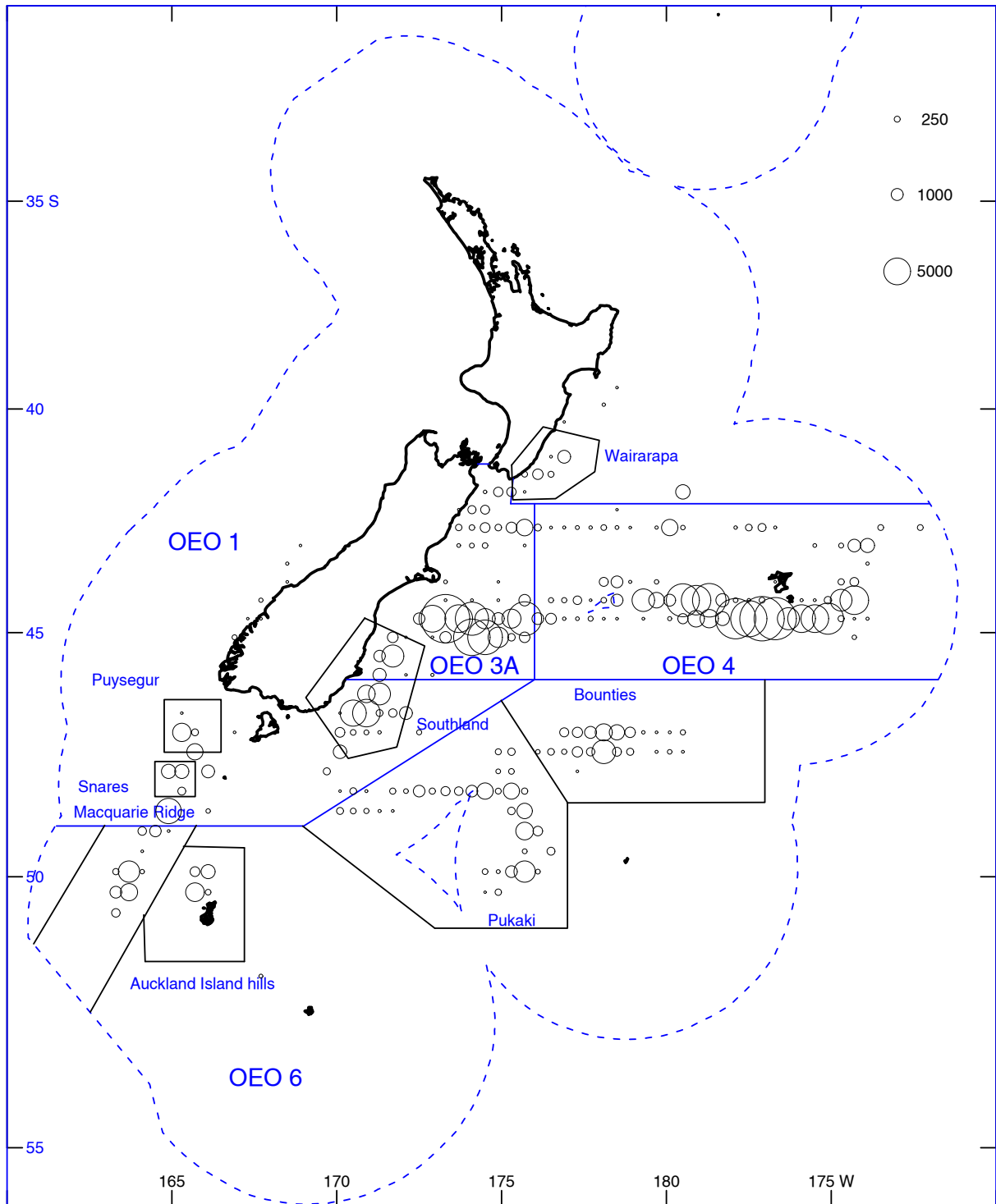


Figure 10: Smooth oreo catches (t) from 1977–78 to 2007–08 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of smooth oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

