

**Descriptions of the black oreo and smooth oreo fisheries in OEO 1,
OEO 3A, OEO 4 and OEO 6
from 1977–78 to 2009–10**

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EXECUTIVE SUMMARY

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New Zealand Fisheries Assessment Report 2011/55.

Descriptions of black oreo and smooth oreo fisheries are presented with data from the 1977–78 to the 2009–10 fishing years. The analyses are based on Ministry of Fisheries commercial tow-by-tow estimated catch data, scaled to the reported landings by fishing year and QMA. All tows used in the analyses either targeted or caught unspecified oreo (OEO), black oreo (BOE), or smooth oreo (SSO).

Reported landings and TACCs, and total estimated catches for all oreo species combined are provided separately for each QMA. For each recognized fishery (either a region within a QMA, a region formed from part of two QMAs, or a region comprising an entire QMA) and for smooth and black oreo separately, tables are provided with detailed summaries of percentage catch by nation, effort (number of tows and number of vessels), catch (adjusted for the catch of unspecified oreo and scaled to the reported landings), catch rates, and the proportion of target tows with no catch. In addition, tables are provided for each fishery that show the effort by individual vessel in each year, in order to help determine the feasibility of performing a standardised CPUE analysis and the time periods which it might cover. Figures are also presented which summarise the location of fishing effort and catch sizes, and the pattern of effort and catch over each year.

The main features of the recent fishery are:

- Reported landings continued to decrease in OEO 1, and remain well below the TACC even after it was halved in 2007–08.
- Landings were stable and close to the TACC over the last several years in OEO 3A, OEO 4, and OEO 6.
- No fishing by foreign registered vessels was recorded in any oreo fishery in the last three years.
- The number of vessels operating in the OEO 1, Bounty Plateau, Pukaki Rise, and OEO 4 fisheries decreased in the last three years and remained stable in the other fisheries.
- Target fishing for smooth oreo in Wairarapa has virtually ceased.
- Target fishing for smooth oreo on the Auckland Island hills and in OEO 4, for black oreo on the Pukaki Rise, and for both species in OEO 3A (excluding Southland) increased in the last three fishing years.
- Over the last three years the estimated catch of smooth oreo decreased in Wairarapa and Pukaki Rise, and the estimated catch of black oreo decreased in Southland. The estimated catch in all other fisheries was relatively stable.
- There was no fishing for black or smooth oreo in the Puysegur fishery in the last three years.
- Unstandardised catch rates decreased in the last three years in the Pukaki Rise smooth oreo fishery, but no clear trend is evident in any other fishery.
- The fraction of zero tows increased in the last few years in the Southland, Macquarie Ridge, and Bounty Plateau smooth oreo fisheries. The reasons for this are unclear, but these fractions were generally lower than reported in some of the earlier years of these and other oreo fisheries, and may be related to improvements in fishing techniques and equipment and changes in reporting practices.

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 2009–10 is provided below. The fisheries are ordered from large to small, based on the average annual estimated catch from the last three years (2007–08 to 2009–10).

Fishery	Largest annual catch (t) (FY)	Annual catch trends over time	Average recent annual catch (t)	Recent average target catch rate (t/tow)	Catch limit (t)
(a) Black oreo					
Pukaki Rise	4 400 (81–82)	Declined, ceased in mid 1980s Fishing resumed in 1994–95. Recently increased.	3 100	3.1	
OEO 3A	12 400 (80–81)	Declined, then 3000–4000 t for 16 years, now 1500–2000 t.	1 600	5.8	
OEO 4	8 500 (80–81)	Declined.	800	3.3	
Southland	1 900 (83–84)	Fluctuated. Overall declined.	100	1.3	
Snares	2 400 (92–93)	Declined.	100	1.1	
Puysegur	2 300 (91–92)	Declined due to fishery closure.	less than 100	–	
(b) Smooth oreo					
OEO 4	7 800 (87–88)	Remained constant.	6 200	9.8	
Pukaki Rise	2 600 (00–01)	Declined slowly.	1 100	2.7	
OEO 3A	7 000 (88–89)	Declined.	1 500	6.0	1 400 ¹
Bounty Plateau	2 200 (04–05)	Fluctuated.	1 000	4.9	
Southland	3 900 (85–86)	Fluctuated, then declined.	400	3.9	400 ²
Macquarie Ridge	1 400 (00–01)	Fluctuated, then declined.	300	2.8	
Puysegur	1 100 (93–94)	Declined due to fishery closure.	less than 100	–	

– Too few target tows to estimate a catch rate, or the recent (2007–08 to 2009–10) fishery is small (100 t or less).

¹ A voluntary agreement between the fishing industry and the Minister of Fisheries to limit the catch of smooth oreo from OEO 3A to 1400 t was implemented in 1998–99 (Ministry of Fisheries 2011).

² Quota owners manage an agreed catch limit for SSO in the portion of the Southland fishery within OEO 1 (Clement and Associates Ltd 2009).

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 OEO2009/01 (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 OEO2009/01 had three specific objectives, but only specific objective 1 is the subject of this report.

Specific objective:

1. To update the descriptive analysis of the commercial catch and effort data for black oreo and smooth oreo from selected fisheries with the inclusion of data up to the end of the 2008/09 fishing year. The selected fisheries are OEO 1, OEO 3A, OEO 4 and OEO 6.

3. METHODS

The last published descriptive analyses of oreo catch and effort data was by Coburn & McMillan (2009). The current analyses are updated by including new data from the 2008–09 and 2009–10 fishing years 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 little or no fishery-independent 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 April to 31 March up to 1982–83, 1 October to 30 September thereafter).

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.

Catch and effort figures.

The patterns of oreo fishing over time in the EEZ were analysed by summing the number of tows 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. Raw catch weights by species were modified by adding to them a fraction of the catch of unspecified oreos according to the ratio of species catch weights in the relevant fishing year and fishery, and then by applying a scaling factor based on the ratio of estimated catch to landed catch for the relevant fishing year and QMA.

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 2009–10 (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 years (2007–08 to 2009–10) with a threshold value of 5 tows per cell, were plotted in the same way to provide an overview of recent activity.

In a similar way, the cumulative catches of black oreo and smooth oreo per cell were also separately plotted. For these, circles were plotted at the centre of each cell where the circle area was proportional to the weight of fish caught. All tows from 1977–78 to 2009–10 (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, 2007–08 to 2009–10, with a threshold value of 5 t per cell, were plotted in the same way to provide an overview 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 catch rate (tonnes per tow), number of tows, and number of vessels for all tows targeting or catching **smooth** oreo; the catch rates and number of tows for only the tows targeting **smooth** oreo; the total catch; and the percentage of tows with no catch of **smooth** oreo, by fishing year. Total (estimated) catch is scaled to reported landings and adjusted for the catch of unspecified oreos, as described above.
- 3) The catch rate (tonnes per tow), number of tows, and number of vessels for all tows targeting or catching **black** oreo; the catch rates and number of tows for only the tows targeting **black** oreo; the total catch; and the percentage of tows with no catch of **black** oreo, by fishing year. Total (estimated) catch is scaled to reported landings and adjusted for the catch of unspecified oreos, as described above.
- 4) Numbers of tows with a positive catch of **smooth** oreo by vessel and fishing year, with vessels ordered by the mean fishing year of all tows attributed to them. Only cells with 10 or more positive catches are shown.
- 5) Numbers of tows with a positive catch of **black** oreo by vessel and fishing year, with vessels ordered by the mean fishing year of all tows attributed to them. Only cells with 10 or more positive catches are shown.

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 the scaled annual total catch was 1 t or more. Unscaled catches were used to calculate catch rates.

3.3 Summary plots

Mean annual estimated scaled catch and the mean annual unstandardised CPUE of black oreo and smooth oreo separately from each fishery are shown for the last three years (2007–08 to 2009–10). 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 over the last several 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 catch history, the distribution of accumulated catch from a 15 year (reference) period following the introduction of GPS (1992–93 to 2006–07), and the accumulated catch from the last three years (2007–08 to 2009–10). 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.

Cumulative catch plots were prepared for each fishery. In these, catches in each year were summed in chronological order and scaled to the total estimated catch for the year. The relative accumulated catch after the addition of the catch from each new tow is represented in these plots by a single point in a series. A series is plotted for each year of the fishery to illustrate the historical spread of fishing across the fishing year, with the last three years (2007–08, 2008–09, and 2009–10) shown in detail, along with the percentage of tows by month.

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 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 were from the Southland fishery. The only stock assessments for oreos in OEO 1 were 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 were 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 3100 t in 2002–03, and then raised in 2009–10 to 3350 t. Recent catches were generally 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 were the subject of previous MFish funded research survey and stock assessment, e.g., Doonan et al. (2009a, 2009b).

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 6750 t was introduced in 1982–83 based on average annual catch. The TACC was raised to 7000 t in 1987–88 and remained at this level 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, 2011).

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 was the predominant species taken except for the last four years (2006–07 to 2009–10) 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 were consistently close to the TACC, although usually slightly below it. OEO 6 contains several oreo fisheries but most recent catches were from the Pukaki Rise fishery. Stock assessments for oreos in OEO 6 include Pukaki Rise smooth oreo (Coburn et al. 2007, McKenzie 2007), Bounty Plateau smooth oreo (McKenzie 2009), and Pukaki Rise black oreo (Anderson & Doonan 2010, Doonan et al. 2010). 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 88% of reported landed catch for OEO 1, 80% for OEO 3A, 94% for OEO 4, and 92% for OEO 6 over the last 10 years (2000–01 to 2009–10) (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.

Over the entire history of the New Zealand oreo fishery (since 1977–78), most of the tows have been in OEO 3A, OEO 4, Southland, Pukaki Rise, Puysegur, Macquarie Ridge, Snares, Wairarapa, Bounty Plateau, and Auckland Island hills (Figure 6). The distribution of tows for the last three years (2007–08 to 2009–10) 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 OEO 3A. There was no fishing in the closed Puysegur fishery (Figure 7).

Black oreo catches since 1977–78 (Figure 8) were mainly from OEO 3A in early years, but the Pukaki Rise displaced OEO 3A as the largest fishery in 2002–03. Smaller contributions came from OEO 4, Pukaki Rise, Southland, Puysegur, and Snares (Figure 8). Pukaki Rise was the largest black oreo fishery over the last three fishing years (Figure 9).

Smooth oreo catches since 1977–78 were mainly from 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 the most important, followed by OEO 3A, Bounty Plateau, Pukaki Rise, Southland, and Macquarie Ridge (Figure 11).

Comparison of the plots of the number of tows 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 tows in more northern 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

- 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. Fishing is spread out over the area, but has been focused more in the south, particularly for black oreo (Figures 6–11).
- Soviet vessels took most of the catch from 1977–78 to 1987–88. New Zealand vessels dominated from 1990–91 onwards except for 2005–06 when Ukraine vessels fished extensively. This fishery was fished by New Zealand vessels only in the last three years (Table 5).
- Smooth oreo have made up the largest proportion of oreo catch in most years. Both species are targeted, but smooth oreo is targeted predominantly (Tables 6 & 7).
- There are 55 main vessels that have operated in this fishery since 1983–84, with a constant turnover over time (Tables 8 and 9). Linkage of vessels between years is poor in the late 1980s and a standardised CPUE analysis would probably need to split the time series at this point.
- The seasonal pattern of fishing is highly variable, and fishing has taken place at all times of the year (Figure 12). There is often an intense period of fishing early in the year, especially obvious in 2007–08 and 2009–10 when 50–60% of the annual catch was taken before November.

Smooth oreo (Table 6)

- The number of vessels ranged mainly between 10 and 20 up until 2003–04, and dropped to 2–6 since then.
- There was minimal catch before 1983–84, when targeted fishing began. Catches peaked at 3921 t in 1985–86 and were generally 500–2500 in the following years up to 2004–05. Catches reduced to 300–450 t in the last five years. 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 2009). The 2009–10 smooth oreo catch (311 t), was the lowest since 1988–89.
- Raw catch rates were more variable earlier in the fishery (1.7–8.5 t/tow), and generally higher before 1996–97. Catch rates since 1996–97 were stable and mostly between 2.5 and 3.5 t/tow. Target catch rates follow a similar pattern.
- The fraction of zero tows, high in the 1980s and early 1990s, was less than 10% in most years since 1993–94, but increased to 16% in 2009–10.

Black oreo (Table 7)

- The number of vessels ranged mainly between 10 and 20 up until 2003–04, and dropped to 2–6 since.
- Fished since 1979–80 and catches have fluctuated with the highest catch (1850 t) in 1983–84. The 2009–10 catch (57 t) was the lowest since 1983.
- Catch rates were also greatest in 1983–84 (and the target catch rates highest in 1988–89) and, although highly variable, generally declined over time.
- The fraction of zero tows, high in the 1980s, was 2% or less in most years since

4.3.2 OEO 1 – Puysegur

- This fishery lies between 46° 25.2' S, 47° 30.5' S, 164° 46.0' E, and 166° 29.5' E (see Figure 6). Oreos were caught at first as the main bycatch of the orange roughy fishery. The fishery occurred on the hills and slopes of the Puysegur Bank until the orange roughy fishery was closed there in 1997–98, and there has been no reported fishing in the last three years (Figures 6–11).
- Fished initially by Japanese vessels, at a low level of effort, but since 1989–90 New Zealand vessels dominated apart from some effort by Ukraine vessels in 2003–04 and 2004–05 (Table 10).
- Catches are predominantly black oreo, although smooth oreo were caught in similar amounts to black oreo in the most recently fished years (Tables 11 and 12).
- There are 21 main vessels that have operated in this fishery since 1989–90. Linkage of vessels between years ceases in 1996–97 and a standardised CPUE analysis would probably end the time series at this point (Tables 13 & 14).
- The seasonal pattern of fishing was variable, with fishing occurring at all times of the year, but predominantly catches accumulate faster early in the fishing year – to about half the annual catch within the first few months – and then accumulate more slowly throughout the remainder of the year (Figure 12).

Smooth oreo (Table 11)

- The number of vessels rose from 1 in 1989–90 to 17 two years later. By 1995–96 there were only 6 vessels and since then only 1 or 2 vessels have targeted or caught smooth oreo in each year.
- Smooth oreo has been fished since 1989–90 with catches peaking in 1993–94, then decreasing slowly until 2007–08 when fishing ceased.
- Catch rates were mostly 1–3 t/tow and with little pattern over time. Catch rates for target tows only were generally lower but were similar when the fraction of target tows was high in 1999–2000 and 2000–01.
- Apart from 1999–2000, the fraction of zero tows was 4% or less.

Black oreo (Table 12)

- The pattern of vessels numbers is similar to that of smooth oreo.
- Catches peaked in 1991–92, and effort and catch subsequently dropped rapidly, and fluctuated considerably before fishing ceased in 2007–08.
- Catch rates were highest in the late 1980s and early 1990s, and declined to 1–2 t/tow in most years since then.
- The fraction of zero tows was consistently low, usually less than 1%.

4.3.3 OEO 1 – Snares

- This fishery lies between 47° 41.9' S, 48° 24.6' S, 164° 29.1' E, and 165° 42.5' W (see Figure 6). This is a hill fishery for orange roughy and oreos west of the Snares Islands. The fishery began in 1990–91 and is closely associated with the Puysegur fishery (Figures 6–11). Initially, oreos were caught as a bycatch of orange roughy fishing, but there was a switch to mainly target fishing for oreos in 1996–97.
- Carried out entirely by New Zealand vessels except in 2003–04, 2004–05, and 2006–07 when Ukraine vessels fished (Table 15).
- Black oreo was the main oreo species reported caught up to 1996–97, with catches divided between black oreo and smooth oreo in most subsequent years (Tables 16 and 17).
- There have been nine vessels operating in this fishery since 1990–91 (Tables 18 and 19), with one vessel fishing in most of these years and providing linkage over time which may allow a standardized CPUE to include the whole time series.

- The seasonal pattern of fishing was relatively consistent, with steady accumulation of catch in most years. In some years, however, little catch was taken before May and in the last three years the catch was taken entirely within one or two short periods near the middle of the fishing year (Figure 13).

Smooth oreo (Table 16)

- The number of vessels operating in this fishery was consistently low, ranging from 2 to 7 between 1990–91 and 2002–03 and between 1 and 3 since then.
- Catches peaked at 761 t in 1992–93 and were stable at 100–300 t for the following eight years. Catches dropped considerably since then, to less than 30 t per year, despite occasionally high levels of effort.
- Catch rates have fluctuated over time but generally dropped after peaking in the early 1990s.
- The annual fraction of zero tows was never greater than 9%, and since 2000–01 was less than 1%.

Black oreo (Table 17)

- The pattern of vessels numbers is similar to that of smooth oreo.
- Catches peaked in 1992–93 at 1250 t, and dropped steadily since, although the 371 t catch in 2007–08 was the highest for 11 years. Effort was greatest in the early 1900s, and was low and variable since.
- High raw catch rates were achieved in the first few years (13 t/tow in 1991–92), and since 1997–98 were relatively steady, generally 1–2 t/tow. Target catch rates decreased over time.
- The annual fraction of zero tows was 0–2% in all years.

4.3.4 OEO 1 – Wairarapa

- This fishery lies 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). This is the most northern of the recognized oreo fisheries (see Figures 6–11) and is probably a rough-bottom fishery on plateaus and undulating bottom. Oreo was taken mainly as bycatch in orange roughly target fishing.
- New Zealand vessels were responsible for all the catch since 1983–84. Before then, some fishing was attributed to Japanese and Russian vessels (Table 20).
- The main catch was smooth oreo, with very little black oreo catch recorded (Tables 21 and 22).
- There were 21 vessels operating in this fishery since 1981–82 (Tables 23 and 24), with linkage between years in the smooth oreo target fishery provided by several vessels which operated for a long time. This may allow a standardized CPUE to include most of the time series. Data is more limited for black oreo and a standardized CPUE is unlikely to be worthwhile.
- The seasonal pattern of fishing was relatively consistent, with fishing usually concentrated in the first half of the fishing year, and little catch taken after May. The three most recent years were typical in this regard (Figure 13).

Smooth oreo (Table 21)

- The number of vessels grew slowly from 1–2 in the early 1980s to a peak of 12 in the mid 1990s. Vessel numbers decreased slowly since then, to 3–5 in the last five years.
- Catches fluctuated between about 30 t and 300 t for much of the history of the fishery, but peaked at 900 t in 2000–01 and, following a steady decrease over a period of nine years, reached a low of 7 t in 2009–10.
- Catch rates were relatively low, less than 1 t per tow in most years (even when targeted), but were 3–4 t/tow for a few years in the early 2000s.
- The annual fraction of zero tows was 5% or less in most years.

Black oreo (Table 22)

- The number of vessels reporting catches of black oreo was less than for smooth oreos, and was consistently 1–6 with little pattern over time.
- Annual catches were never greater than 50 t, with no catch since 2004–05.
- Annual raw catch rates were mostly less than 0.5 t/tow.
- Black oreo were not targeted in this fishery.