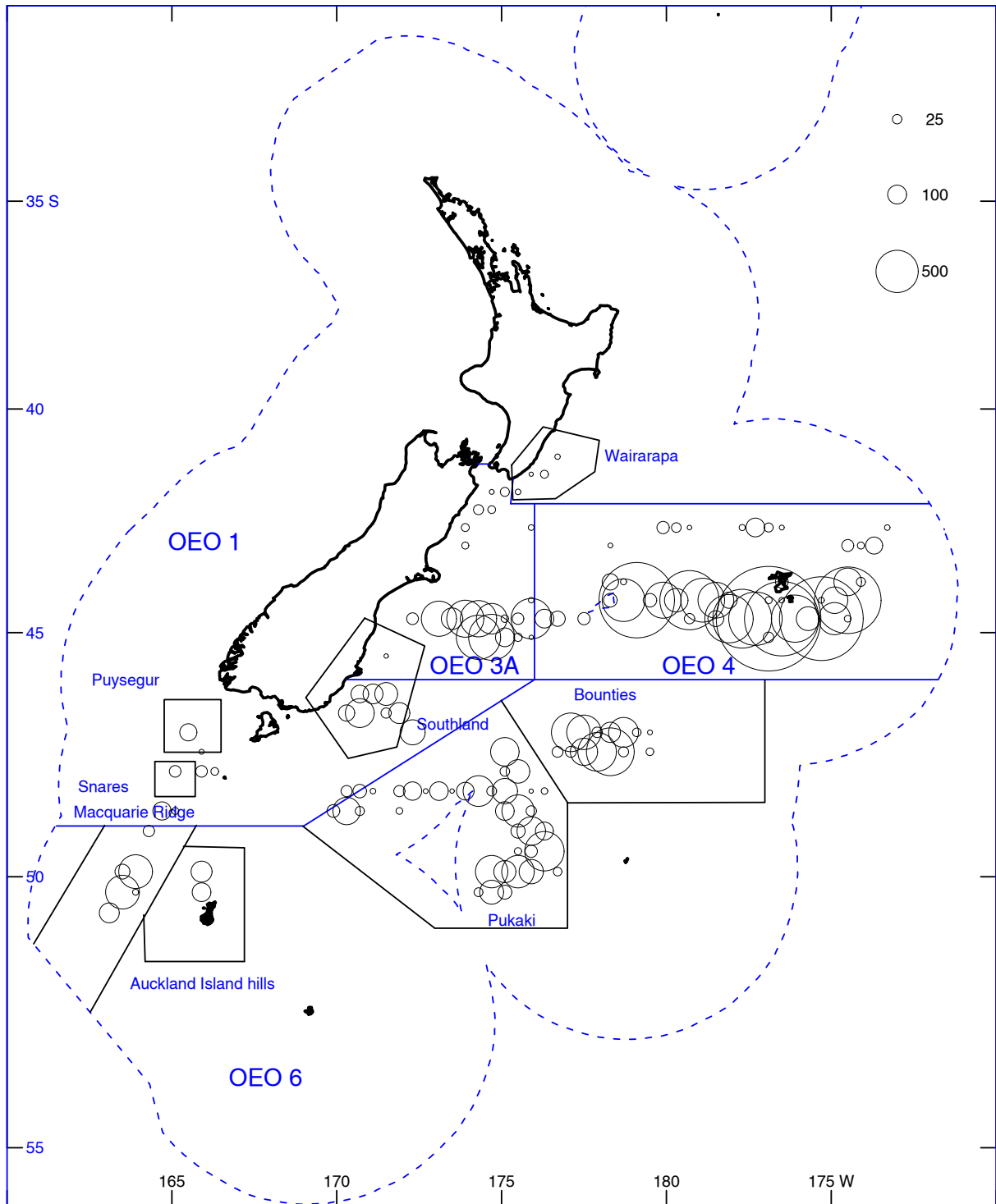


Figure 11: Smooth oreo catches (t) from 2005–06 to 2007–08 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of smooth oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

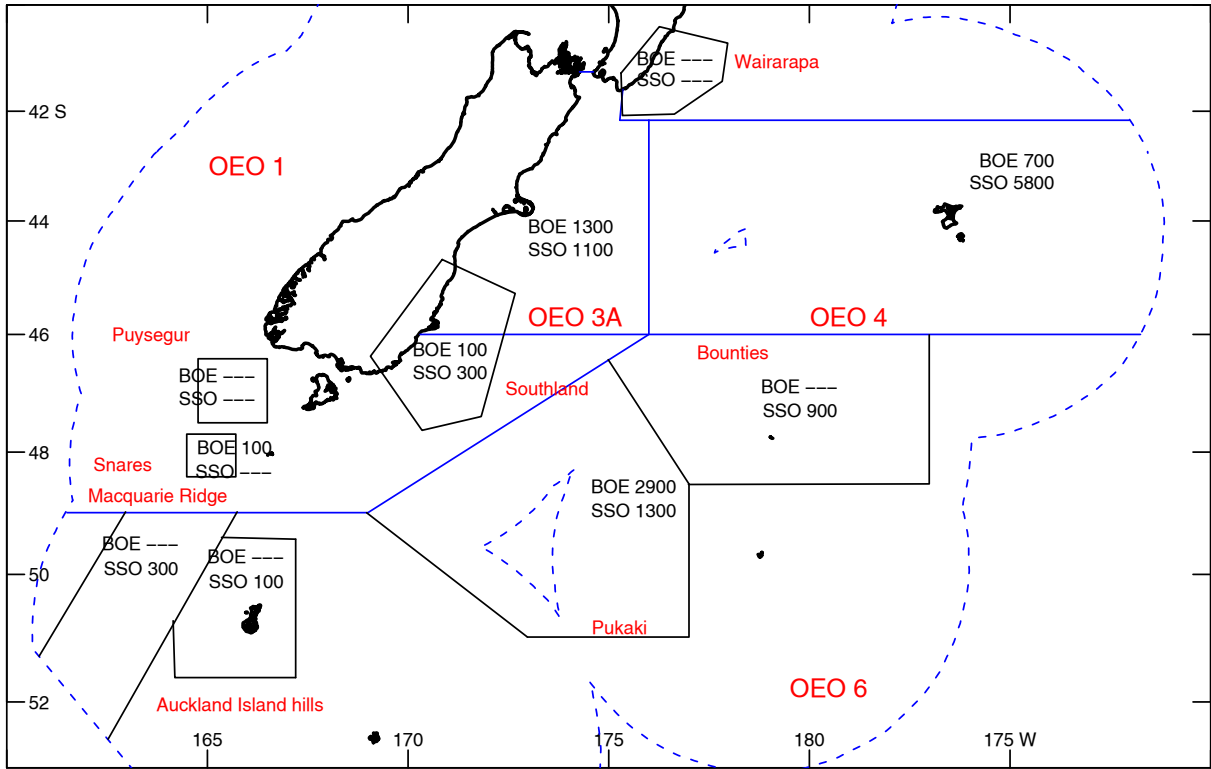


Figure 12: Mean annual estimated catch (t) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2005–06 to 2007–08. —, catch less than 100 t.

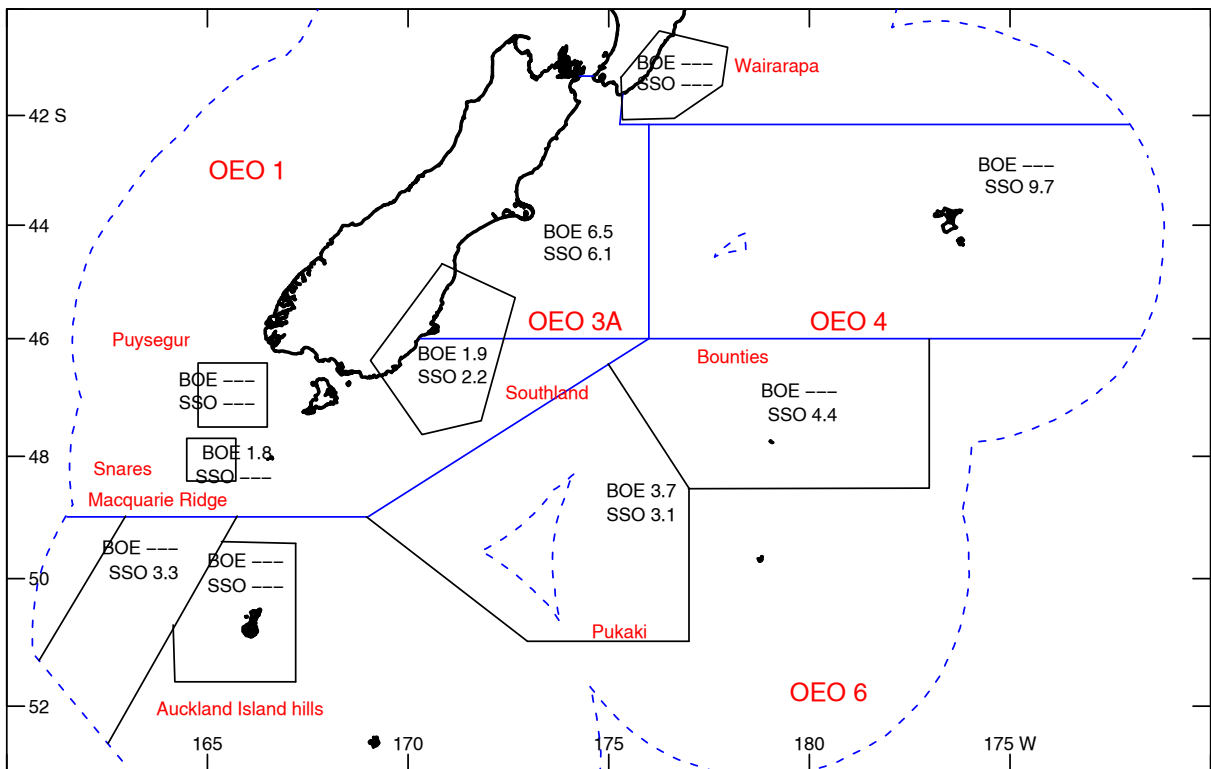


Figure 13: Mean annual unstandardised target CPUE (t/tow) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2005–06 to 2007–08, taken from tows that target fished for black oreo or smooth oreo. —, insufficient data (fewer than 50 target tows).

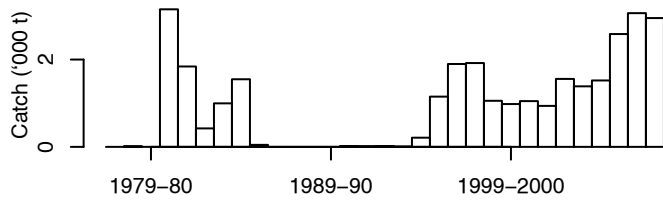


Figure 14: Black oreo annual estimated catch (t) from Pukaki Rise.

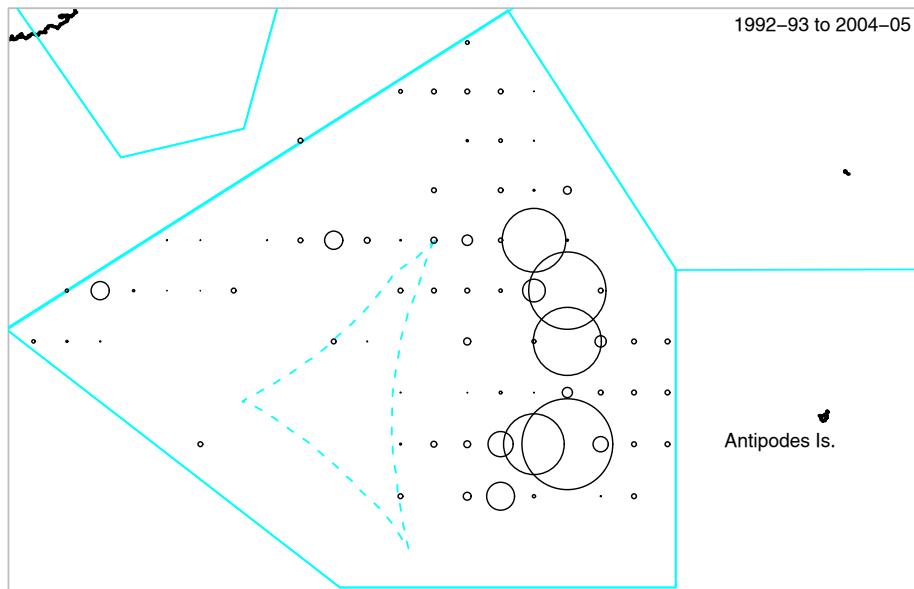


Figure 15: Black oreo from Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05). The dashed line marks the EEZ.