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

- This area comprises the remainder of oreo management area OEO 1 north of 45° S (see Figure 6). This area is a catch-all for any other oreo fishing outside the main OEO 1 fisheries defined above. Oreo was caught over a wide area, mainly as a bycatch of orange roughly fishing on the west coasts of the North and South Islands, the Challenger Plateau, and the east coast of the North Island (see Figures 6–11). 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.
- Carried out by vessels of various nationalities from 1977–78 to 1983–84, and predominantly by New Zealand vessels thereafter (Table 25). Only New Zealand vessels operated in this fishery in the last five years.
- Smooth oreo was the main oreo species caught, but the catches of each species fluctuated with a similar pattern, dictated by the level of effort (Tables 26 and 27).
- There are 32 main vessels that have operated in this fishery since 1981–82 (Tables 28 and 29), with vessel linkage between years in the smooth oreo target fishery for most of the period, but a distinct gap in the black oreo fishery in the early 1990s. Standardized CPUE would be difficult in this broadly spread fishery.

Smooth oreo (Table 26)

- The number of vessels peaked at 21 in 1998–99 and subsequently dropped to 7 in the last three years.
- Annual catches were variable, with the highest levels (800–1400 t) occurring between 1995–96 and 2000–01. Since then catches were 20–400 t per year.
- Raw catch rates were variable, with generally higher values in the late 1990s, and show no trend over time. Target catch rates show a similar pattern.
- The annual fraction of zero tows was generally 5% or less.

Black oreo (Table 27)

- The number of vessels peaked at 21 in 1998–99 and subsequently dropped to 5 in the last fishing year.
- Annual catches were generally less than 100 t, but were higher for a period in the late 1990s, peaking at 760 t in 1997–98.
- Raw catch rates were mostly less than 1 t/tow, but were higher (up to 7.6 t/tow) at times during the 1990s. Target catch rates were generally higher.

4.3.6 OEO 6 – Auckland Island hills

- 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 Figures 6–11). This is a target hill fishery for smooth oreo and orange roughly.
- There was Soviet fishing in 1981–82 and 1985–86, but New Zealand vessels fished virtually exclusively in this fishery since 1990–91 (Table 30).
- Smooth oreo was the main oreo species caught, with only very small amounts of black oreo reported (Tables 31 and 32).

- There were 9 vessels operating in this fishery since 1992–93 (Table 33), with good vessel linkage between years in the smooth oreo target fishery. Standardisation of CPUE may be feasible for this fishery.
- In most years the catch was taken early in the fishing year, generally 80% before March, with only small amounts taken over the remainder of the year (Figure 14). This is true for 2009–10 also, but the catch was taken later in the two previous years.

Smooth oreo (Table 31)

- The number of vessels was low, climbing to a high of 8 in 1998–99 and dropping to 1–2 in the last six years.
- Annual catches were small before 1992–93, but were 200–700 t from then until 2003–04, after which they were more variable.
- Raw catch rates were relatively high, generally 2.5–4.5 t/tow, with no trend over time. Target catch rates were more variable.
- The annual fraction of zero tows was usually less than 5%.

Black oreo (Table 32)

- The number of vessels was never greater than 4, and was 0–1 in the last seven years.
- The annual catch was 39 t in 1982–83, but since then was 5 t or less.
- Catch rates were 0.5 t or less.
- The annual fraction of zero tows was variable due to the low number of tows, but was usually less than 1%.

4.3.7 OEO 6 – Bounty Plateau

- This is a predominantly oreo target fishery, lying between 46° 29.3' S, 47° 60.0' S, 176° 23.8' E, and 178° 8.4' W, along the north slope of the Bounty Plateau (see Figures 6–11).
- Soviet vessels undertook some trawling in the early 1980s, but New Zealand vessels reported virtually all the catch from 1990–91 onward, and fished exclusively in this fishery over the last four years (Table 34).
- Smooth oreo was the main oreo species caught, but with substantial catches of black oreo reported in a few years, 1983–84 in particular (Tables 35 and 36).
- There are 19 main vessels that have operated in this fishery since 1993–94 (Tables 37 and 38), with good vessel linkage between years. Standardisation of CPUE may be feasible for smooth oreo.
- In the three most recent years, and several earlier years, the catch accumulated steadily over the fishing year, often with high levels of effort near the end of the year. In other years there was a focus of effort and catch in October and November (Figure 14).

Smooth oreo (Table 35)

- The number of vessels was mostly less than 2 until 1994–95, growing to a peak of 11 in 1998–99, then decreasing to 2 vessels in the last three years.
- Apart from 1982–83 catches were in the tens of tonnes until 1992–93 when catches began to increase, peaking at about 2200 in 2004–05, and declining slightly since.
- Raw annual catch rates were high, 3–18 t, decreasing from a peak in 1993–94 but showing no recent trend. Target catch rates were more variable, but also show no recent trend.
- The annual fraction of zero tows was variable and often relatively high (more than 5%). This fraction increased to 10–22% in the last several years.

Black oreo (Table 36)

- The number of vessels was generally 5 or less, with a maximum of 9 in 1998–99.
- The total annual catch was 725 t in 1983–84 but since then was always less than 100 t and usually 10 t or less.
- Raw annual catch rates were occasionally high (about 13 t/tow) in the earlier years, but since 1991–92 were mostly less than 1 t/tow.
- The annual fraction of zero tows was mostly less than 1%.

4.3.8 OEO 6 – Pukaki Rise

- This flat bottom and drop-off target oreo fishery lies along the north and east slopes of the Pukaki Rise 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 Figures 6–11).
- Black oreo were fished mainly by Soviet vessels from 1978–79 to 1983–84. New Zealand vessels took most of the catch since 1988–89 and fished exclusively over the last three years (Table 39).
- Large annual catches of both black and smooth oreo have been made through much of the history of this fishery, although there was little fishing effort in the late 1980s and early 1990s. Black oreo have always been the main species caught (Tables 40 and 41).
- There were 35 vessels operating seriously in this fishery since 1980–81 (Tables 42 and 43), with the gap in fishing separating the fishery into two time series for the purposes of CPUE standardization (see Anderson & Doonan 2010 for a recent black oreo CPUE analysis).
- Catches accumulated steadily throughout the year in most years, especially the last three (Figure 15).

Smooth oreo (Table 40)

- There were up to nine vessels fishing in the early phase of the fishery, and up to 12 in the later phase. The number of vessels decreased recently, from 12 in 2004–05 to 2–3 in the last three years.
- The total annual catch peaked at 640 t in the early phase of the fishery, and after a few years of little or no fishing in the early 1990s rose rapidly to 1000–2500 t in most years since. Annual catches decreased over the last three years, the 895 t estimated for 2009–10 was the lowest since 1994–95.
- Raw annual catch rates were variable but often high in the early phase of the fishery. Catch rates generally decreased from 3–4 t/tow in the 1990s to 1–2 t/tow since 2004–05. Target catch rates were more variable.
- Apart from a few years in the early phase, the fraction of zero tows was relatively low, generally about 1–7%.

Black oreo (Table 41)

- The pattern of vessel numbers in this fishery is the same as for the smooth oreo fishery.
- The total annual catch reached over 4000 t in 1981–82, but fishing ceased for several years in the late 1980s. Since fishing resumed, annual catches were about 1000–3400 t, the highest catches occurring in the years since 2005–06.
- Raw annual catch rates were greatest in the early phase of the fishery and in the initial years of the later phase. Raw catch rates since 1998–99 were stable at about 2.5–3.5 t/tow with no trend. Target catch rates also showed no trend.
- The fraction of zero tows was high in the early phase, mostly 10–40%, but was 5% or less since 1989–90.

4.3.9 OEO 6 – Macquarie Ridge

- This fishery, in the northern section of the Macquarie Ridge within the EEZ, 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, and is almost continuous with the Snares and Puysegur fisheries (see Figures 6–11).
- Fishing was almost entirely by New Zealand vessels, with only a small percentage by Belize vessels in 1998–99 (Table 44).
- Catches were predominantly smooth oreo, but black oreo was also frequently caught (Tables 45 and 46).
- There are nine main vessels that have operated in this fishery since 1990–91 (Tables 47 and 48), with good vessel linkage between years.
- Fishing was strongly focused in the early part of the fishing year, with 80–90% of the annual catch usually taken before April. The most recent three years were typical in this regard (Figure 15).

Smooth oreo (Table 45)

- Vessel numbers grew to a peak of six in 1998–99 and steadily decreased since, to 1–2 vessels from 2003–04.
- The total annual catch grew steadily to peak at 1369 t in 2000–01 and was variable but declining since.
- Raw annual catch rates peaked at about 10 t/tow in 1993–94 and slowly decreased since. Target catch rates were more variable but also generally decreased since peaking in 1996–97.
- The fraction of zero tows was relatively high, generally 10–20%.

Black oreo (Table 46)

- Vessel numbers as per smooth oreo.
- The total annual catch fluctuated over time, with a peak of 177 t in 1998–99, and about 3–92 t in the last six years.
- Raw catch rates decreased from 8 t/tow in 1990–91 to 1–2 t/tow since 1998–99, with no recent trend.
- The fraction of zero tows was negligible throughout.

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

- This is a flat bottom, drop-off, and hill fishery mostly targeting oreo, located on the Chatham Rise in the region west of 176° E but excluding the part of OEO 3A that falls within the Southland fishery (see Figures 6–11).
- Fishing was dominated by Soviet vessels up to 1986–87, and then by New Zealand vessels. All fishing in the last three years was by New Zealand vessels (Table 49).
- Catches were predominantly black oreo until 1984–85, reflecting the Soviet preference for that species, but since then there was an even mixture of black and smooth oreo (Tables 50 and 51).
- There were 131 vessels operating in this fishery since 1979–80 (Tables 52 and 53), with good vessel linkage between years throughout, for both target fisheries.
- Fishing was spread out over the fishing year, but with an emphasis on October, November, and September. The most recent three years were typical, although there was little catch after May in 2009–10 (Figure 16).

Smooth oreo (Table 50)

- Vessel numbers grew rapidly to a peak of 42 in 1985–86 before declining but remained at 20–30 vessels between 1989–90 and 2003–04. Since then, 12–16 vessels operated in this fishery.

- Total annual catches ranged from about 700 to about 7000 t up to 1988–89 then declined to a constant level of about 1100–1700 from 1999–2000 to 2009–10
- Raw catch rates were greatest at the beginning of the fishery but rapidly settled to about 2–4 t/tow since the mid 1980s. The target catch rates were generally higher than raw catch rates and increased from a low of 2 t/tow in the mid 1990s.
- The fraction of reported zero tows increased from the beginning of the fishery and was 10–20% for several years in the late 1980s and early 1990s before decreasing to 1–2% in most recent years.

Black oreo (Table 51)

- The pattern of vessel numbers is similar to that in the smooth oreo fishery.
- Total annual catches reached over 12 000 t in 1980–81, were mostly 2000–6000 t between 1982–83 and 2001–02, and since then were constant at 1440–1900 t.
- Raw annual catch rates dropped from about 6 t/tow initially to about 2 t/tow by the late 1980s, then were variable but generally 2–4 t/tow since. Target catch rates were variable but generally increased since 1987–88.
- The fraction of zero tows shows a pattern over time similar to that of smooth oreo.

4.3.11 OEO 4 – South-east Chatham Rise

- This is a flat bottom, drop-off, and hill fishery with oreo mainly taken as bycatch in orange roughy fishing. It lies on the Chatham Rise, in the region east of 176° E (see Figures 6–11).
- Predominantly fished by Soviet vessels up to 1984–85 and by New Zealand vessels thereafter. All fishing in the last three years was by New Zealand vessels (Table 54).
- Black oreo catches were predominant only from 1978–79 to 1980–81, with smooth oreo then more important (Tables 55 and 56).
- There were 103 vessels operating in this fishery since 1978–79 (Tables 57 and 58), with good vessel linkage between years throughout, for both target fisheries.
- Fishing was evenly spread out over the fishing year, but was usually mostly completed by the end of June. The most recent three years were typical (Figure 16).

Smooth oreo (Table 55)

- Vessel numbers grew rapidly to a peak of 31 in 1987–88 and fluctuated between 8 and 25 since then. Since 2005–06 there were 13 or fewer vessels operating.
- Total annual catches increased rapidly to peak of about 7800 t in 1987–88 and remained at a high level (mostly over 6000 t) since then.
- Raw annual catch rates were mostly 2–4 t/tow and show no trend over time. Target catch rates were higher but variable and generally increasing since about 1989–90.
- The fraction of reported zero tows was relatively high in the early years of the fishery, but since 1985–86 was mostly less than 5%.

Black oreo (Table 56)

- The pattern of vessel numbers is similar to that in the smooth oreo fishery.
- Total annual catches were greatest at the beginning of the fishery (8500 t in 1980–81), but dropped thereafter to about 1000–2000 t for several years and then a little further, to 600–1000 t over the last 16 years.
- Raw annual catch rates decreased from 4.5 t/tow in 1980–81 to 0.7 t/tow in 1989–90, but remained stable since. Target catch rates were variable, but generally high when there was sufficient fishing to calculate annual values.
- The fraction of reported zero tows was relatively high in the early years of the fishery, but since 1988–89 was less than 1%.

4.4 Summary plots

The mean annual estimated catches of black oreo and smooth oreo for each fishery in the last three years (2007–08 to 2009–10) are shown in Figure 17. There were three black oreo fisheries close to or over 1000 t per annum: Pukaki Rise (3100 t), OEO 3A (1600 t) and OEO 4 (800 t). Smooth oreo fisheries close to or more than 1000 t per annum were: OEO 4 (6200 t), Pukaki Rise (1100 t), OEO 3A (1500 t), and Bounty Plateau (1000 t).

Mean annual unstandardised catch rates (t/tow) for each of the fisheries in the last three years (2007–08 to 2009–10) are shown in Figure 18. OEO 3A (6.0 t/tow) had the highest black oreo catch rates followed by OEO 4 (3.3) and Pukaki Rise (3.1). The smooth oreo catch rate in OEO 4 (9.8 t/tow) was highest followed by OEO 3A (6.0), Bounty Plateau (4.9), Southland (3.9), Auckland Island hills (3.5), Macquarie Ridge (2.8), and Pukaki Rise (2.7).

Black oreo

The largest fishery in the last three years was Pukaki Rise (Figure 19). The fishery operated in the early to mid 1980s but was rested for several years and 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 remained similar, although slightly more catch was taken in the south (Figure 20).

The second largest fishery was OEO 3A (Figure 21). This was formerly the largest fishery in the EEZ (15 400 t reported catch 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 2006–07) and for the last three fishing years (2007–08 to 2009–10) are similar, although the centre of fishing may have moved slightly southeast (Figure 22).

The third largest fishery in the last three years was in OEO 4, where oreo are taken mostly taken as a bycatch to orange roughy target fishing. Reported catches were fairly stable over the last 12 years (Figure 23). The spatial distribution over the last three years (2007–08 to 2009–10) differs to that over the post-GPS reference period (1992–93 to 2006–07) with less catch being taken from the southeast (Andes and Big Chief hill complexes) (Figure 24).

Smooth oreo

OEO 4 is the largest and longest-established of the smooth oreo fisheries, with increasing catches in the 1980s followed by relatively steady levels through to the present (Figure 25). Catches in this fishery are mostly associated with seamounts and undulating terrain. Comparison of the distribution of catches suggests little change between the post-GPS period and the last three fishing years, except that there was less dependence on the area to the southwest of the Chatham Islands (Figure 26).

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 (2552 t) and subsequently declined (Figure 27). The distribution of catches in the last three fishing years compared to the post-GPS period suggests that the most productive fishing areas changed little over time (Figure 28).

The OEO 3A (minus Southland) smooth oreo fishery is one of the longest-established oreo 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 29). Comparison of the catch distributions suggests little change in the last three fishing years compared to the post-GPS period (Figure 30).

The Bounty Plateau smooth oreo fishery is a relatively recent fishery with the highest catch in 2004–05 (Figure 31). Comparison of the catch distributions suggested a slight shift of catches to the west and south, and less fishing towards the extremities of the fishery in the last three fishing years compared to the post-GPS period (Figure 32).

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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	2 828	17	8	101	47
1979–80*	143	141	18	15	99	83
1980–81*	467	480	283	286	103	101
1981–82*	21	22	4 380	4 190	105	96
1982–83*	162	140	765	685	86	90
1983–83#	39	78	354	426	200	120
1983–84†	3 241	3 690	3 568	3 092	114	87
1984–85†	1 480	1 844	2 044	1 853	125	91
1985–86†	5 390	5 834	126	126	108	100
1986–87†	532	413	0	0	78	–
1987–88†	1 193	1 099	197	249	92	126
1988–89†	432	316	0	0	73	–
1989–90†	2 069	1 860	0	0	90	–
1990–91†	4 563	3 592	288	279	79	97
1991–92†	4 156	3 577	33	19	86	58
1992–93†	5 739	5 625	815	580	98	71
1993–94†	4 910	4 593	983	864	94	88
1994–95†	1 483	1 294	2 528	2 254	87	89
1995–96†	4 783	3 972	4 435	3 810	83	86
1996–97†	5 181	4 927	5 645	5 225	95	93
1997–98†	2 681	2 733	5 222	4 799	102	92
1998–99†	4 102	3 787	5 287	4 707	92	89
1999–00†	3 711	3 420	5 914	5 467	92	92
2000–01†	4 852	4 447	5 932	5 371	92	91
2001–02†	4 197	3 857	5 737	5 454	92	95
2002–03†	3 034	2 873	6 115	5 643	95	92
2003–04†	1 703	1 421	5 811	5 320	83	92
2004–05†	1 025	832	5 744	5 481	81	95
2005–06†	850	643	6 463	5 924	76	92
2006–07†	903	773	5 926	5 285	86	89
2007–08†	947	843	5 902	5 204	89	88
2008–09†	582	578	5 540	5 535	99	100
2009–10†	464	386	5 730	4 620	83	81

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2009–10. *, 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		% of tow-by-tow data	
	Reported	Tow by tow	Reported	Tow by tow	OEO 3A	OEO 4
1978–79*	1 366	1 367	8 041	8 150	100	101
1979–80*	10 958	10 913	680	694	100	102
1980–81*	14 832	15 043	10 269	10 476	101	102
1981–82*	12 750	13 043	9 296	9 217	102	99
1982–83*	8 576	8 797	3 927	3 103	103	79
1983–83#	4 409	4 441	3 209	4 098	101	128
1983–84†	9 190	9 098	6 104	6 158	99	101
1984–85†	8 284	6 775	6 390	6 419	82	100
1985–86†	5 331	4 722	5 883	5 838	89	99
1986–87†	7 222	7 100	6 830	6 818	98	100
1987–88†	9 049	8 943	8 674	8 533	99	98
1988–89†	10 191	8 570	8 447	7 548	84	89
1989–90†	9 286	7 735	7 348	5 852	83	80
1990–91†	9 827	8 762	6 936	6 112	89	88
1991–92†	10 072	9 371	7 457	6 480	93	87
1992–93†	9 290	8 508	7 976	6 161	92	77
1993–94†	9 106	9 035	8 319	6 772	99	81
1994–95†	6 600	6 164	7 680	6 435	93	84
1995–96†	7 786	7 672	6 806	5 874	99	86
1996–97†	6 991	7 007	6 962	6 121	100	88
1997–98†	6 336	5 672	7 010	6 357	90	91
1998–99†	5 763	5 344	6 931	6 492	93	94
1999–00†	5 859	4 005	7 034	6 518	68	93
2000–01†	4 577	3 729	7 358	6 840	81	93
2001–02†	3 923	3 182	4 864	4 375	81	90
2002–03†	3 070	2 171	5 402	4 973	71	92
2003–04†	2 856	2 003	6 735	6 327	70	94
2004–05†	3 061	2 313	7 390	6 869	76	93
2005–06†	3 333	2 338	6 829	6 266	70	92
2006–07†	3 073	2 221	7 211	6 775	72	94
2007–08†	3 092	2 870	7 038	6 759	93	96
2008–09†	2 848	2 638	6 907	6 468	93	94
2009–10†	3 551	3 362	7 047	7 144	95	101

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2009–10. *, 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 2009–10 and TACs (t) from 1986–87 to 2009–10.