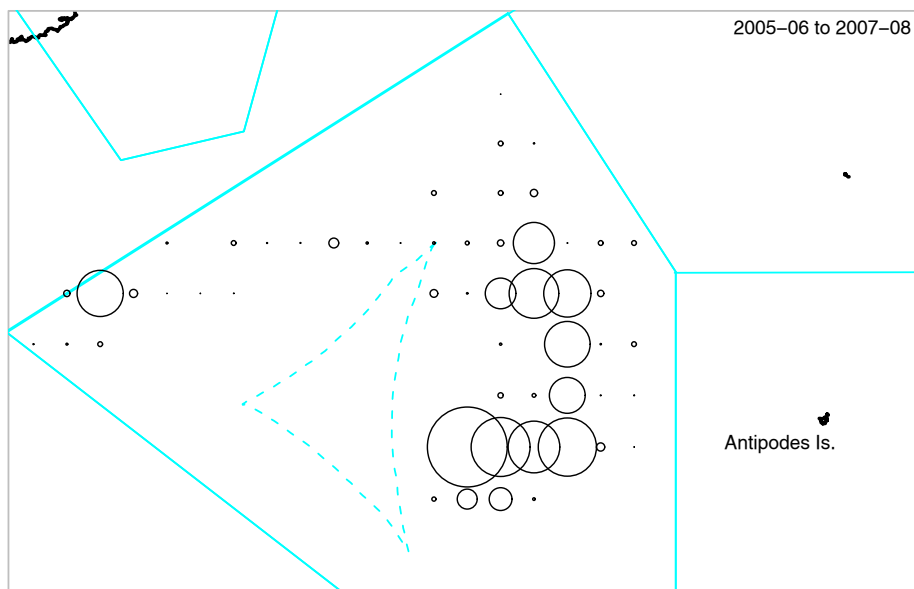


Figure 16: Black oreo from Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2005-06 to 2007-08). The dashed line marks the EEZ.

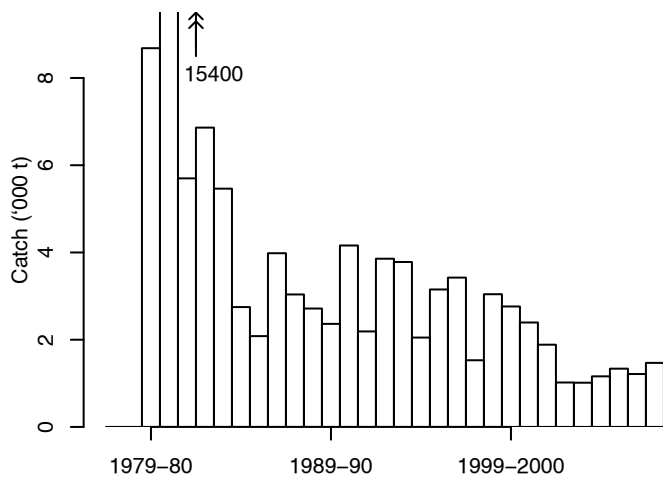


Figure 17: Black oreo annual estimated catch (t) from OEO 3A (minus catch from Southland).

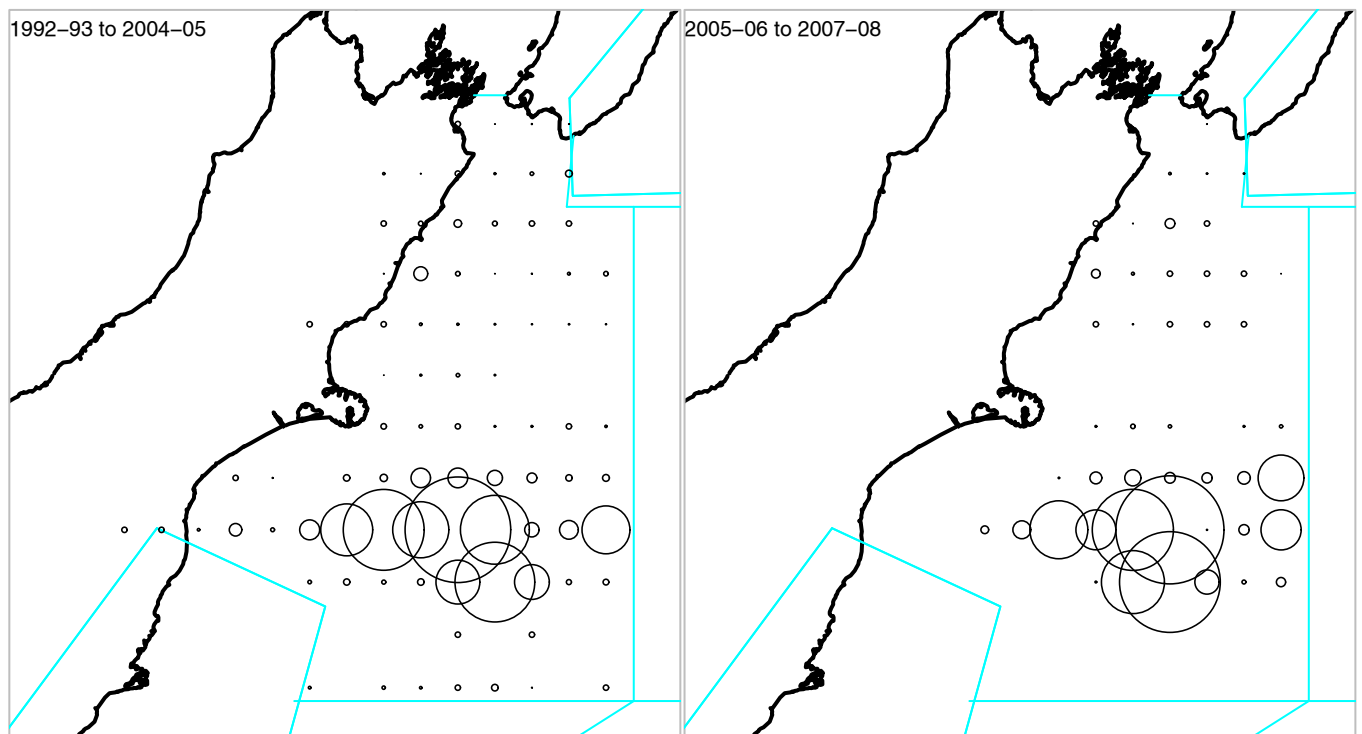


Figure 18: Black oreo from OEO 3A (minus catch from Southland) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05) left panel, and for the recent period (2005-06 to 2007-08) right panel.

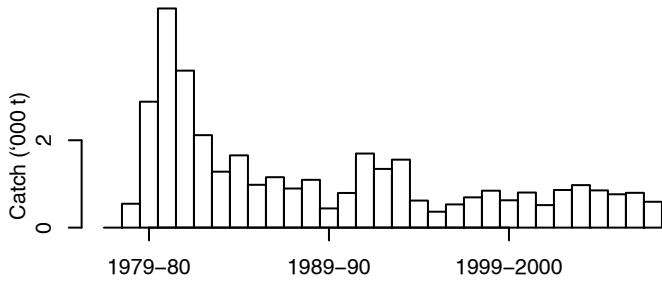


Figure 19: Black oreo annual estimated catch (t) from OEO 4.

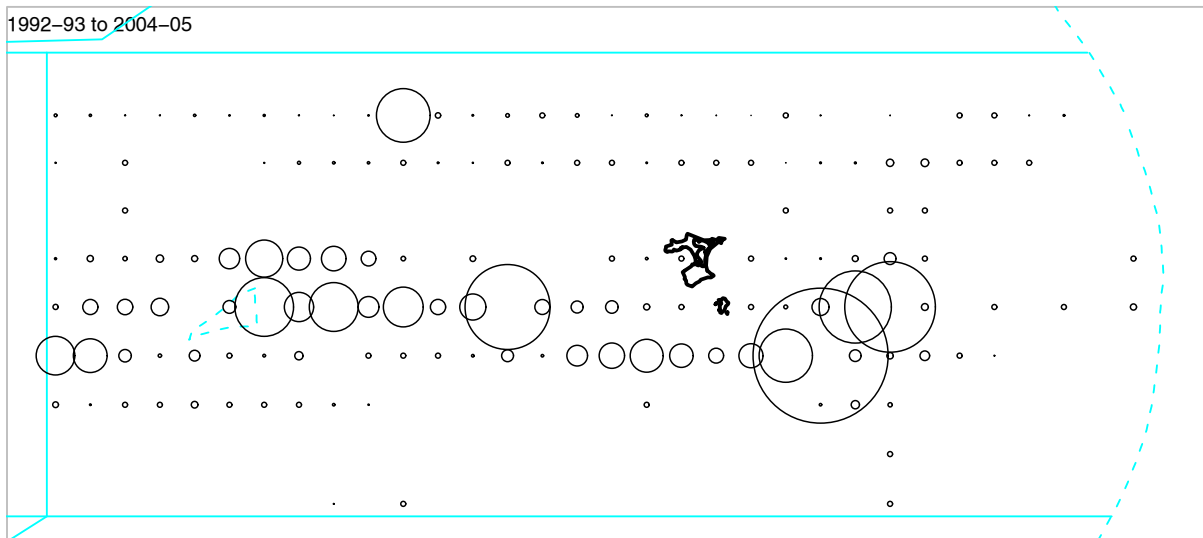


Figure 20: Black oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05).

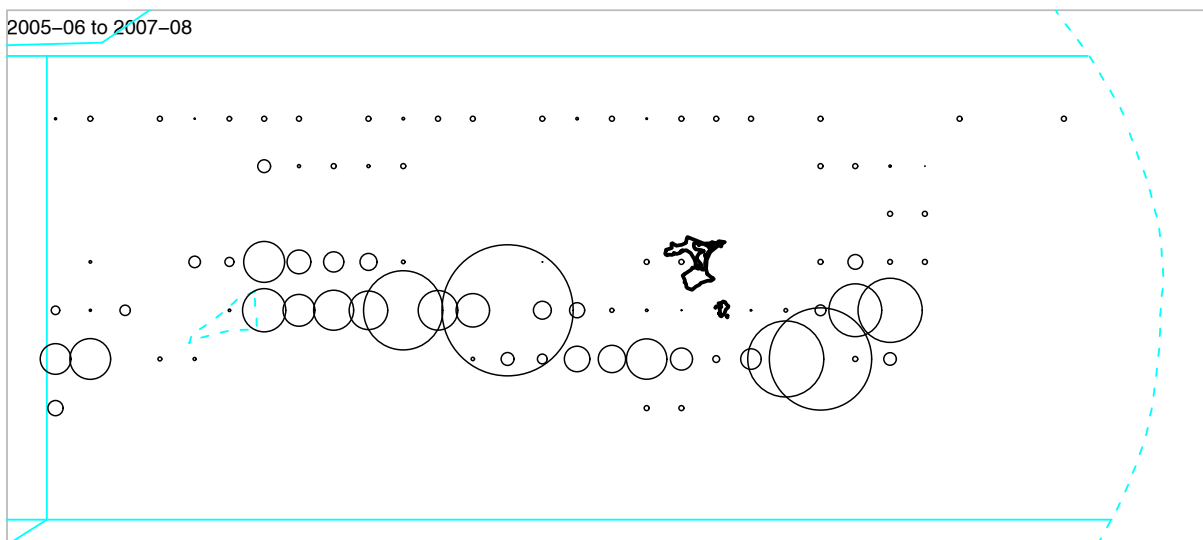


Figure 21: Black oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2005-06 to 2007-08).

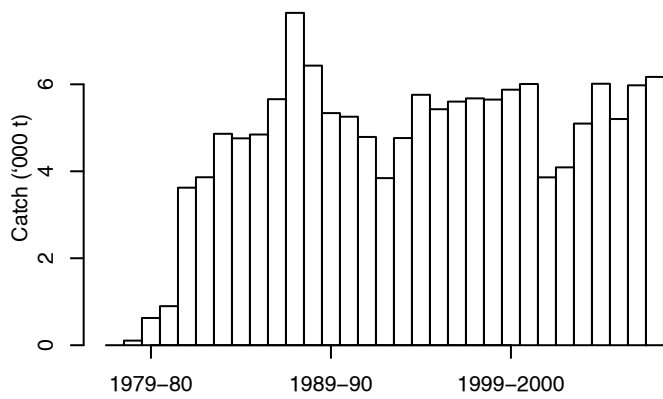


Figure 22: Smooth oreo annual estimated catch (t) from OEO 4.