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
2008–09†	582	2 500	5 540	6 000
2009–10†	464	2 500	5 730	6 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2009–10.

*, 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 2009–10 and TACs (t) from 1982–83 to 2009–10.

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
2008–09†	2 848	3 100	6 907	7 000
2009–10†	3 551	3 350	7 047	7 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2009–10.

*, 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
2008-09	0	100	0	0	0	0	0
2009-10	0	100	0	0	0	0	0

Table 6: Southland Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (t, scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	2.8	5	2	14	3	–	40
1980–81*	–	1	1	0	0	–	0
1981–82*	–	0	0	0	0	–	–
1982–83*	–	0	0	0	0	–	–
1983–83#	–	0	0	0	0	–	–
1983–84†	3.5	360	10	1 114	274	3.4	31
1984–85†	4.5	195	14	713	89	6.7	8
1985–86†	5.6	759	14	3 921	566	6.8	15
1986–87†	1.7	93	7	200	43	1.7	23
1987–88†	4.4	210	12	993	192	4.6	33
1988–89†	8.5	23	4	268	17	7.5	35
1989–90†	3.7	162	9	675	151	4.0	11
1990–91†	4.5	146	8	841	126	4.9	12
1991–92†	7.8	441	19	3 812	290	8.9	3
1992–93†	3.0	295	20	1 137	231	2.7	15
1993–94†	3.3	189	14	671	50	2.1	3
1994–95†	3.7	125	12	503	12	1.2	2
1995–96†	4.1	262	20	1 302	49	2.1	8
1996–97†	1.4	426	13	630	206	1.6	9
1997–98†	2.9	223	14	680	90	2.6	6
1998–99†	2.8	372	17	1 148	129	2.6	2
1999–00†	2.2	445	12	1 074	289	2.4	6
2000–01†	5.3	335	14	1 936	76	1.7	3
2001–02†	3.5	634	10	2 445	221	2.5	4
2002–03†	3.8	432	10	1 775	70	5.0	3
2003–04†	2.5	293	10	913	65	2.7	2
2004–05†	2.7	152	6	500	55	2.8	7
2005–06†	4.3	58	5	329	10	0.2	5
2006–07†	2.5	110	4	324	51	2.3	0
2007–08†	3.2	89	3	318	10	3.7	1
2008–09†	3.2	137	2	445	81	4.6	6
2009–10†	3.3	79	6	311	69	3.5	16

Table 7: Southland. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows.. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	3.0	39	4	117	38	2.9	28
1980–81*	9.2	7	2	462	0	–	0
1981–82*	–	1	1	0	0	–	0
1982–83*	–	1	1	0	1	–	100
1983–83#	–	0	0	0	0	–	–
1983–84†	5.2	405	10	1 850	227	5.6	14
1984–85†	4.7	215	17	870	152	5.5	21
1985–86†	3.0	351	15	978	181	3.5	5
1986–87†	2.1	70	7	189	58	2.3	11
1987–88†	1.2	114	13	150	28	2.4	10
1988–89†	3.7	19	5	95	7	7.1	11
1989–90†	1.4	134	10	211	0	–	0
1990–91†	3.4	112	7	490	1	–	1
1991–92†	4.3	275	16	1 329	12	4.3	1
1992–93†	2.2	106	18	295	2	–	0
1993–94†	1.8	126	13	235	19	1.7	4
1994–95†	3.4	113	11	430	5	1.4	3
1995–96†	3.1	235	19	891	47	5.2	2
1996–97†	3.9	411	12	1 702	51	4.0	0
1997–98†	1.7	151	12	253	3	–	0
1998–99†	1.4	284	15	440	27	1.2	2
1999–00†	1.3	328	13	482	16	1.1	1
2000–01†	1.0	155	12	170	27	2.3	1
2001–02†	1.7	309	11	570	40	2.6	0
2002–03†	1.8	266	12	563	24	3.3	1
2003–04†	1.9	178	10	429	46	3.9	0
2004–05†	1.1	75	5	99	11	1.8	0
2005–06†	1.9	40	6	101	0	–	0
2006–07†	2.5	102	4	300	28	3.6	1
2007–08†	1.3	74	2	105	33	0.5	7
2008–09†	1.8	88	2	164	57	2.1	0
2009–10†	1.1	45	5	57	11	1.3	4

Table 8: Southland. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	18																										
2	94																										
3	16																										
4	20																										
5		16																									
6		11																									
7	34	53	89																								
8	45	34	95	16																							
9			14																								
10		14	15																								
11		16	49																								
12			123																								
13		17	45	11																							
14			74																								
15			48																								
16			27																								
17	12				77																						
18				17																							
19					27																						
20							86	70																			
21								10																			
22					14				20	10																	
23							31		10		27																
24									18																		
25									15																		
26									127	41	15																
27									21	11																	
28									14	18																	
29							10		73	83	20		21	79													
30											17	10		16													
31									30		24																
32			56	18										12			110										
33														15													
34										10				20													
35												24															
36											13				19												
37													16														
38													24														
39													23		75	111											
40								52				43		177													
41																10											
42																11											
43														14													
44												43			28	27	37										
45																35											
46															24		14		13	12							
47																42			102	21							
48																	20										
49															11	47	27		24	36	46						
50																36	18	18	39		10	38			24		
51								28	19	26	29	14	53	19	23	12	13	159	185	212	93	33	16	27	63	127	28
52																13	174	103	223	120	112	49		78			25
53																		12	12	13							
54																					19						
55																						19	28				

Table 9: Southland. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1978-79	1979-80	1981-82	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	18																													
2				41																										
3				45																										
4				121																										
5				45																										
6				41	20	14																								
7						16																								
8						13																								
9				34	54	88																								
10						18																								
11						14																								
12					16	48																								
13					14	19																								
14					17	40	11																							
15						16																								
16			12					55																						
17							17																							
18								10																						
19									81	70																				
20								14		10	20	10																		
21									28		10	20	27																	
22												20																		
23												15																		
24											54	14																		
25											30	16	10			15														
26											55	39				12	100													
27													14																	
28													23				14													
29						56	18									11	12			122										
30															34	12														
31														13		19														
32																18														
33																17	10													
34											40				44	26	48	62												
35																16														
36																24														
37																183														
38																		10												
39															29		20	18	19											
40																		35												
41																		37												
42																	16													
43																			12											
44																			18											
45																	11	42	26					26	35	47				
46																									10					
47																11	36	25	19	53						24		27		
48											20	10		11	40	36	26	13	14	33	40	74	28	12			26	42	86	
49																				79	52	156	91	76	20		69			22
50																														
51																														

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
2008–09	0	0	0
2009–10	0	0	0

Table 11: Puysegur. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1989–90†	2.5	70	1	198	6	0.5	4
1990–91†	2.2	183	4	517	23	0.5	4
1991–92†	1.2	393	17	602	44	0.9	2
1992–93†	1.4	306	13	511	43	2.1	4
1993–94†	3.1	325	11	1 102	3	–	0
1994–95†	5.4	87	4	535	0	–	0
1995–96†	2.5	180	6	535	8	0.3	3
1996–97†	2.2	111	4	259	0	–	0
1997–98†	–	0	0	0	0	–	–
1998–99†	20.7	10	2	230	0	–	0
1999–00†	2.2	78	1	183	59	1.6	21
2000–01†	7.5	33	2	268	32	7.6	6
2001–02†	–	1	1	0	0	–	0
2002–03†	–	1	1	0	0	–	0
2003–04†	2.2	54	1	145	0	–	0
2004–05†	1.6	69	2	136	1	–	0
2005–06†	2.1	40	1	111	2	–	0
2006–07†	1.1	9	1	12	0	–	0
2007–08†	–	0	0	0	0	–	–
2008–09†	–	0	0	0	0	–	–
2009–10†	–	0	0	0	0	–	–

Table 12: Puysegur. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1989–90†	10.6	62	1	734	0	–	0
1990–91†	8.2	206	4	2 167	81	8.3	7
1991–92†	4.1	446	17	2 255	8	4.8	0
1992–93†	3.4	357	14	1 448	32	7.3	1
1993–94†	3.0	296	9	956	0	–	0
1994–95†	1.5	48	4	81	0	–	0
1995–96†	2.0	83	5	199	0	–	0
1996–97†	1.8	70	5	134	0	–	0
1997–98†	–	0	–	0	0	–	–
1998–99†	–	1	1	0	0	–	0
1999–00†	3.0	52	1	167	0	–	0
2000–01†	0.3	6	1	2	0	–	0
2001–02†	–	0	–	0	0	–	–
2002–03†	–	0	–	0	0	–	–
2003–04†	2.4	62	1	179	0	–	0
2004–05†	1.6	68	2	137	0	–	0
2005–06†	1.1	22	1	31	0	–	0
2006–07†	0.9	8	1	8	0	–	0
2007–08†	–	0	–	0	0	–	–
2008–09†	–	0	–	0	0	–	–
2009–10†	–	0	–	0	0	–	–

Table 13: Puysegur. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1989–90	1990–91	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
1	67	119	58	19	10												
2		14	55														
3			24														
4			41	31													
5			12	10													
6			20	41													
7				12													
8				32													
9			86	74	67												
10			21	21			14										
11				19	97												
12					19												
13		40	30	18	111	66	30	49									
14						15											
15							18										
16							61	22									
17							51	33									
18											62	30					
19														54	52		
20															17	40	

Table 14: Puysegur. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
1	62	113	79	52	35												
2			61														
3			24														
4			10														
5			39	31													
6			10														
7			14	13													
8			15	41													
9			72	63	33												
10				13													
11				13													
12				35													
13				14													
14		68	80	27	90	33	17	39									
15			28		17		13										
16				35	108												
17							18										
18							26	20									
19											52						
20															62	56	
21															12	22	

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
2008-09	100	0
2009-10	100	0

Table 16: Snares. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1990–91†	2.6	15	3	49	2	–	7
1991–92†	6.6	15	2	115	9	8.8	0
1992–93†	2.6	292	5	761	38	1.6	7
1993–94†	4.2	157	7	707	10	4.0	3
1994–95†	4.8	22	4	123	0	–	0
1995–96†	3.2	74	5	288	12	0.9	9
1996–97†	5.0	53	3	281	6	0.2	8
1997–98†	2.3	33	4	102	11	2.0	3
1998–99†	4.6	76	6	378	20	5.4	4
1999–00†	2.6	107	3	302	60	3.5	7
2000–01†	1.3	53	2	75	0	–	0
2001–02†	4.6	54	6	269	9	1.3	0
2002–03†	1.2	65	4	81	0	–	0
2003–04†	–	1	1	1	0	–	0
2004–05†	1.0	13	3	16	0	–	0
2005–06†	0.7	23	1	21	0	–	0
2006–07†	–	3	1	4	0	–	0
2007–08†	0.2	118	2	22	1	–	0
2008–09†	–	4	1	3	1	–	0
2009–10†	0.7	14	1	11	1	–	0

Table 17: Snares. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1990–91†	9.9	19	3	239	0	–	0
1991–92†	13.0	21	2	318	0	–	0
1992–93†	6.1	380	6	2 351	63	7.5	2
1993–94†	5.1	330	7	1 810	5	2.9	0
1994–95†	3.3	54	5	211	3	–	0
1995–96†	5.0	112	4	677	4	–	2
1996–97†	6.4	71	3	485	1	–	0
1997–98†	2.1	40	5	107	3	–	2
1998–99†	1.9	57	6	115	8	1.6	2
1999–00†	3.2	82	4	289	5	2.0	0
2000–01†	1.5	52	2	86	3	–	2
2001–02†	1.9	62	4	130	2	–	0
2002–03†	1.4	49	4	70	0	–	0
2003–04†	–	3	1	4	0	–	0
2004–05†	1.0	15	4	19	0	–	0
2005–06†	2.9	23	1	88	0	–	0
2006–07†	–	3	1	4	0	–	0
2007–08†	1.8	180	2	371	178	1.8	2
2008–09†	–	4	1	1	3	–	0
2009–10†	1.2	14	1	20	13	1.2	0

Table 18: Snares. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	71	23																
2	18	52																
3	25			11														
4				12														
5	153	60	16	34	38	13	38	38	43		38			23				14
6							18	10		21	10							
7								51	10		13							
8										22						113		

Table 19: Snares. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1			73	21																
2	10		10	35																
3			31	166																
4			34		13	40	28													
5		12	221	94	28	39	39	27	34	35	43		24			23				14
6						25														
7										34			13							
8										12		20								
9											32							171		

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
2008–09	100	0	0
2009–10	100	0	0

Table 21: Wairarapa. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1980–81*	–	1	1	1	0	–	0
1981–82*	0.5	43	1	20	0	–	0
1982–83*	1.1	20	1	129	0	–	0
1983–83#	0.6	14	3	28	0	–	0
1983–84†	0.3	172	2	183	0	–	0
1984–85†	0.3	178	6	60	6	1.3	0
1985–86†	0.7	64	7	41	20	1.4	3
1986–87†	0.6	120	7	95	0	–	0
1987–88†	0.4	62	8	29	0	–	0
1988–89†	0.4	70	6	35	2	–	0
1989–90†	1.6	115	7	201	57	1.7	4
1990–91†	0.8	175	8	178	24	1.9	2
1991–92†	0.4	302	8	133	20	0.9	0
1992–93†	0.5	296	7	141	43	0.9	1
1993–94†	0.3	254	12	103	9	0.3	0
1994–95†	0.4	220	12	111	13	0.6	1
1995–96†	0.5	124	9	81	22	0.5	0
1996–97†	0.4	83	10	45	18	0.7	2
1997–98†	0.7	119	6	85	20	1.5	5
1998–99†	0.5	132	10	76	19	0.6	1
1999–00†	0.9	145	9	143	40	2.1	1
2000–01†	3.8	213	7	903	101	3.2	10
2001–02†	3.1	112	9	374	33	2.7	8
2002–03†	2.9	115	9	351	63	4.0	3
2003–04†	1.5	45	7	82	30	2.0	11
2004–05†	1.0	69	7	88	23	2.9	1
2005–06†	0.3	40	4	32	10	0.5	2
2006–07†	0.3	55	5	20	5	0.5	0
2007–08†	0.3	67	3	22	3	–	0
2008–09†	0.5	73	4	36	5	0.2	0
2009–10†	0.2	39	4	7	2	–	0

Table 22: Wairarapa. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1983–83#	0.2	7	2	2	0	–	0
1983–84†	–	0	0	0	0	–	–
1984–85†	0.0	102	5	4	0	–	0
1985–86†	0.0	17	3	0	0	–	0
1986–87†	0.0	61	6	2	0	–	0
1987–88†	0.0	21	4	1	0	–	0
1988–89†	0.0	24	3	1	0	–	0
1989–90†	0.0	7	1	0	0	–	0
1990–91†	0.4	24	5	11	0	–	0
1991–92†	0.7	21	5	17	0	–	0
1992–93†	0.2	5	5	1	0	–	0
1993–94†	0.8	14	4	12	0	–	0
1994–95†	0.2	12	5	2	0	–	0
1995–96†	0.2	7	3	1	0	–	0
1996–97†	0.2	21	5	6	0	–	0
1997–98†	0.1	8	2	1	0	–	0
1998–99†	0.2	13	5	3	0	–	0
1999–00†	0.3	23	3	7	0	–	0
2000–01†	1.3	33	5	47	0	–	0
2001–02†	0.8	11	5	10	0	–	0
2002–03†	0.6	15	5	9	0	–	0
2003–04†	–	4	3	0	0	–	0
2004–05†	0.2	11	5	2	0	–	0
2005–06†	0.1	7	1	0	0	–	0
2006–07†	–	2	2	0	1	–	50
2007–08†	0.0	9	2	0	0	–	0
2008–09†	0.0	5	2	0	0	–	0
2009–10†	0.1	6	3	0	0	–	0

Table 23: Wairarapa. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	
1																						19								
2																				49	47									
3		15																												
4		11	112	63		17	25		41	20	22		67																	
5			60						15			12		34	12	14	28	29	42	13										
6				20		10					13	14		17	10															
7	43																													
8				26	37	46		20																						
9							11		12	33	67	53	17		10		13	10	33	32	17	10			10					
10							18																							
11											36	36												22						
12				54				21		80	145	131	112	100	37	14	11	11	23	41	11									
13													10				27	20												
14						12								13																
15						10	11																							
16						23			32	20	11	42	22	17																
17																				33										
18														17	46	20	21	35	37	19		49	19	15	27	43	48	35	14	
19																	13						11					10		
20																												18	26	16
21																			12											

Table 24: Wairarapa. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
1	29	10															
2	37																
3	11																
4			15														
5			25	16													
6	17						11										
7								10									
8													11				
9																12	
10															15	11	

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	NZ	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
2008-09	0	0	0	100	0	0	0	0	0
2009-10	0	0	0	100	0	0	0	0	0

Table 26: OEO 1 north of 45° S excluding Wairarapa. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	0.4	6	2	3	0	–	0
1980–81*	–	1	1	0	0	–	0
1981–82*	–	3	2	0	0	–	0
1982–83*	0.2	95	5	19	2	–	0
1983–83#	–	3	1	0	0	–	0
1983–84†	3.9	17	5	61	11	5.6	12
1984–85†	0.2	90	15	19	0	–	0
1985–86†	2.0	211	18	400	26	13.9	3
1986–87†	0.2	183	16	49	0	–	0
1987–88†	0.1	211	12	24	2	–	0
1988–89†	0.2	66	13	20	3	–	2
1989–90†	1.2	39	7	50	5	6.1	0
1990–91†	0.4	77	15	43	2	–	3
1991–92†	1.2	94	9	163	0	–	0
1992–93†	0.8	136	17	117	0	–	0
1993–94†	0.6	126	14	95	0	–	0
1994–95†	0.1	51	14	11	0	–	0
1995–96†	5.5	204	10	1 358	111	5.5	16
1996–97†	3.1	245	18	896	63	5.0	4
1997–98†	4.1	193	17	835	24	6.6	4
1998–99†	3.8	334	21	1 370	48	2.7	3
1999–00†	2.0	393	21	863	116	3.6	2
2000–01†	1.8	549	12	1 100	57	3.0	1
2001–02†	1.5	233	13	377	31	2.9	2
2002–03†	1.3	175	13	242	9	4.6	1
2003–04†	0.9	128	16	137	12	2.1	2
2004–05†	0.4	78	15	43	1	–	0
2005–06†	0.5	93	9	65	2	–	1
2006–07†	2.3	86	13	237	15	4.8	0
2007–08†	1.1	85	7	109	15	1.9	5
2008–09†	0.3	73	7	19	11	1.2	3
2009–10†	0.6	84	7	63	8	4.9	1