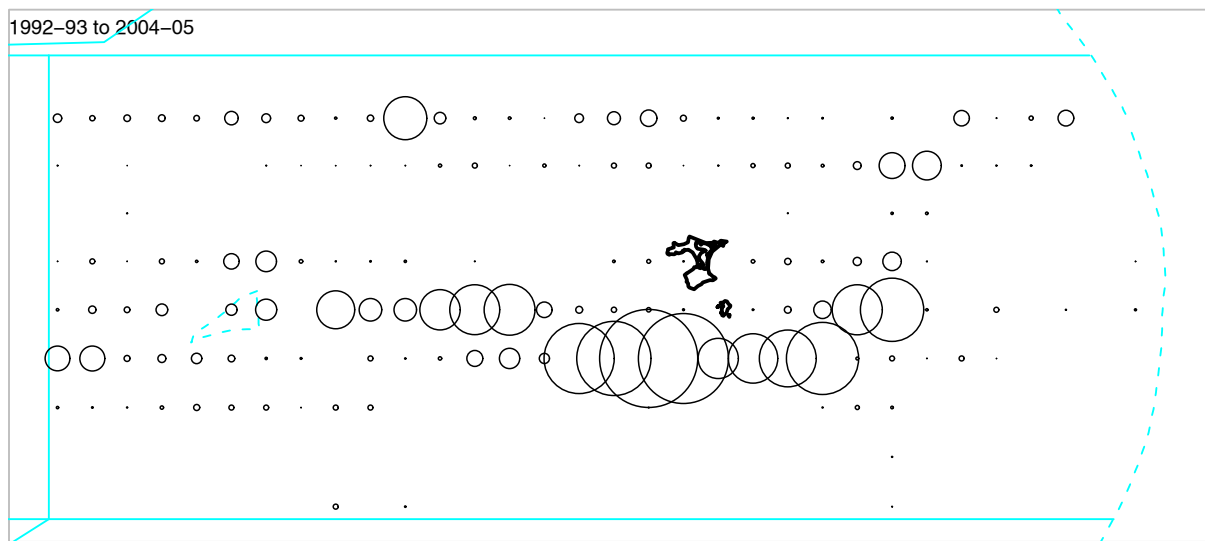


Figure 23: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05).

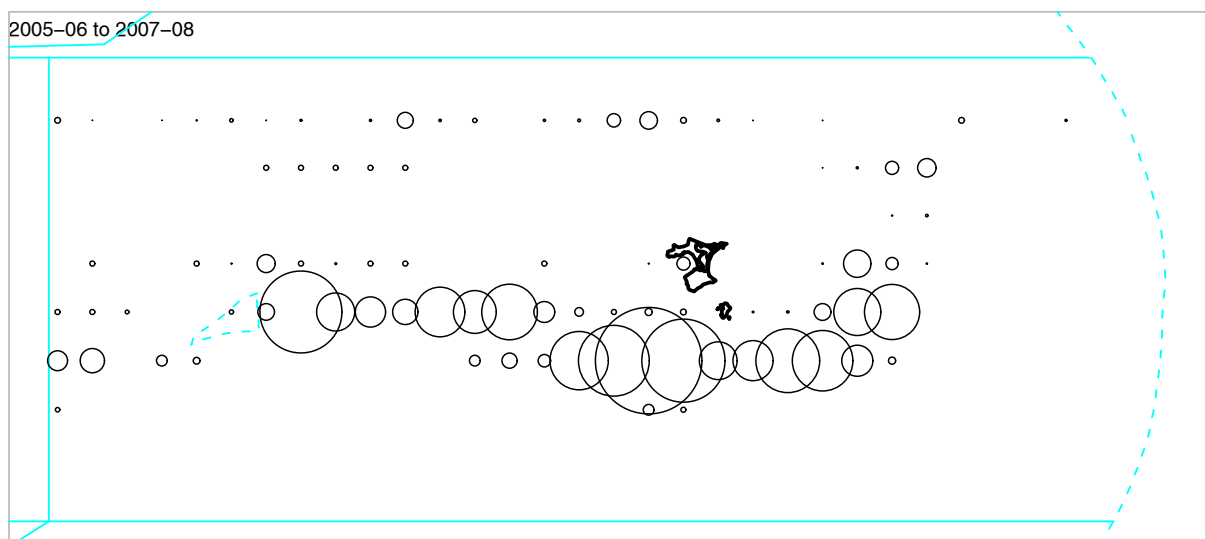


Figure 24: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2005-06 to 2007-08).

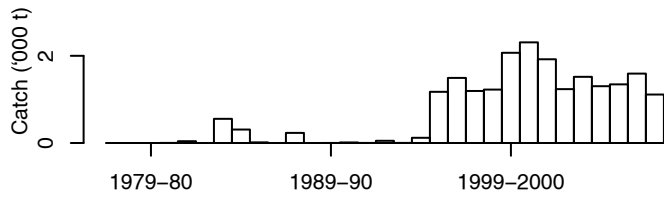


Figure 25: Smooth oreo annual estimated catch (t) from Pukaki Rise.