Table 27: OEO 1 north of 45° S excluding Wairarapa. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1978–79*	0.1	79	6	81	0	–	0
1979–80*	0.0	178	7	9	0	–	0
1980–81*	0.0	139	4	3	0	–	0
1981–82*	–	0	0	0	0	–	–
1982–83*	1.2	9	4	12	0	–	0
1983–83#	–	0	0	0	0	–	–
1983–84†	1.8	25	4	41	0	–	0
1984–85†	0.2	79	9	12	0	–	0
1985–86†	0.5	117	14	51	11	2.2	0
1986–87†	0.1	92	12	8	0	–	0
1987–88†	0.0	78	10	3	0	–	0
1988–89†	0.2	31	11	12	1	–	0
1989–90†	0.1	13	6	2	0	–	0
1990–91†	0.8	27	5	29	0	–	0
1991–92†	6.0	10	7	84	0	–	0
1992–93†	5.8	15	9	93	0	–	0
1993–94†	0.2	43	6	11	0	–	0
1994–95†	0.9	49	8	62	0	–	0
1995–96†	0.5	25	6	14	0	–	0
1996–97†	5.5	90	10	569	0	–	0
1997–98†	7.6	95	11	759	1	–	0
1998–99†	1.5	200	21	329	10	2.6	0
1999–00†	0.6	120	20	77	3	–	2
2000–01†	0.7	103	14	76	15	0.8	3
2001–02†	0.7	115	17	89	0	–	0
2002–03†	0.4	76	17	31	0	–	0
2003–04†	0.8	54	9	53	0	–	0
2004–05†	0.1	47	9	4	0	–	0
2005–06†	1.1	48	8	70	0	–	0
2006–07†	0.6	10	7	8	1	–	0
2007–08†	0.2	21	5	6	7	0.2	0
2008–09†	0.2	22	8	4	2	–	0
2009–10†	0.3	7	5	3	2	–	0

Table 28: OEO 1 north of 45° S excluding Wairarapa. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	83																												
2					11																								
3					27	20																							
4				29	14	34	15																						
5					32	23																							
6							33																						
7					26	19	61	15	13	12		22																	
8						19							13																
9						30	26									10	14												
10					14						18	11																	
11					19		14									11													
12												13																	
13						11																							
14							23	12	10		25		39						12										
15													12																
16					21					14	31	49	23	14					15	35									
17															54	76	38												
18															85	54	59	38											
19																11													
20													17																
21																			16	27									
22																			20										
23					12																								11
24						11										21	23	144	68	68	14	33			39		25		
25																				10									
26																		19	19		15		20						
27																				196	60	17							
28																		16	114	118	58	20	28			15			
29																				23		15	21	22					
30																			15										
31																			26			22							
32															17	23	20	37	42	76	44	41	10	20	33	43	46	36	48

Table 29: OEO 1 north of 45° S excluding Wairarapa. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	
1	28																															
2	65	10																														
3	72	142																														
4	14	39																														
5						20	42																									
6								12																								
7								11																								
8							14	13																								
9							11			13																						
10								10		10																						
11									15																							
12								40	16	19																						
13												19																				
14							11																									
15									17							32	22															
16																	11	11														
17																			37													
18																		56	43	25												
19																					13											
20																						10										
21																					79	32	20		12			30		11		
22																					19	20		15		19						
23																					14	17	42	29								
24																											12					
25																						10										
26																								10								
27																									10							
28																								19	12	19	18				12	

Table 30: Auckland Island hills. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 and 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
2008–09	0	100	0
2009–10	0	100	0

Table 31: Auckland Island hills. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1982–83*	–	3	2	11	3	–	33
1983–83#	–	0	0	0	0	–	–
1983–84†	–	0	0	0	0	–	–
1984–85†	–	0	0	0	0	–	–
1985–86†	–	2	1	30	0	–	0
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†	–	2	1	0	0	–	0
1991–92†	–	0	0	0	0	–	–
1992–93†	4.6	67	2	436	54	4.6	6
1993–94†	3.0	93	3	349	9	4.0	1
1994–95†	2.3	249	4	640	84	1.0	11
1995–96†	2.9	172	6	584	19	2.8	5
1996–97†	2.4	95	5	261	10	4.1	1
1997–98†	2.2	142	6	351	0	–	0
1998–99†	3.3	199	8	739	13	1.1	2
1999–00†	3.6	154	4	597	14	2.3	3
2000–01†	2.7	75	4	221	12	0.9	3
2001–02†	4.8	76	5	384	9	10.4	0
2002–03†	2.9	91	4	290	9	2.5	2
2003–04†	3.8	52	4	217	2	–	0
2004–05†	4.2	10	1	44	2	–	10
2005–06†	–	4	1	15	0	–	0
2006–07†	–	3	1	10	0	–	0
2007–08†	4.3	46	1	225	29	6.4	7
2008–09†	3.5	44	1	154	30	1.9	0
2009–10†	2.3	45	2	130	23	2.2	2

Table 32: Auckland Island hills. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1982–83*	7.1	5	3	39	2	—	0
1983–83#	—	0	0	0	0	—	—
1983–84†	—	0	0	0	0	—	—
1984–85†	—	0	0	0	0	—	—
1985–86†	—	3	2	2	2	—	33
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†	—	1	1	0	0	—	0
1991–92†	—	0	0	0	0	—	—
1992–93†	—	0	0	0	0	—	—
1993–94†	—	0	0	0	0	—	—
1994–95†	0.5	9	2	5	0	—	0
1995–96†	—	4	2	1	0	—	0
1996–97†	—	3	2	0	0	—	0
1997–98†	—	1	1	3	0	—	0
1998–99†	—	2	2	1	0	—	0
1999–00†	—	2	1	0	0	—	0
2000–01†	—	1	1	0	0	—	0
2001–02†	0.2	6	2	2	0	—	0
2002–03†	0.1	6	4	0	0	—	0
2003–04†	—	0	0	0	0	—	—
2004–05†	—	1	1	0	0	—	0
2005–06†	—	2	1	0	0	—	0
2006–07†	—	0	0	0	0	—	—
2007–08†	—	4	1	0	0	—	0
2008–09†	0.0	6	1	0	0	—	0
2009–10†	0.0	9	1	0	1	—	11

Table 33: Auckland Island hills. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
1	52	85																
2			107	63														
3			57															
4	11		11	57	52	20												
5				31	10	44	45											
6					10													
7					20													
8							35	87	41	34	57	28						
9			46			67	100	54	22	36	25	19				43	44	38

Table 34: Bounty Plateau. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 and 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
2008–09	0	0	100	0	0	0
2009–10	0	0	100	0	0	0

Table 35: Bounty Plateau. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1981–82*	0.1	5	1	1	5	0.1	60
1982–83*	–	0	0	0	0	–	–
1983–83#	–	0	0	0	0	–	–
1983–84†	15.7	34	5	616	26	15.1	12
1984–85†	–	0	0	0	0	–	–
1985–86†	–	1	1	0	1	–	100
1986–87†	–	0	0	0	0	–	–
1987–88†	–	2	1	14	2	–	0
1988–89†	–	0	0	0	0	–	–
1989–90†	–	0	0	0	0	–	–
1990–91†	3.3	6	1	21	6	3.3	50
1991–92†	–	0	0	0	0	–	–
1992–93†	10.1	8	1	114	0	–	0
1993–94†	18.1	24	2	494	23	16.6	4
1994–95†	8.3	154	7	1 461	87	5.7	7
1995–96†	5.9	125	6	908	8	14.1	0
1996–97†	7.5	13	3	610	0	–	0
1997–98†	4.1	132	5	651	45	2.6	10
1998–99†	3.2	329	11	1 192	181	2.2	8
1999–00†	5.6	143	7	863	47	8.1	4
2000–01†	3.8	130	6	544	50	3.9	10
2001–02†	6.2	149	5	979	113	6.4	4
2002–03†	5.8	236	6	1 532	60	8.5	1
2003–04†	5.5	227	5	1 417	40	6.2	4
2004–05†	5.3	391	8	2 182	162	5.4	6
2005–06†	5.3	312	4	1 788	130	6.0	9
2006–07†	3.0	201	5	667	125	3.2	8
2007–08†	3.7	87	2	365	61	3.7	10
2008–09†	5.2	240	2	1 260	237	5.3	22
2009–10†	5.4	197	2	1 321	190	5.6	16

Table 36: Bounty Plateau. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1983–84†	13.6	46	4	725	33	15.6	13
1984–85†	–	0	0	0	0	–	–
1985–86†	–	1	1	0	1	–	100
1986–87†	–	0	0	0	0	–	–
1987–88†	–	0	0	0	0	–	–
1988–89†	–	0	0	0	0	–	–
1989–90†	–	1	1	0	0	–	0
1990–91†	13.0	6	1	81	0	–	0
1991–92†	–	0	0	0	0	–	–
1992–93†	–	0	0	0	0	–	–
1993–94†	–	1	1	3	0	–	0
1994–95†	–	0	0	0	0	–	–
1995–96†	–	3	2	2	0	–	0
1996–97†	–	3	1	0	0	–	0
1997–98†	1.1	7	3	9	0	–	0
1998–99†	0.5	17	9	10	0	–	0
1999–00†	0.2	5	3	1	0	–	0
2000–01†	–	3	2	2	0	–	0
2001–02†	0.1	18	3	1	0	–	0
2002–03†	0.3	7	4	2	0	–	0
2003–04†	0.4	19	2	7	0	–	0
2004–05†	0.2	63	5	16	0	–	0
2005–06†	1.4	35	4	54	0	–	0
2006–07†	0.4	16	3	6	3	–	6
2007–08†	0.0	8	3	0	1	–	12
2008–09†	0.2	20	1	5	2	–	0
2009–10†	0.4	19	2	10	1	–	0

Table 37: Bounty Plateau. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
1																	
2		35															
3		28	13														
4	22																
5		14	39		13	18	10										
6			52				19										
7		16	13		36	28											
8					46												
9						44											
10						117											
11						28					13						
12								26		19							
13								49	71	65	34	19	32	30			
14														10			
15		45			21	42	55	10	15	28	45	153	67	75	62	160	88
16												11					
17												29					
18							35	21	46	119	123	134	168	65	16	27	78
19												11	17				

Table 38: Bounty Plateau. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1									
2									
3				12					
4				11					
5				11				20	10
6	10		16	26	11				
7					17				

Table 39: Pukaki Rise. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 and 25 for abbreviations.

	UN	NZ	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
2008-09	0	100	0	0	0	0	0
2009-10	0	100	0	0	0	0	0

Table 40: Pukaki Rise. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1980–81*	–	3	1	1	3	–	0
1981–82*	0.2	6	5	2	4	–	50
1982–83*	1.0	39	2	45	12	1.4	21
1983–83#	–	0	0	0	0	–	–
1983–84†	5.0	111	9	640	59	5.1	6
1984–85†	2.5	123	4	341	10	1.1	0
1985–86†	0.7	20	2	14	4	–	0
1986–87†	–	0	0	0	0	–	–
1987–88†	16.5	14	1	183	14	16.5	21
1988–89†	–	1	1	0	0	–	0
1989–90†	0.1	5	2	0	4	–	0
1990–91†	0.9	6	3	5	0	–	0
1991–92†	–	4	2	2	0	–	0
1992–93†	3.4	12	3	57	0	–	0
1993–94†	–	0	0	0	0	–	–
1994–95†	4.0	30	6	134	2	–	3
1995–96†	4.3	277	6	1 375	19	5.3	1
1996–97†	3.8	406	8	1 684	16	5.0	0
1997–98†	3.3	354	9	1 328	33	1.3	5
1998–99†	3.2	377	11	1 375	56	1.5	7
1999–00†	3.5	590	8	2 241	220	3.2	7
2000–01†	3.5	651	9	2 552	340	2.8	8
2001–02†	4.6	415	7	2 021	39	1.9	1
2002–03†	2.3	534	9	1 339	96	1.5	5
2003–04†	2.6	585	9	1 658	76	2.4	2
2004–05†	1.8	713	12	1 368	192	3.1	5
2005–06†	1.9	725	8	1 468	99	2.9	2
2006–07†	1.9	851	9	1 785	212	3.8	3
2007–08†	1.1	970	2	1 261	154	2.1	4
2008–09†	1.3	948	3	1 198	222	3.2	3
2009–10†	0.8	907	3	895	96	2.8	3

Table 41: Pukaki Rise. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	–	12	3	18	4	–	33
1980–81*	2.6	82	3	276	80	2.7	11
1981–82*	5.6	753	11	4 377	688	5.8	11
1982–83*	3.0	196	4	658	193	3.0	41
1983–83#	3.9	109	7	351	109	3.9	46
1983–84†	6.2	161	11	1 150	99	6.8	14
1984–85†	5.2	295	7	1 708	217	3.8	37
1985–86†	1.8	26	3	46	24	1.9	4
1986–87†	–	0	0	0	0	–	–
1987–88†	–	0	0	0	0	–	–
1988–89†	–	0	0	0	0	–	–
1989–90†	–	2	2	0	0	–	0
1990–91†	–	2	1	1	0	–	0
1991–92†	–	3	2	25	0	–	0
1992–93†	1.5	12	4	26	0	–	0
1993–94†	–	1	1	0	0	–	0
1994–95†	7.3	29	2	236	0	–	0
1995–96†	4.8	241	4	1 338	0	–	0
1996–97†	3.6	534	6	2 096	0	–	0
1997–98†	4.1	472	7	2 152	40	2.1	1
1998–99†	2.9	370	10	1 193	46	5.8	2
1999–00†	2.3	420	8	1 055	101	3.2	1
2000–01†	3.0	349	8	1 158	52	3.3	1
2001–02†	3.5	267	8	988	53	3.6	1
2002–03†	3.6	430	7	1 689	129	3.0	1
2003–04†	3.2	437	9	1 515	49	2.7	0
2004–05†	2.8	535	12	1 594	34	2.1	0
2005–06†	3.6	723	8	2 820	28	3.2	0
2006–07†	3.4	907	7	3 434	231	4.6	1
2007–08†	2.9	1 012	2	3 346	643	3.4	5
2008–09†	2.7	1 032	3	2 822	792	3.2	2
2009–10†	2.4	1 070	3	3 126	956	2.6	4

Table 42: Pukaki Rise. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	30																												
2			14																										
3			36																										
4				10																									
5				32																									
6			36	75																									
7					18																								
8							11																						
9															72														
10															60														
11															11	42													
12															23	25		44	13										
13															44	28													
14															15	23								16					
15															10														
16															30														
17															36	128	54	33	21										
18															12									15					
19															33	174	198	103	149	70	56	38	12					140	
20																		101	46	58	134	104	118	97					
21																						38	19						
22																						15	15						
23																							16						
24														24	175	260	231	189	183	142	206	251	266	311	411	496	908	792	669
25																							18						
26																							96	51	16				
27																								46					
28																			80	21	22	42		38	186	25	122	74	

Table 43: Pukaki Rise. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	28																													
2	71																													
3	17																													
4	187																													
5	28																													
6	109		30																											
7	57	66																												
8		135																												
9		79	14																											
10		52		10																										
11				19																										
12				35																										
13				13	20																									
14					12																									
15					43																									
16					20																									
17				36	77																									
18						19																								
19																														
20															39															
21															99															
22															43	47	23													
23															22	26				47	12									
24																	21													
25															58	64									26					
26																	28													
27																	12													
28																	12	61	20	19	10									
29																	32	126	84	70	168	67	55	29	11				140	
30																						11								
31																				97	53	57	135	118	145	131				
32															27	179	306	337	224	152	92	93	174	180	220	433	532	941	880	820
33																							17							
34																							75	42	14					
35																								36						
																				14	35	19	12	37		31	206	25	126	68

Table 44: Macquarie Ridge. Percentage oreo catch (combined) by nation and fishing year. See Tables 5 and 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
2008-09	0	100
2009-10	0	100

Table 45: Macquarie Ridge. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1990-91†	3.0	15	2	47	0	—	0
1991-92†	—	0	0	0	0	—	—
1992-93†	3.8	21	4	113	3	—	5
1993-94†	9.8	10	2	111	0	—	0
1994-95†	3.7	8	2	33	1	—	12
1995-96†	3.9	32	4	147	26	3.5	34
1996-97†	5.7	115	4	925	80	6.6	20
1997-98†	4.3	106	4	686	42	4.5	2
1998-99†	3.0	179	6	597	64	3.5	8
1999-00†	4.6	217	5	1 089	71	2.0	7
2000-01†	3.6	343	4	1 369	135	3.8	11
2001-02†	4.7	265	3	1 318	121	5.3	9
2002-03†	3.7	296	3	1 173	51	3.5	3
2003-04†	4.3	190	2	885	56	4.4	4
2004-05†	2.5	172	2	454	135	2.3	17
2005-06†	4.6	63	2	319	0	—	0
2006-07†	1.5	12	1	20	0	—	0
2007-08†	3.2	171	1	622	159	3.3	16
2008-09†	2.2	43	1	94	31	2.8	16
2009-10†	2.4	66	2	196	50	2.2	15

Table 46: Macquarie Ridge. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1990-91†	8.0	16	1	132	0	—	0
1991-92†	—	0	0	0	0	—	—
1992-93†	4.1	12	2	69	0	—	0
1993-94†	2.5	9	3	26	0	—	0
1994-95†	2.1	7	1	17	0	—	0
1995-96†	2.5	7	3	20	0	—	0
1996-97†	2.4	19	3	61	0	—	0
1997-98†	2.4	10	3	33	0	—	0
1998-99†	1.9	84	6	177	2	—	0
1999-00†	1.1	48	3	57	0	—	0
2000-01†	1.5	51	3	83	0	—	0
2001-02†	0.5	72	3	39	0	—	0
2002-03†	1.1	69	3	85	0	—	0
2003-04†	1.9	51	2	108	1	—	0
2004-05†	1.2	74	2	92	0	—	0
2005-06†	0.6	5	2	3	0	—	0
2006-07†	—	4	1	3	0	—	0
2007-08†	1.6	43	1	77	11	3.1	2
2008-09†	0.3	17	1	6	3	—	0
2009-10†	1.5	26	2	47	12	1.8	4

Table 47: Macquarie Ridge. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1			14			12	38	43												
2							18		24											
3							35	29	34											
4									16											
5									30	16										
6											10									
7									28	117	131	121	77	80	114					15
8												35	41							
9	14							23	32	61	164	84	170	102	29	59	12	144	36	41

Table 48: Macquarie Ridge. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1			11																	
2							10		18											
3									20											
4													10							
5									20	20	33	56	30	42	61					
6	16								14	20	16	11	29		13			42	17	22

Table 49: OEO 3A, excluding Southland. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 and 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
2008–09	0	100	0	0	0	0	0	0
2009–10	0	100	0	0	0	0	0	0