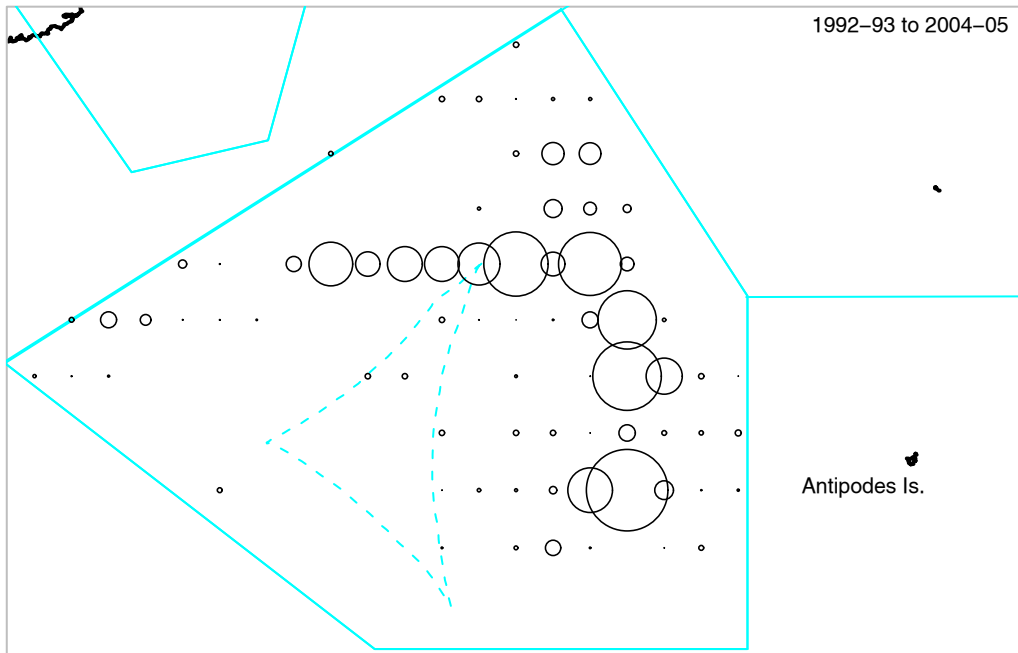


Figure 26: Smooth oreo Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05).

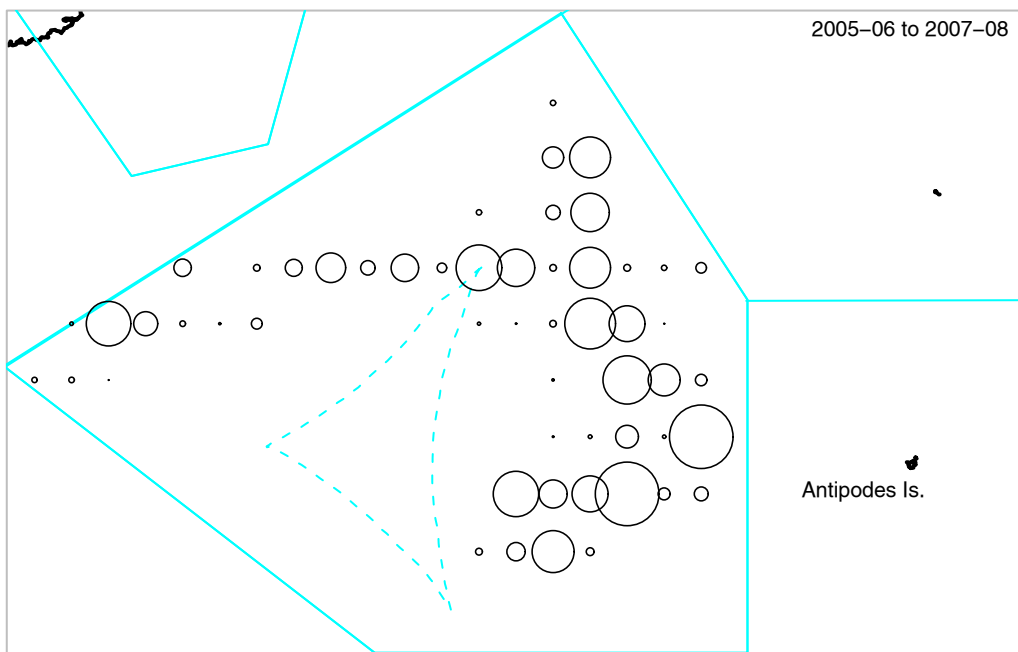


Figure 27: Smooth oreo Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2005-06 to 2007-08).

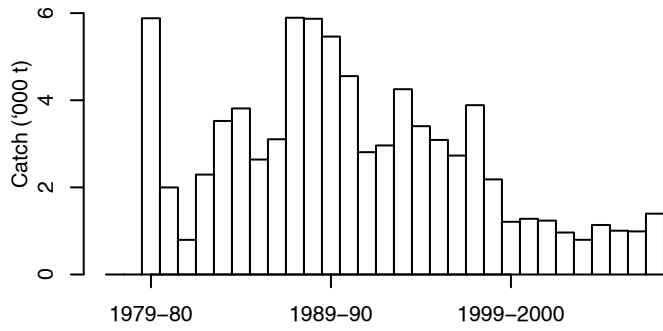


Figure 28: Smooth oreo annual estimated catch (t) from OEO 3A (minus Southland).

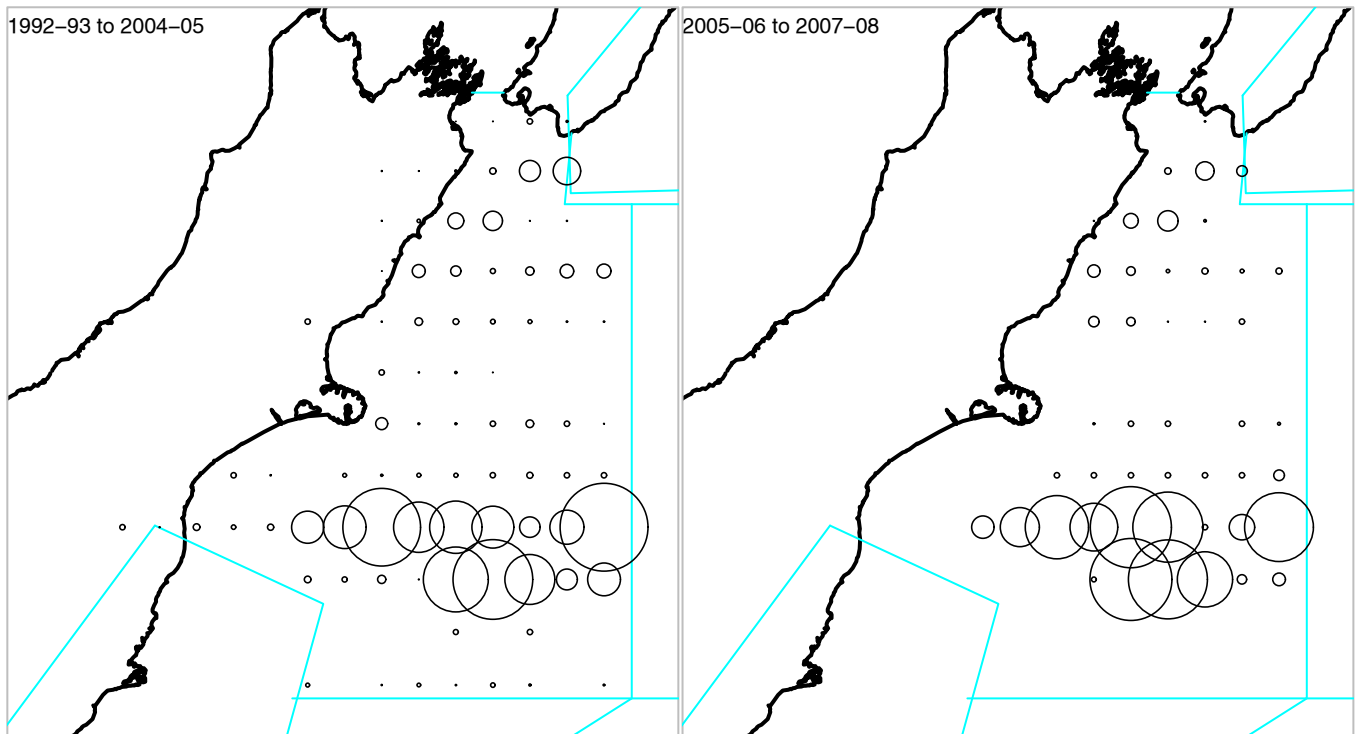


Figure 29: Smooth oreo OEO 3A relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05) left panel, and for the recent period (2005-06 to 2007-08), right panel.

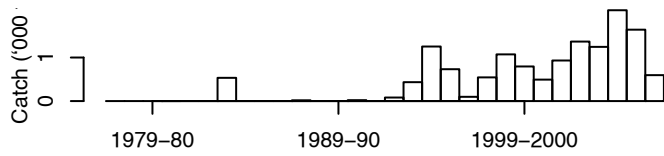


Figure 30: Smooth oreo annual estimated catch (t) from Bounty Plateau.

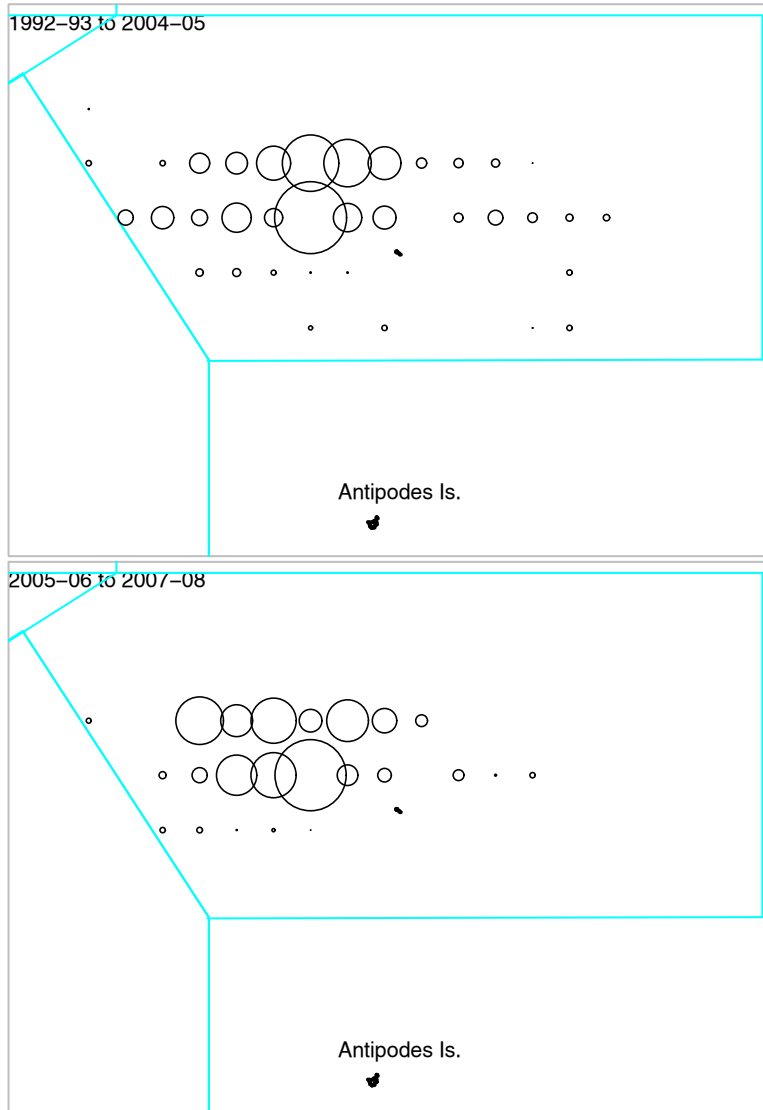


Figure 31: Smooth oreo Bounty Plateau relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2004-05) upper panel, and for the recent period (2005-06 to 2007-08) lower panel.