Table 50: OEO 3A, excluding Southland. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	7.3	708	6	5 217	131	15.4	3
1980–81*	3.1	501	12	2 197	94	8.2	1
1981–82*	2.4	553	12	1 288	24	7.6	0
1982–83*	3.4	646	17	2 129	161	6.7	4
1983–83#	2.0	366	19	719	38	5.8	3
1983–84†	2.8	1 243	26	3 601	439	3.6	9
1984–85†	4.2	911	35	4 700	353	7.4	6
1985–86†	2.2	1 199	42	2 980	390	4.4	5
1986–87†	2.2	1 385	36	3 159	504	4.0	8
1987–88†	3.5	1 677	36	5 969	776	5.6	13
1988–89†	4.3	1 367	35	6 956	599	6.7	8
1989–90†	3.3	1 635	28	6 461	1 064	3.2	19
1990–91†	2.1	2 153	29	5 125	1 419	2.5	22
1991–92†	3.1	900	26	3 040	193	7.8	2
1992–93†	2.6	1 131	26	3 552	403	2.5	13
1993–94†	2.7	1 595	27	4 417	191	2.4	4
1994–95†	3.3	1 031	31	3 778	173	1.9	4
1995–96†	2.4	1 281	33	3 526	187	1.9	5
1996–97†	2.0	1 378	32	2 912	220	1.9	5
1997–98†	2.6	1 480	29	4 333	469	3.6	7
1998–99†	2.0	1 107	32	2 339	127	2.4	2
1999–00†	1.2	987	23	1 768	43	4.0	1
2000–01†	1.5	825	24	1 577	102	3.1	1
2001–02†	1.9	637	21	1 529	50	5.4	1
2002–03†	2.2	440	20	1 364	24	5.7	0
2003–04†	1.8	434	20	1 159	67	4.2	2
2004–05†	2.4	475	14	1 504	50	5.9	2
2005–06†	3.1	327	12	1 433	40	5.3	1
2006–07†	3.0	332	12	1 375	76	5.4	2
2007–08†	2.8	494	15	1 504	77	7.1	1
2008–09†	2.9	413	16	1 292	137	5.9	2
2009–10†	3.2	484	13	1 661	196	5.0	4

Table 51: OEO 3A, excluding Southland. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	6.2	929	8	5 742	493	5.9	3
1980–81*	5.2	1 719	20	12 407	914	4.7	4
1981–82*	6.6	1 770	15	11 463	1 709	6.8	5
1982–83*	5.6	1 173	14	6 447	1 046	5.8	13
1983–83#	4.0	924	19	3 690	882	4.1	21
1983–84†	3.2	1 718	24	5 581	1 434	3.3	26
1984–85†	2.9	961	31	3 387	663	2.9	23
1985–86†	2.3	913	36	2 350	331	3.3	12
1986–87†	2.9	1 363	33	4 051	812	3.4	12
1987–88†	2.2	1 391	33	3 074	768	2.3	16
1988–89†	2.4	1 113	32	3 235	355	2.9	3
1989–90†	2.4	969	23	2 823	105	4.3	0
1990–91†	3.4	1 224	26	4 701	90	4.8	0
1991–92†	4.1	534	23	2 353	147	4.9	3
1992–93†	5.0	776	24	4 590	84	2.9	1
1993–94†	3.1	1 199	27	3 895	231	5.5	1
1994–95†	2.6	770	29	2 233	59	4.6	0
1995–96†	2.5	1 273	36	3 574	139	3.3	1
1996–97†	2.7	1 243	33	3 653	137	6.0	0
1997–98†	1.4	1 125	30	1 730	9	6.0	0
1998–99†	3.0	1 022	30	3 301	415	3.8	8
1999–00†	2.8	993	25	4 051	294	3.7	3
2000–01†	2.9	835	25	2 954	211	4.6	3
2001–02†	3.2	594	21	2 325	63	8.6	0
2002–03†	3.0	341	23	1 442	25	8.4	0
2003–04†	2.3	434	21	1 457	38	7.1	0
2004–05†	3.5	330	18	1 536	64	7.7	2
2005–06†	4.3	313	14	1 899	89	6.9	0
2006–07†	3.4	355	15	1 685	39	10.6	0
2007–08†	3.0	496	16	1 582	144	5.2	2
2008–09†	2.9	473	15	1 467	144	5.7	0
2009–10†	3.4	524	15	1 881	169	6.6	1

Table 52: OEO 3A, excluding Southland. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	198																														
2	224																														
3	34																														
4	101																														
5	165																														
6		19																													
7		92																													
8		76																													
9		163																													
10		39																													
11		104																													
12		10	26																												
13		67	70	191																											
14		14	77	82																											
15		42		14	41																										
16		76		22	40			19																							
17		221	16	34	129			22	96																						
18					10																										
19				85	80	16																									
20					67																										
21					67																										
22					15																										
23					16	17																									
24					289	170	27																								
25					53																										
26			83	29	100	48	18	30	52																						
27					75	125																									
28					17	23	29																								
29						49	23																								
30						25	19																								
31						56	22																								
32							15																								
33							13	27																							
34				31	25	25	53	181																							
35			28	50	34	15	11	20	66	44	23																				
36				55		38	50	83	85																						
37							61																								
38							95		31																						
39					13					23																					
40				60	11	21	13			91		10																			
41							11																								
42			11		24	24			36			34																			
43							42																								
44							75	135	87																						
45							40	51	55																						
46							18	24	32																						
47							40	83	136	28																					
48								10	15																						
49								22	79																						
50						12	17	57	131	86	47	29	12																		
51								19		10	19																				
52									14	31																					
53										36																					
54										62																					

Vessel	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	
68							10	10	73	90	87	48		15	80	23																
69							13			16				12			10															
70												19																				
71					11				50	30	20	132	185	114	80																	
72												69																				
73												17	11	19																		
74							69	59	35	46	147	187	46	110	234	73	83	98														
75							21				14	27		20	35	25	34															
76														16																		
77												26	21	15	64	19	25	10														
78							25	54	80	110	257	156	189	228	283	186	63	38	14											32		
79													53	31																		
80												11																				
81										77	109	43	58	47		65	89	68														
82												22	25	61	19	20	19															
83												10	21	35																		
84											28	68	92	191	127	125	165															
85								11	40	39	81	44			25	62	98	90	72													
86															38																	
87															17																	
88															20																	
89														13		10																
90															14																	
91																12																
92																13	15															
93																	11															
94																	11															
95																	54															
96																13		35														
97																		57	23													
98									18		109	92	92	53	39	19	331	397	492	199	87	30	13	14	38	37	84	67	104		116	
99						12	29	12	25		23	28	22	25	127	74	85	105	117	223	344	249	187	88	88	134						
100																19						27										
101																		18	13	17												
102																	12	41	56	29	38	26	11									
103																			15													
104																		81	62	77	76	55	28	38								
105																		40	14													
106														45	59		64	72	54							12		13		15	79	
107																				11												
108															25		58	36	61	66	44	53	47	28	30	40	18	38	41	14		
109																						27										
110																				23						19						
111						36								25	27	14	16												96	116		
112															28	10	24	31	65	70	85	94	56	73	58	59	12					
113																	45	24	16	29				10	17	21	27					
114																								29	48							
115																	96	37			16	26	14	25	10		48	19	44			
116																26		75	50	40	79	58	50	52	16	25	48	38	48	71		
117																			102	122	97	46	25	41	54	52	58	41	73			
118																								10	26							
119																										13		35				
120																	12							19					29	38	29	
121																													18	12		
122																														13		
123																															13	21

Table 53: OEO 3A, excluding Southland. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	185																														
2	53																														
3	265																														
4	37																														
5	18																														
6	232																														
7	220	70																													
8	48	28																													
9	13																														
10	28	23																													
11	38	53																													
12	96	150																													
13	80	132																													
14	81	208																													
15	56	159																													
16		54																													
17		46																													
18		23																													
19		39																													
20		292	60																												
21		277	15		59																										
22		87	140	87																											
23		180	139	45	47			19																							
24		71	95	322																											
25		193	203	38	122	41	18	41	56																						
26		246	22	200	166			32	96																						
27					10																										
28				17		17																									
29				155	11	21				26																					
30					74																										
31					77																										
32					15																										
33		87	48	55	15	18			57			38																			
34					428	200	35																								
35					49																										
36					48	89																									
37				71	45					39																					
38					16	22	29																								
39			76	75	56	22	53	247																							
40			24	138		43	26	112	80																						
41						51	28																								
42						25	19																								
43						55	21																								
44							15																								
45							28																								
46			22					21	26		34																				
47							40	13																							
48								43																							
49							40	51	56																						
50							56	153	120																						
51							10	26	13																						
52							18	24	41																						
53								10	14																						
54									11																						
55								16	95	26	16																				
56							10	16				12																			
57						46	95	101	81	110	61	77	11	12	32	18															
58									14	34																					
59									117	40	31	35																			
60								17			19																				
61										72																					
62										101																					
63										55																					
64										10																					
65								26	69	103	249																				
66										87	90																				
67										15	23																				

Vessel	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
68							32	17	10						25		10														
69								21	16																						
70										55	34	13	16																		
71							17		33	16	12	73	21	41																	
72								66	85	84	49			15	74	26															
73												157																			
74							43	82							52	23		14		28											
75												21																			
76						13				16		23	38	73	32																
77							74	61	25	36	83	151	34	93	158	45	83	115													
78												11																			
79														15																	
80										12	23	28		16	36	28	46	10													
81										24	10	36	31	11	84	24	40	30													
82							27	13	34	61	267	153	142	150	149	164	66	49												32	
83													10	22	12																
84											58	80	32	46	47	37	64	56	38												
85											12	28	35	66	27	27	23														
86											49							35													
87								10				19	51	95	263	157	235	183													
88								10	23	33	53	23				41	78	97	45	60											
89													114	45				13	48	33											
90																40	35														
91																	32														
92																	16														
93															10																
94																16	18	23													
95																	10														
96																	55														
97																	22	19		52											
98																10	39		34		25										
99																		12													
100																						12									
101																		18													
102															28							30									
103																26	45	43	28	26	12	15									
104											29	13	34			215	356	334	164	88	27		11	30	32	82	66	117		116	
105																						15									
106																						11	38	44	26	28	11				
107																12							18								
108																															
109																															
110							16				11			14	52																
111																															
112																															
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114																															
115																															
116																															
117						17																									
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128																															
129																															
130																															
131																															

Table 54: OEO 4. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 and 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
2008-09	0	100	0	0	0	0	0	0
2009-10	0	100	0	0	0	0	0	0

Table 55: OEO 4. Smooth oreo (SSO). Catch rates, number of tows, and number of vessels for all tows targeting or catching smooth oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	1.2	92	7	112	2	–	1
1980–81*	6.3	137	13	1 435	47	13.8	1
1981–82*	5.1	676	12	3 461	236	5.8	4
1982–83*	3.9	641	15	3 132	155	5.3	7
1983–83#	3.2	689	20	1 773	355	4.0	15
1983–84†	4.3	1 127	23	4 832	561	4.8	9
1984–85†	2.9	1 624	28	4 741	607	3.7	10
1985–86†	2.8	1 756	28	4 895	529	4.3	5
1986–87†	2.8	2 004	29	5 672	714	4.1	5
1987–88†	3.3	2 345	31	7 764	811	4.6	4
1988–89†	2.3	2 745	25	7 218	319	4.7	1
1989–90†	2.7	2 022	24	6 790	558	3.5	3
1990–91†	3.3	1 584	23	6 025	373	3.8	8
1991–92†	3.3	1 452	10	5 512	219	5.3	3
1992–93†	3.4	1 118	13	5 911	119	7.2	1
1993–94†	2.8	1 692	15	6 286	33	2.8	0
1994–95†	3.3	1 713	13	6 940	76	10.2	0
1995–96†	4.5	1 211	13	6 385	157	9.2	1
1996–97†	3.9	1 423	20	6 370	293	5.8	3
1997–98†	3.0	1 883	18	6 252	145	8.9	1
1998–99†	2.9	1 964	23	6 032	328	6.7	1
1999–00†	3.3	1 762	21	6 356	400	8.1	2
2000–01†	3.3	1 793	22	6 490	336	9.5	1
2001–02†	2.2	1 769	16	4 292	68	12.4	0
2002–03†	1.7	2 356	21	4 466	86	11.3	0
2003–04†	2.2	2 325	22	5 659	132	11.0	0
2004–05†	2.8	2 163	19	6 473	228	9.8	0
2005–06†	2.5	2 060	13	5 958	165	11.0	0
2006–07†	3.0	2 014	13	6 367	199	8.9	0
2007–08†	3.4	1 798	11	6 426	313	9.5	1
2008–09†	3.5	1 645	8	6 090	398	9.8	0
2009–10†	4.9	1 275	11	6 120	521	10.2	1

Table 56: OEO 4. Black oreo (BOE). Catch rates, number of tows, and number of vessels for all tows targeting or catching black oreo, total catch, number of tows and catch rates for target tows only, and percentage zero tows. Total catch is scaled up to landings according to the percentages shown in Tables 1 and 2 for the relevant QMA, and include a fraction of the unspecified oreo (OEO) catch based on the ratio of known SSO and BOE catches in that year. Catch rates shown only where number of tows ≥ 5 .

Fishing year	Catch rate (t/tow)	Number of tows	Number of vessels	Total catch (scaled)	Number of tows (target)	Catch rate (target, t/tow)	Zero tows (%)
1979–80*	1.6	360	13	568	117	2.9	2
1980–81*	4.5	1 181	21	8 522	171	4.8	2
1981–82*	4.1	1 425	18	5 835	836	4.5	14
1982–83*	2.0	313	15	795	80	4.1	2
1983–83#	3.0	600	20	1 436	230	3.8	17
1983–84†	2.3	560	19	1 272	290	3.0	22
1984–85†	1.7	976	24	1 649	261	1.8	12
1985–86†	1.2	787	28	988	193	2.5	4
1986–87†	1.2	948	25	1 158	285	2.3	7
1987–88†	0.8	1 105	24	910	155	2.3	6
1988–89†	1.0	1 153	24	1 229	73	7.3	0
1989–90†	0.7	614	13	557	0	–	0
1990–91†	1.7	461	19	911	2	–	0
1991–92†	2.2	774	10	1 945	4	–	0
1992–93†	2.2	593	10	2 019	0	–	0
1993–94†	1.9	794	10	2 022	1	–	0
1994–95†	0.9	691	13	740	0	–	0
1995–96†	0.8	455	12	422	1	–	0
1996–97†	1.0	520	15	593	0	–	0
1997–98†	1.0	704	19	757	0	–	0
1998–99†	1.0	866	20	899	15	6.2	0
1999–00†	0.8	770	21	678	2	–	0
2000–01†	1.0	806	19	867	3	–	0
2001–02†	0.7	783	16	572	0	–	0
2002–03†	0.7	1 170	20	936	1	–	0
2003–04†	0.9	1 140	13	1 075	4	–	0
2004–05†	0.8	1 015	18	917	0	–	0
2005–06†	0.8	909	13	870	0	–	0
2006–07†	0.8	968	12	844	0	–	0
2007–08†	0.8	730	11	612	6	3.9	0
2008–09†	1.1	678	8	816	6	3.0	0
2009–10†	1.3	729	10	927	20	3.0	0

Table 57: OEO 4. Smooth oreo (SSO). Number of tows with a positive catch of smooth oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	
1	38																																
2	38																																
3		18																															
4			15																														
5			126																														
6			25																														
7			14																														
8			10	33	16																												
9				45																													
10				10																													
11				13																													
12				62	34																												
13				44	35																												
14		23	26	146	22	53	38																										
15				43	110	36	17																										
16				77			45																										
17				105	110	132				21																							
18				48	51	53		16	38																								
19					110	100	160																										
20					14	51	19	33																									
21					85	43	68	30	48																								
22							23																										
23							20																										
24							33																										
25				47	24				98																								
26							10																										
27							40	50																									
28				26		17	43	30																									
29							14																										
30					23	29	34	29	20																								
31					33	91	104		91																								
32				15				68																									
33							81	32																									
34							29	84	69	10																							
35							63	102	131	21																							
36							46	97																									
37				117	130	203	251	152	174	220	93	113																					
38							36																										
39				86	160	178	201	149	109	436	105																						
40							22		27																								
41								41																									
42				46	89	122	89	84	78	274	309	181																					
43								40																									
44								34																									
45								34	36																								
46					11				35	37																							
47						25	38	47	17																								
48						47	219	269	265	119	113	50	24																				
49									22																								
50									21																								
51							15	11								13																	
52									17	16																							
53									28	15		13																					
54								25				20																					
55										16	23																						
56										190	153	39																					
57										10																							
58											23																						
59				12	180	199	301	241	300	294	357	388	263	258	320			10															
60											24																						
61										379	463	324	314	298	424	328	305	283															
62										97	132	179	214	258	364	127	130	253	339														
63										54	196	198	162	275	57	131	412	208	189	257	414												
64															84	68			11														
65																34																	
66										71	327	246	274	137	194	76	317	232	265	209	169	252	171	118	170	83	22	15	126	35	12	24	137
67																35		48							11								

Vessel	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10				
68																	81	55		45	18	15														
69																						10														
70																			142		10															
71																	21				14	45														
72																				60																
73															19	128	68	11	125	35	20				14	17	23		78	10		14				
74																				34																
75																			12	11																
76																	53	18	212	116	118	305			83	96										
77																				106	107	38														
78																				43																
79																			56	64	86	55	70	12												
80																				11																
81																				69	61	66	40													
82																						13														
83														14													32									
84												12							19			18		19	11	21	10	30								
85																	31	187	168		50							204	118							
86																										15										
87																										25										
88																			16	68	17	28		90	55	37	23		25							
89																		21		41	25		29	12	22	49	12	35		11						
90																				40	61	16	28	134	70											
91																						153	261	490	425	357	404	410	506	388	493	488	586	393	457	379
92																								10	60	40	26									
93																								10		14	21									
94																										15										
95																								23	71	99	67	63	28							
96																										26										
97																			14	21			270	389	532	655	539	496	445	404	277	177				
98																							402	626	577	785	723	699	601	561	890	862	527			
99																										16	10		50							
100																												19		41						
101																													38							

Table 58: OEO 4. Black oreo (BOE). Number of tows with a positive catch of black oreo by vessel by fishing year. Vessels are ordered by the mean fishing year of their tows, and are coded by number. Only cells in which there are 10 or more positive catches are shown.

Vessel	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1	38																															
2	19																															
3	25																															
4	42																															
5	35																															
6	34																															
7	34	48																														
8		48	44																													
9		159	182																													
10		44	330																													
11			11																													
12		14	250																													
13			10																													
14			116																													
15			91																													
16			23																													
17			135	21																												
18		22			22																											
19			36	50																												
20				26																												
21				96																												
22				38	18																											
23			32	75			20																									
24					52																											
25				31	29	13																										
26					45																											
27					21																											
28			97	75	84	50	175																									
29				51	41	86																										
30				64	26			13	26																							
31						10																										
32			140	29	41				107																							
33		19	23	34	20	60	59			21																						
34				17	71	143																										
35				61	17	10		20	70																							
36					13	28		34																								
37							68																									
38							10																									
39							10																									
40					86	54			40	31	48																					
41								14																								
42					26		73	58	93																							
43						13	29	10	11	14																						
44								11																								
45								11																								
46								54																								
47								16																								
48								15																								
49					67				29	75																						
50							20	81	12	44																						
51			113	28			28	31	48	105	129	116																				
52							40		60				10																			
53								14	66																							
54									13																							
55									27																							
56									31																							
57									36	41																						
58										30																						
59							26	121		96	21	61	28																			
60										13																						
61										21																						
62									34	16	18																					
63											37																					
64											61																					
65										28	10		13																			
66											79	70	28																			
67						11	120	143	111	128	183	35	82	84	98	85	169															

Vessel	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
68													53																			
69													12																			
70														85																		
71													69																			
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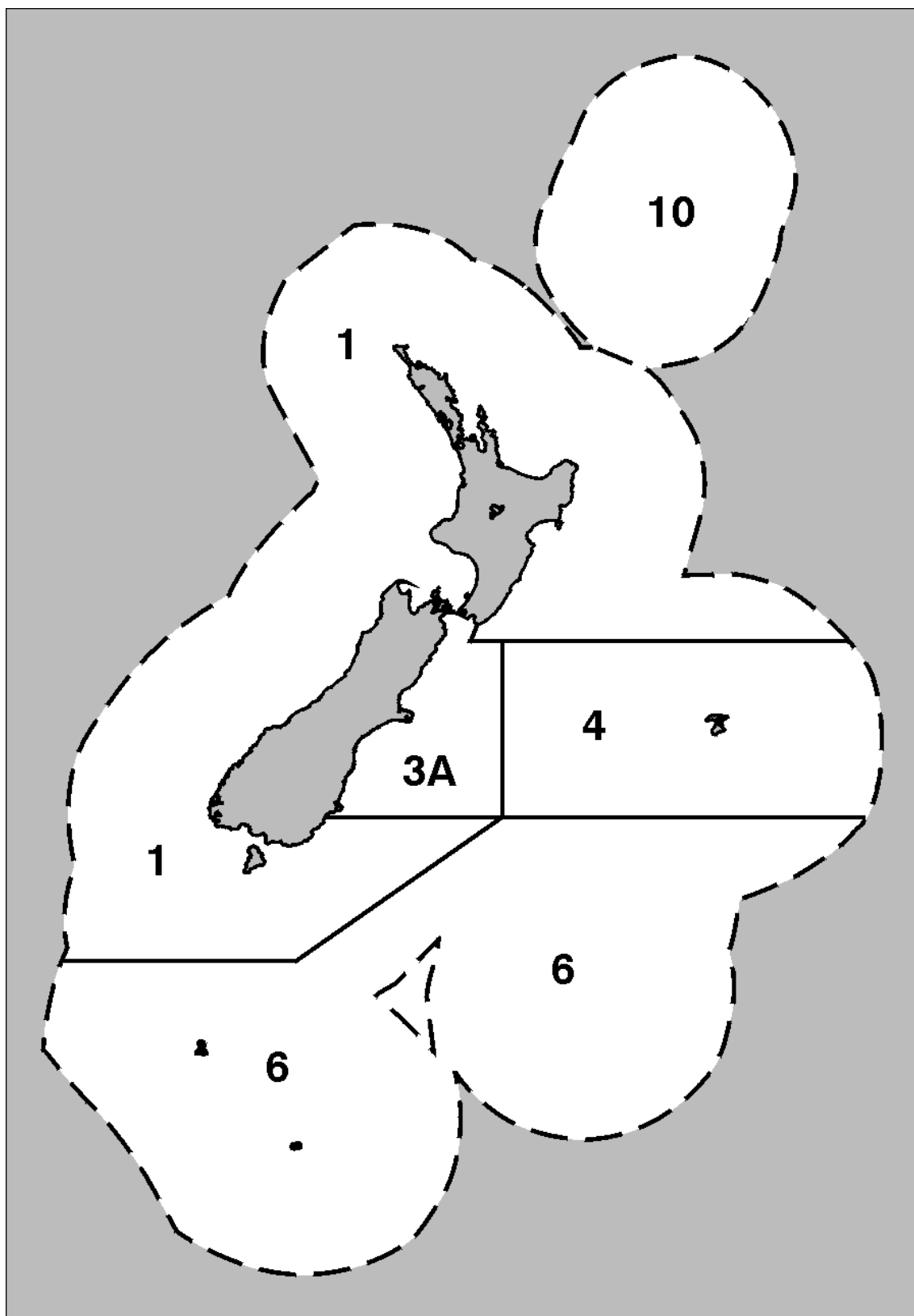


Figure 1: Oreo management areas (thick black lines). The dashed line is the 200 n. mile EEZ.

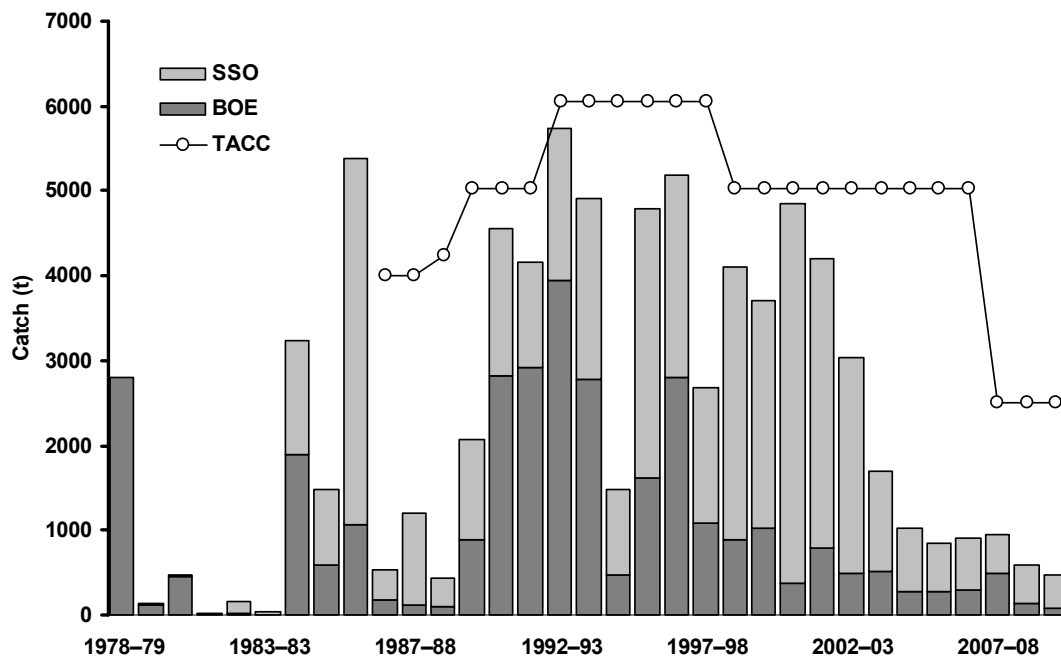


Figure 2: OEO 1 TACC and reported catches by species. The data are based on Tables 2 and 3 of the oreo section of Ministry of Fisheries (2011). The total catches are the Table 2 reported landings, and species breakdowns are derived from the ratio of SSO to BOE estimated catches in Table 3 except for 2008–09 and 2009–10 which are based on ratios calculated from the groomed data used in this report. Fishing years are as in Table 1.

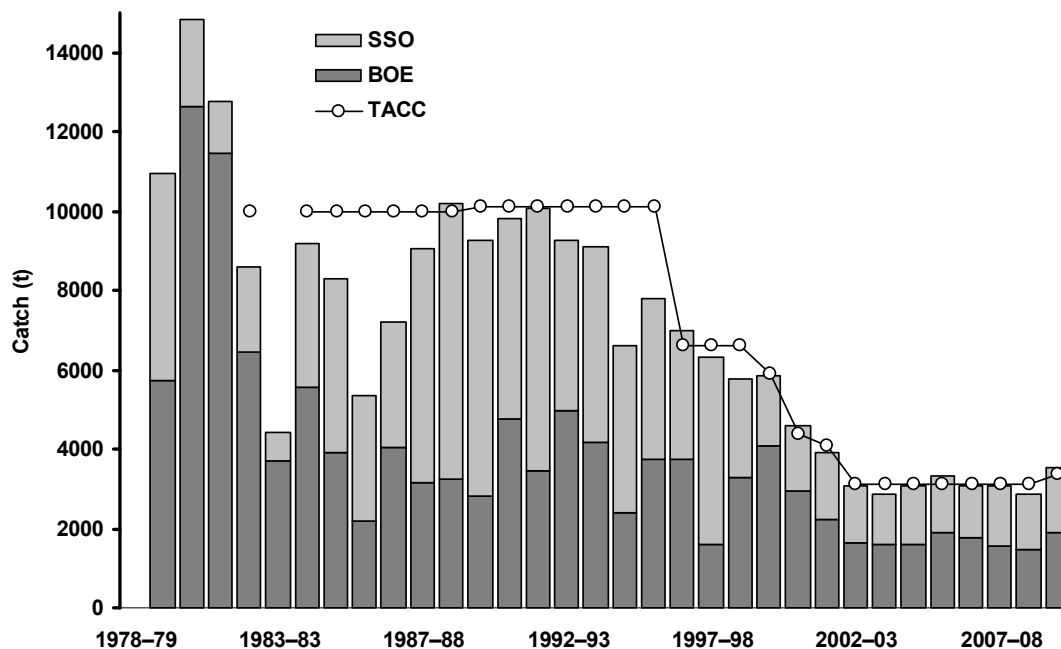


Figure 3: OEO 3A TACC and reported catches by species. The data are based on Tables 2 and 3 of the oreo section of Ministry of Fisheries (2011). The total catches are the Table 2 reported landings, and species breakdowns are derived from the ratio of SSO to BOE estimated catches in Table 3 except for 2008–09 and 2009–10 which are based on ratios calculated from the groomed data used in this report. Fishing years are as in Table 1.

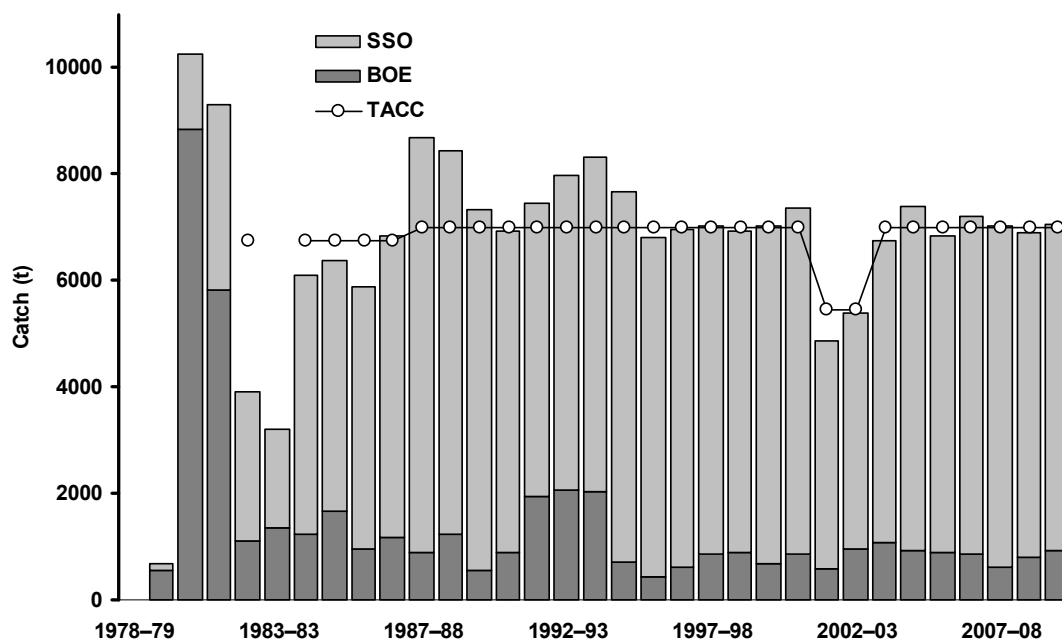


Figure 4: OEO 4 TACC and reported catches by species. The data are based on Tables 2 and 3 of the oreo section of Ministry of Fisheries (2011). The total catches are the Table 2 reported landings, and species breakdowns are derived from the ratio of SSO to BOE estimated catches in Table 3 except for 2008–09 and 2009–10 which are based on ratios calculated from the groomed data used in this report. Fishing years are as in Table 1.

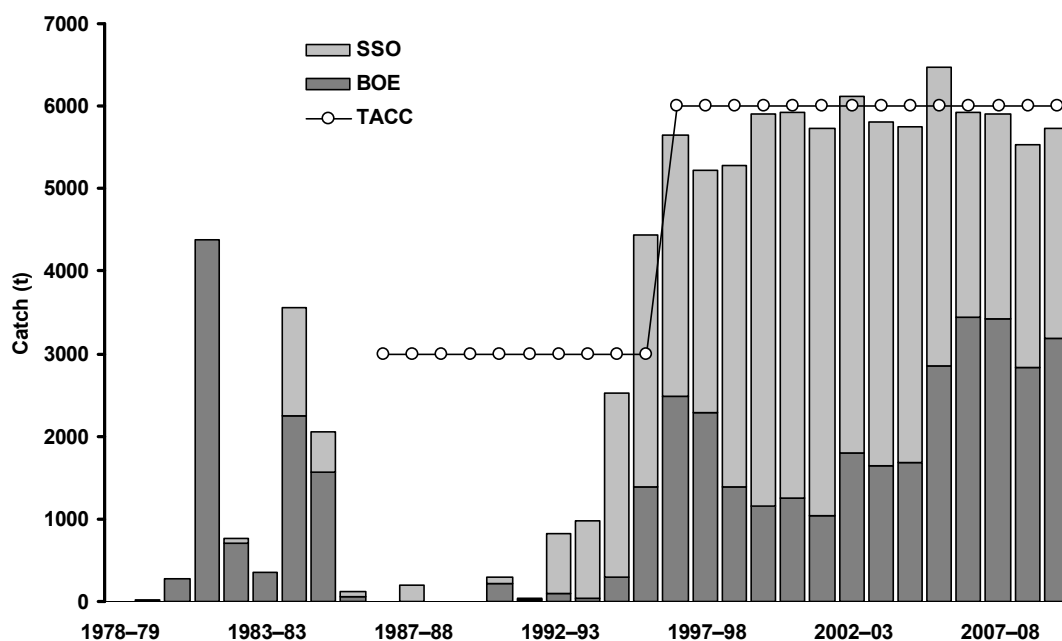


Figure 5: OEO 6 TACC and reported catches by species. The data are based on Tables 2 and 3 of the oreo section of Ministry of Fisheries (2011). The total catches are the Table 2 reported landings, and species breakdowns are derived from the ratio of SSO to BOE estimated catches in Table 3 except for 2008–09 and 2009–10 which are based on ratios calculated from the groomed data used in this report. Fishing years are as in Table 1.

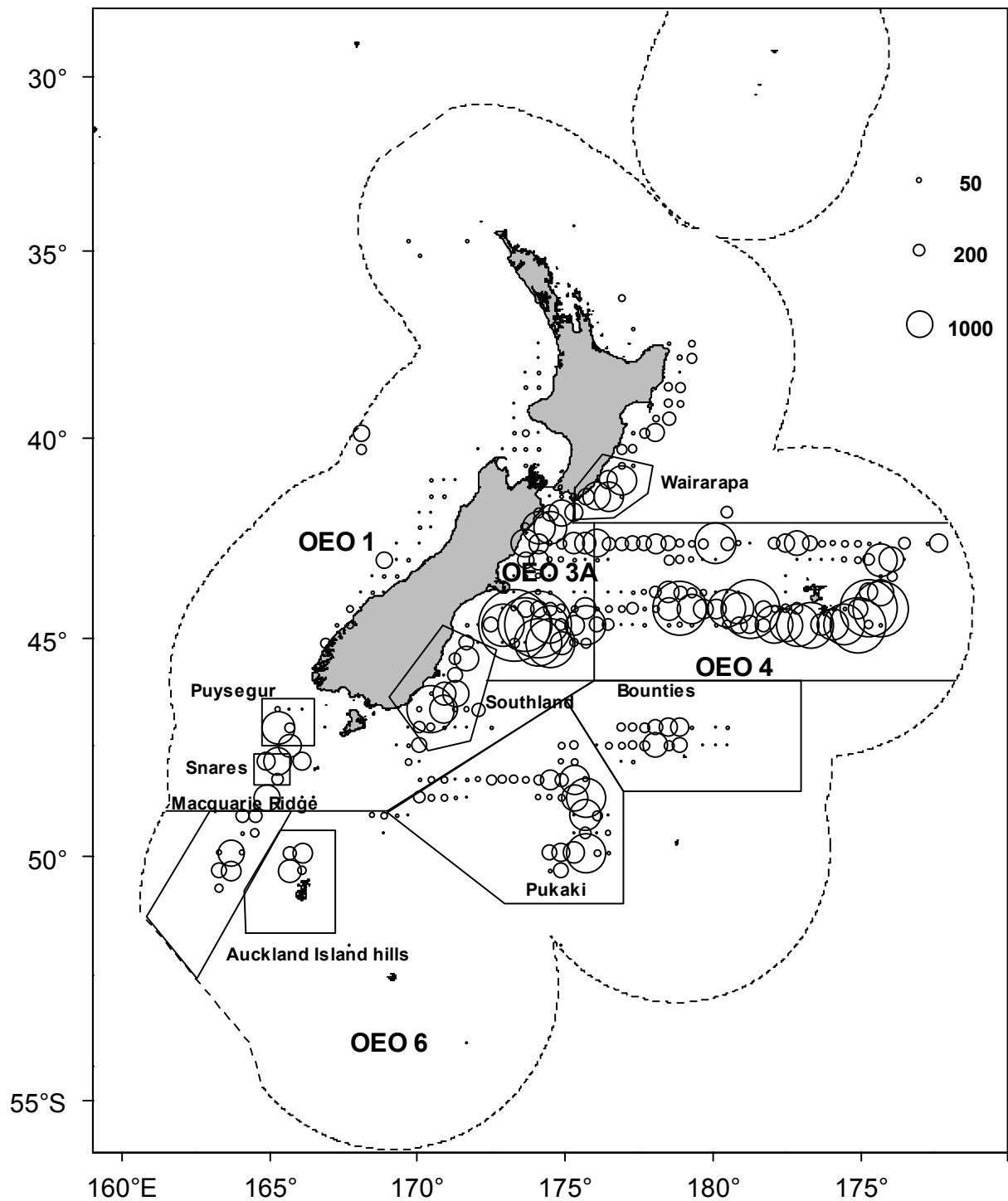


Figure 6: The number of tows that caught or targeted oreos from 1977–78 to 2009–10 summed for each 0.4×0.4 degree cell (for 10 or more tows per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of tows per cell. Fewer than 10 tows per cell 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.

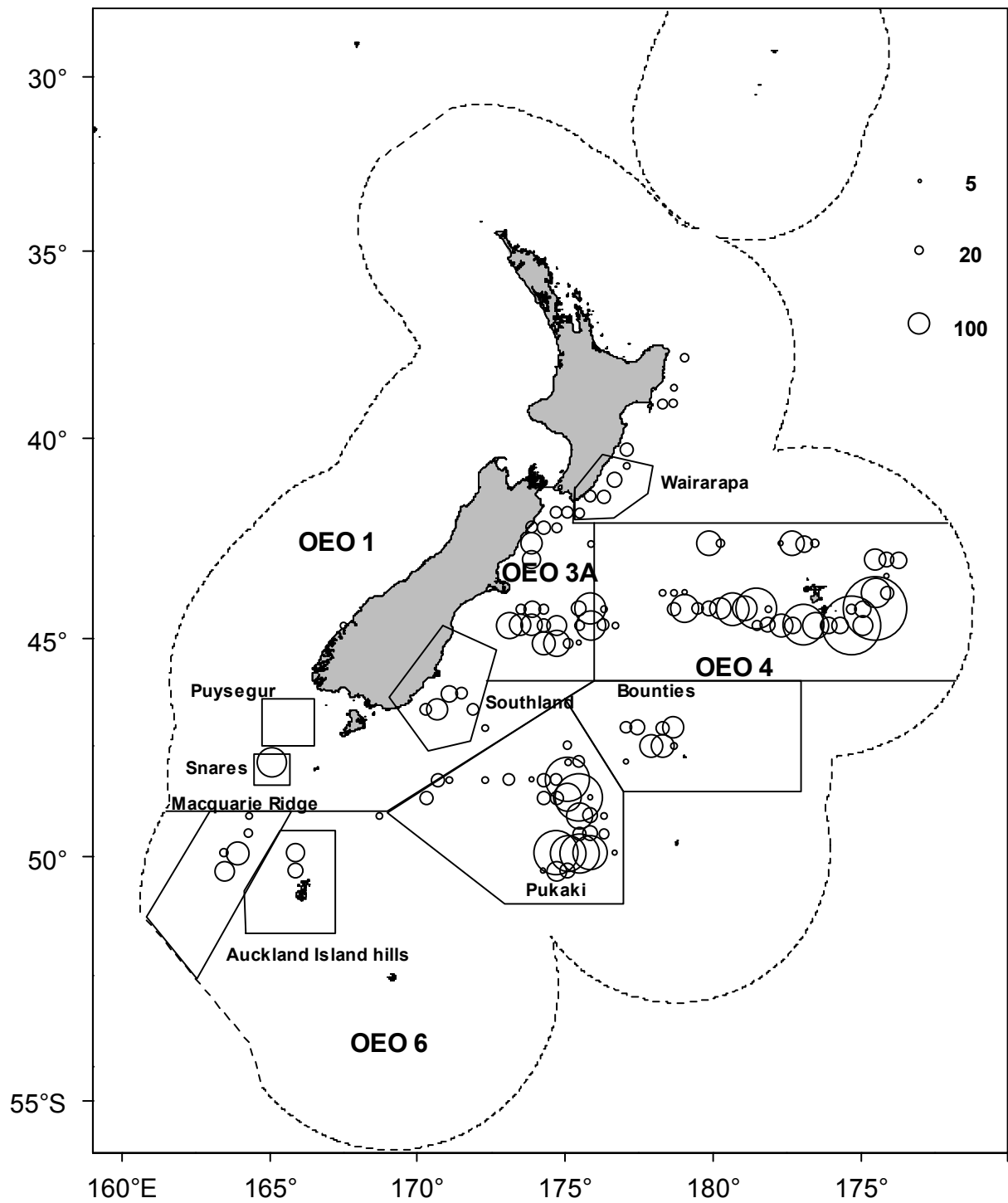


Figure 7: The number of tows that caught or targeted oreos from 2007–08 to 2009–10 summed for each 0.4 x 0.4 degree cell (for 5 or more tows per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of tows per cell. Fewer than 5 tows per cell were not plotted.

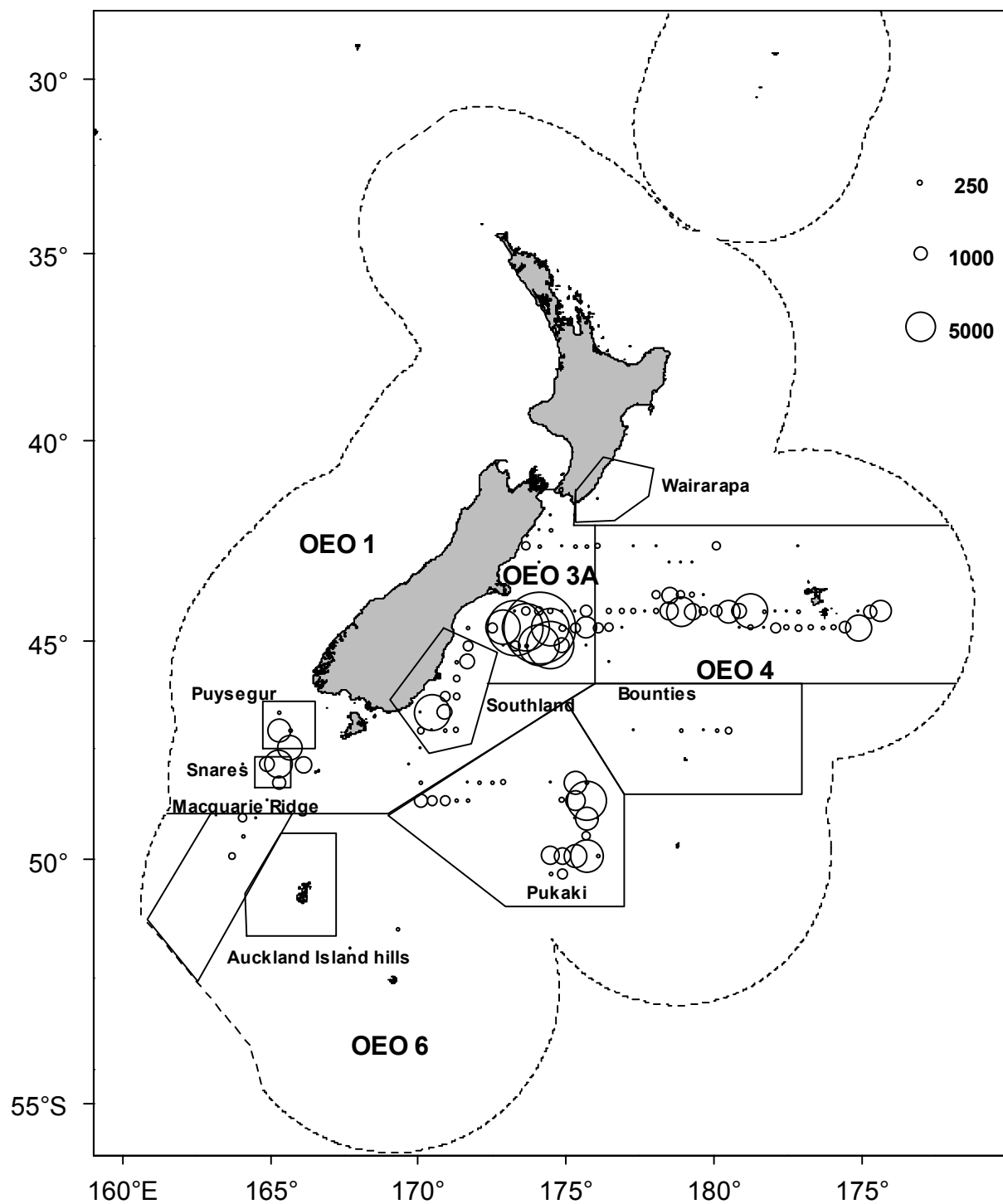


Figure 8: Black oreo catches (t) from 1977–78 to 2009–10 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

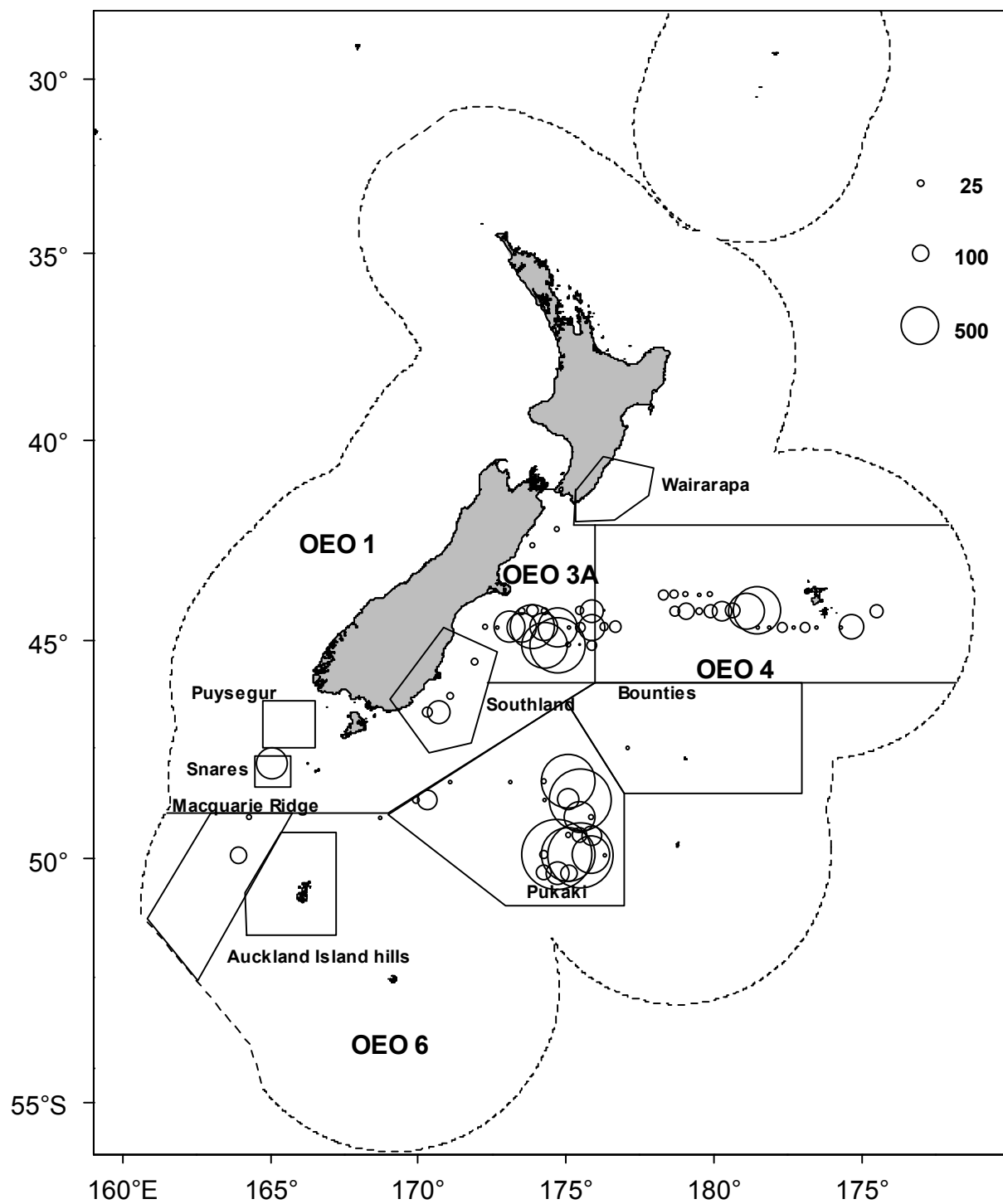


Figure 9: Black oreo catches (t) from 2007–08 to 2009–10 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

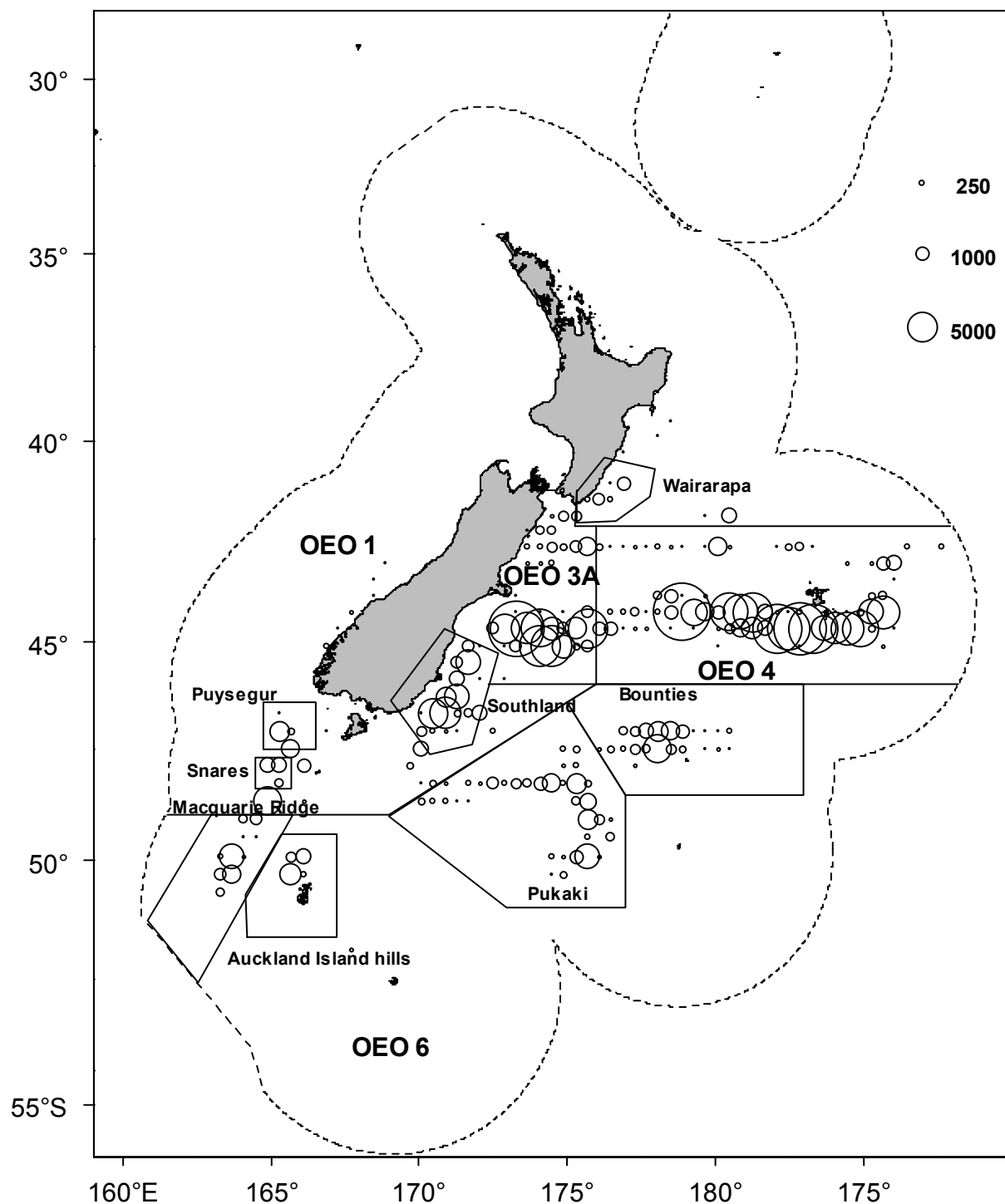


Figure 10: Smooth oreo catches (t) from 1977–78 to 2009–10 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of smooth oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

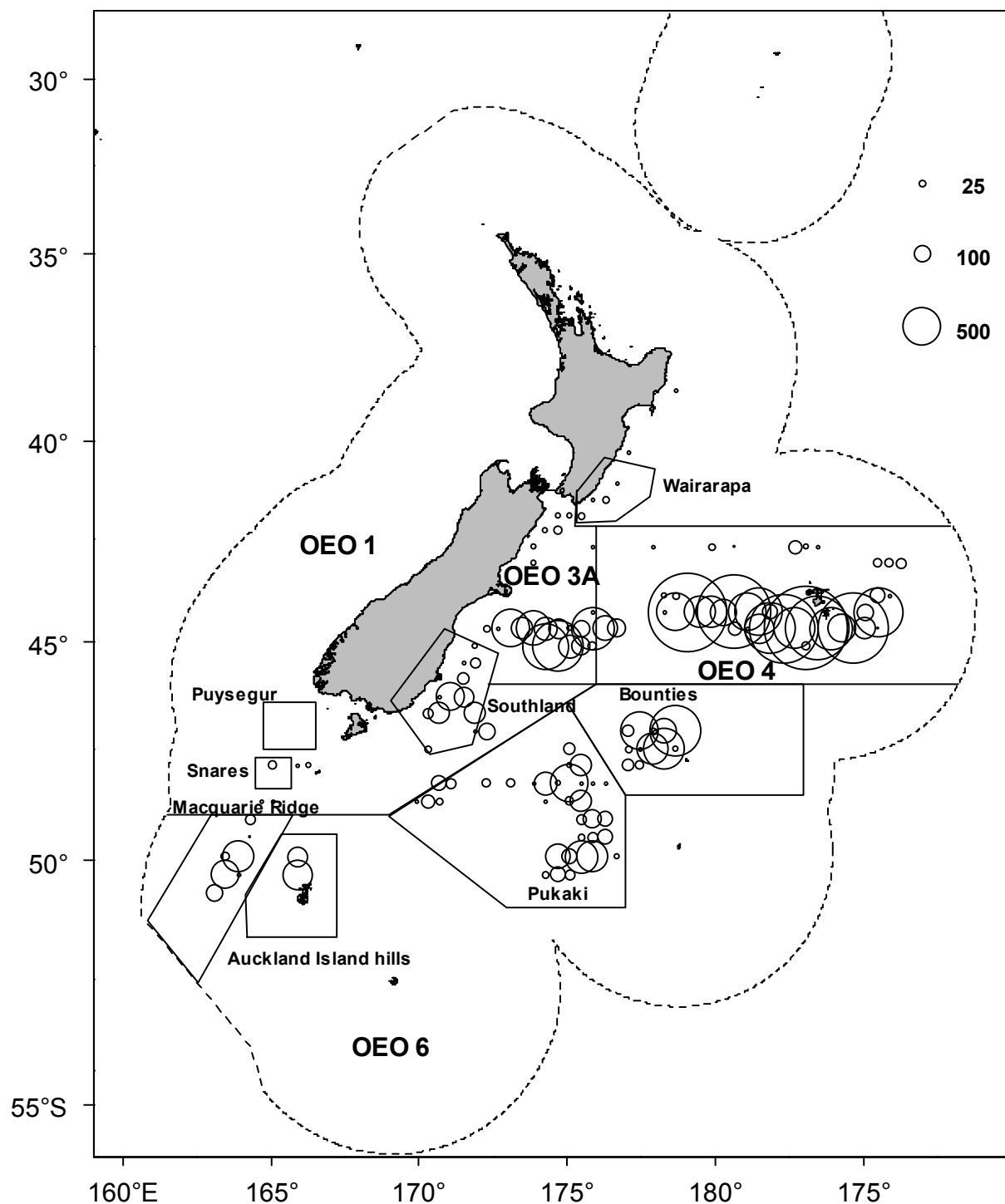


Figure 11: Smooth oreo catches (t) from 2007–08 to 2009–10 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of smooth oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

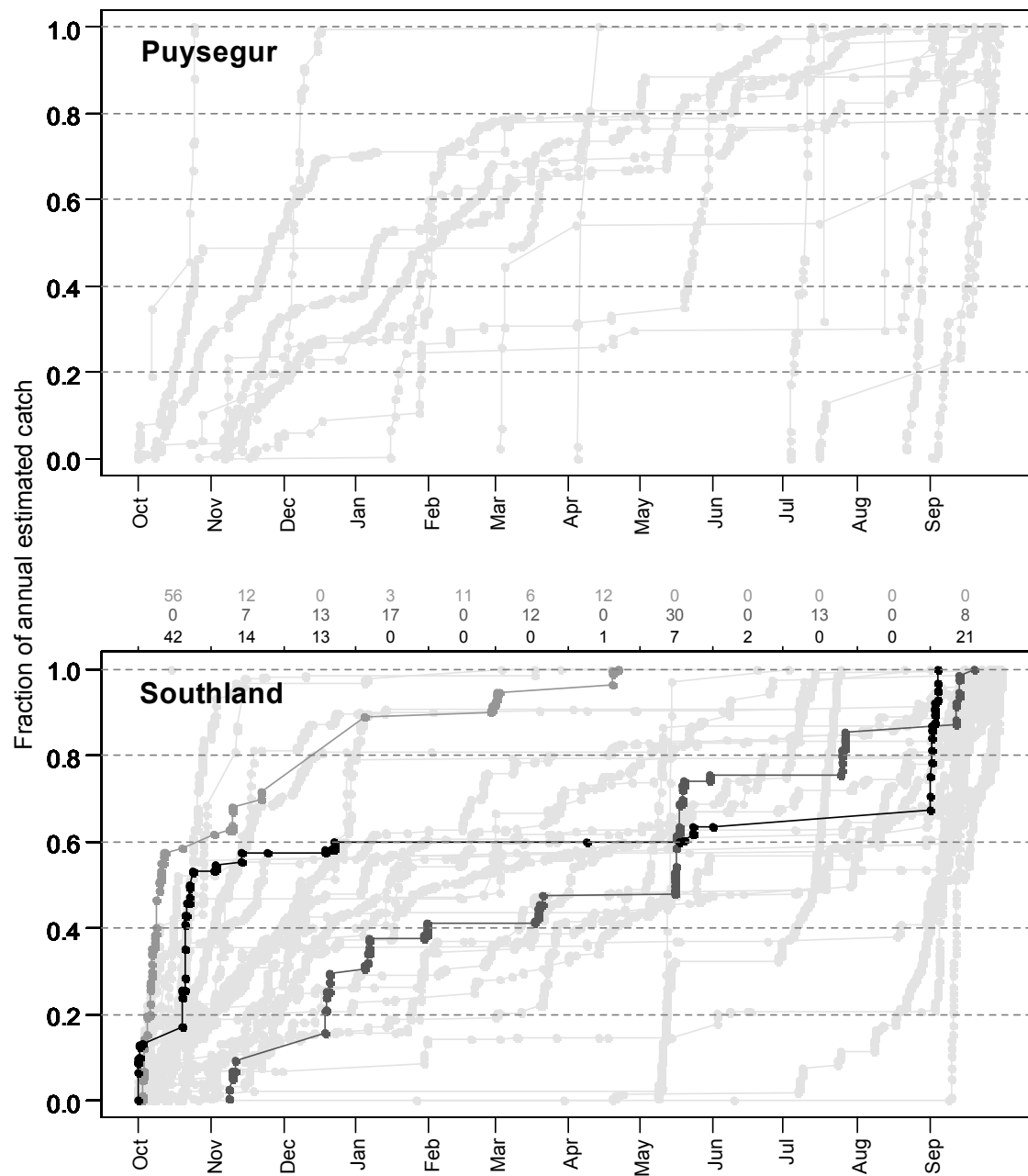


Figure 12: Cumulative catches of all oreo in the Puysegur and Southland fisheries. Catches are summed in chronological order through the fishing year and scaled to the total estimated catch for the year. Each point represents the relative accumulated catch after the addition of the catch from each new tow. The 2007–08, 2008–09, and 2009–10 fishing years are shown individually in shades of dark grey and black (with the percentage of tows by month shown above), and all previous years are shown in light grey.

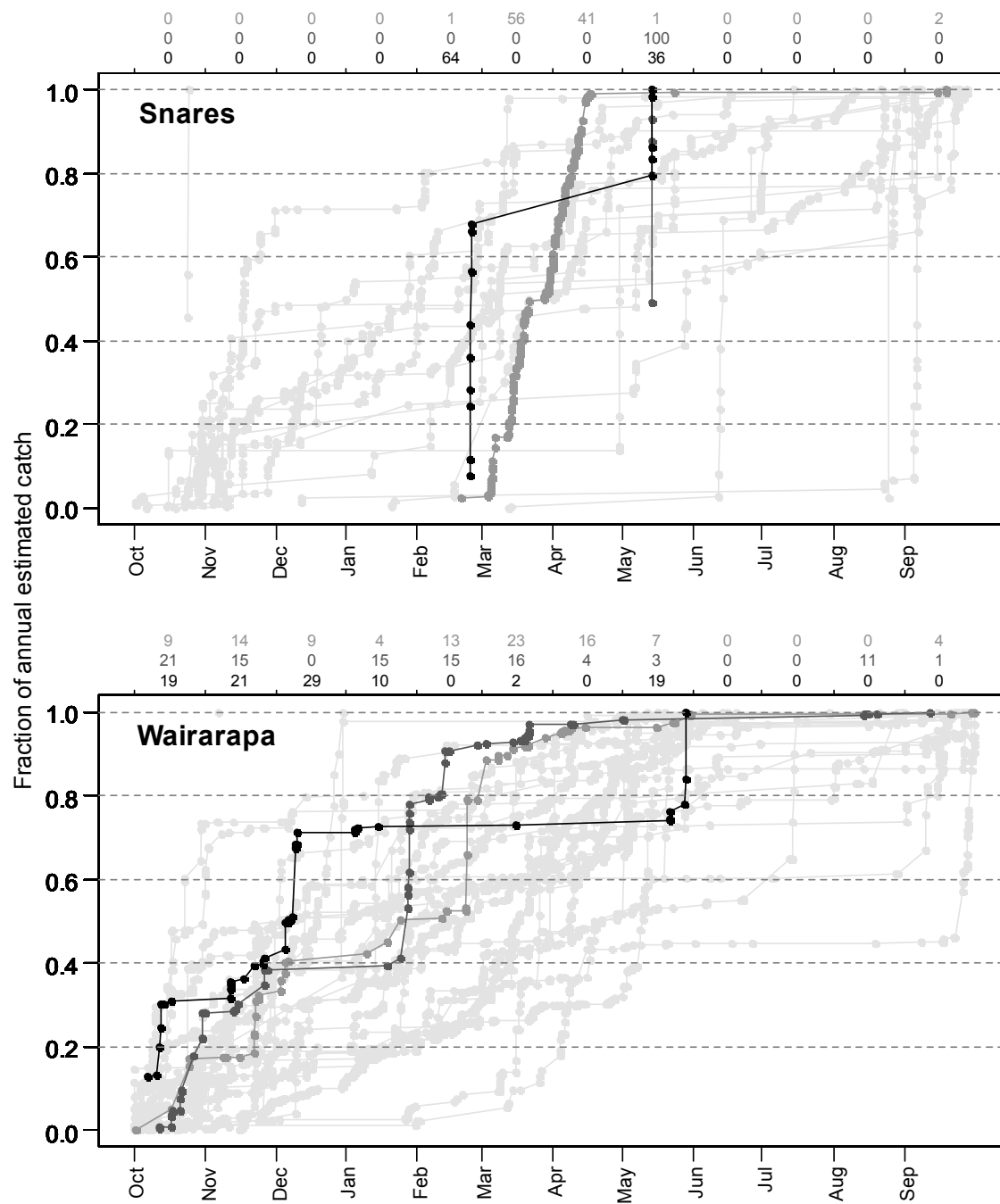


Figure 13: Cumulative catches of all oreo in the Snares and Wairarapa fisheries. See Figure 12 for further details.

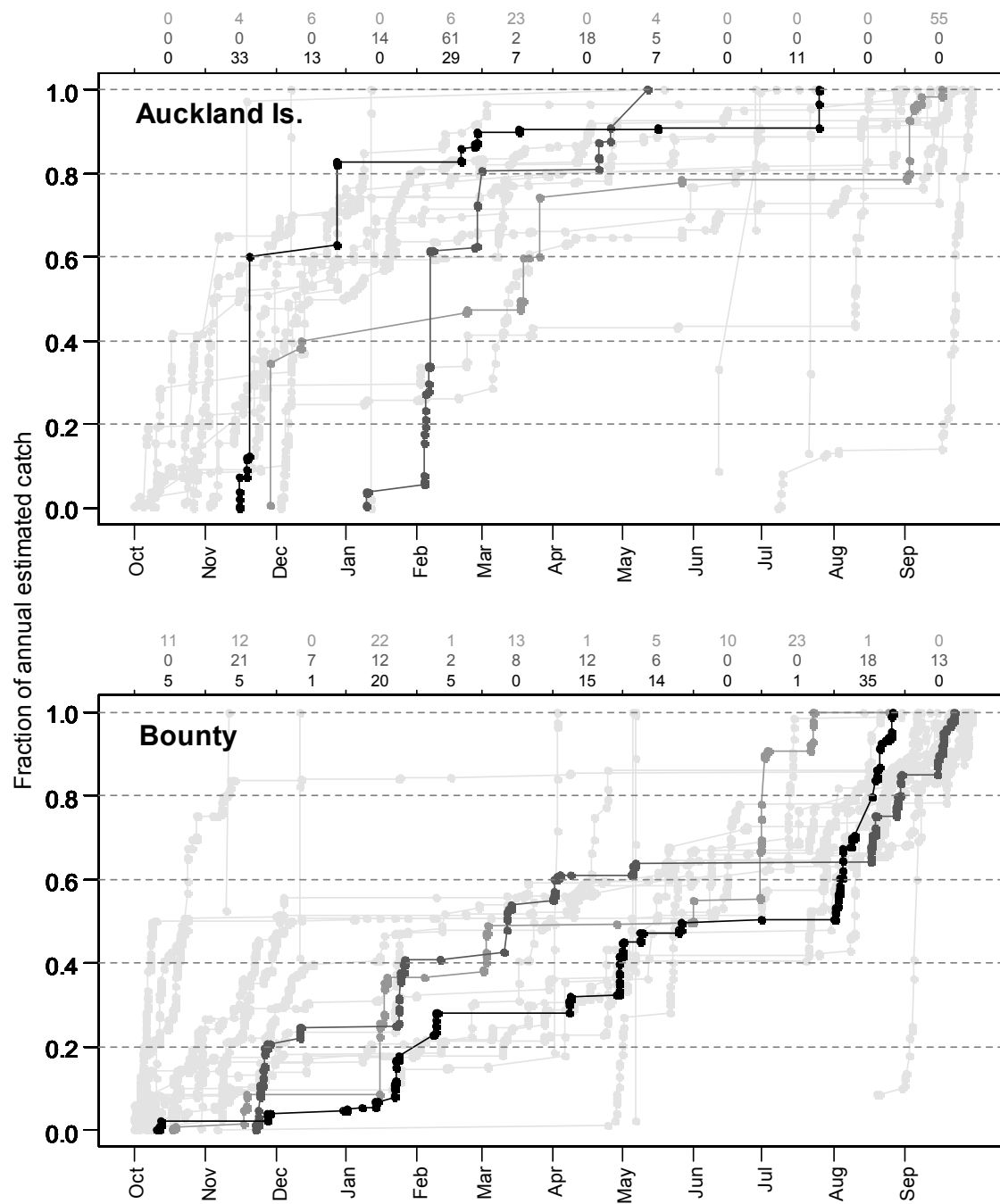


Figure 14: Cumulative catches of all oreo in the Auckland Island hills and Bounty Plateau fisheries. See Figure 12 for further details.

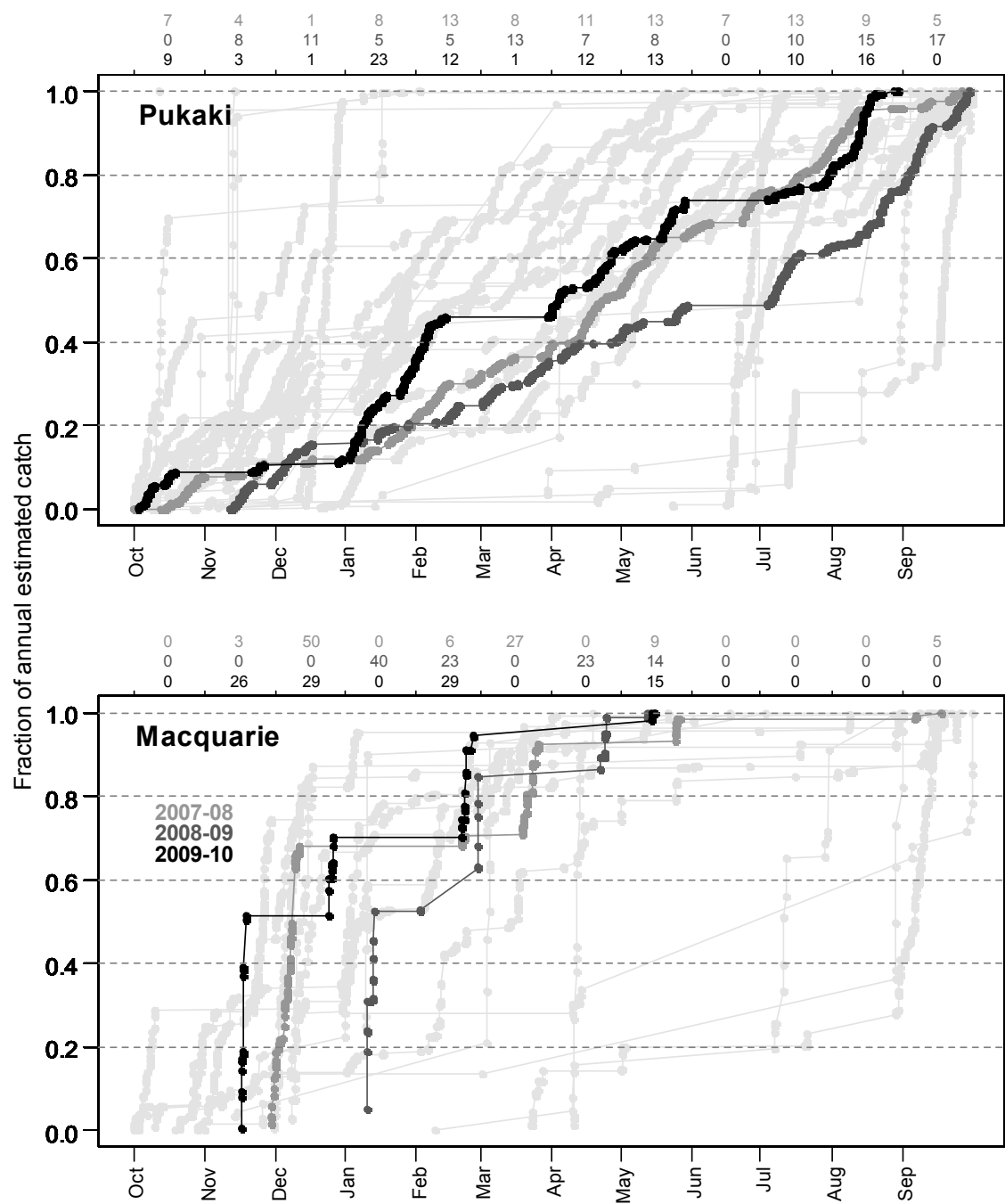


Figure 15: Cumulative catches of all oreo in the Pukaki Rise and Macquarie Ridge fisheries. See Figure 12 for further details.

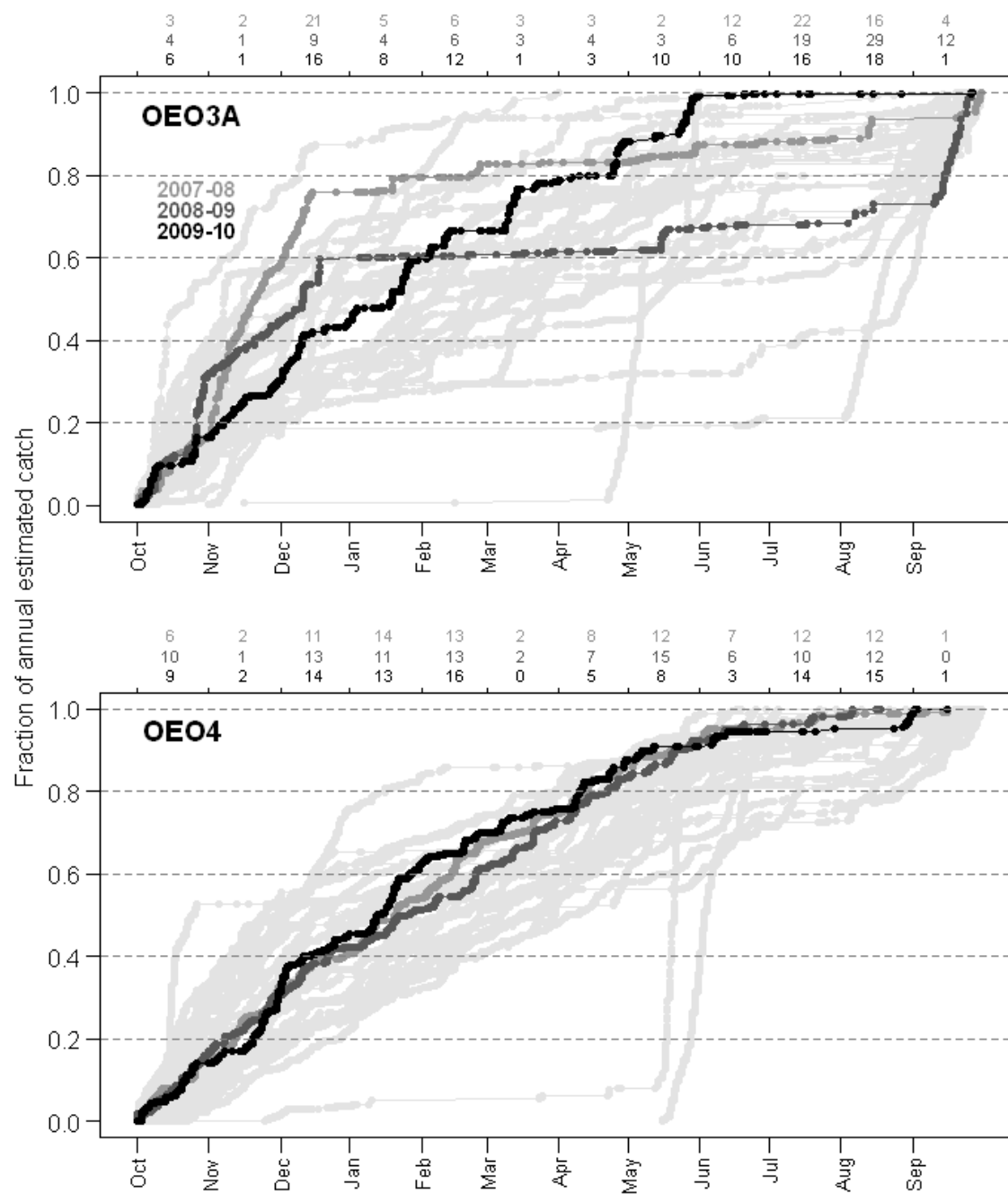


Figure 16: Cumulative catches of all oreo in the OEO 3A (excluding Southland) and OEO 4 fisheries. See Figure 12 for further details.

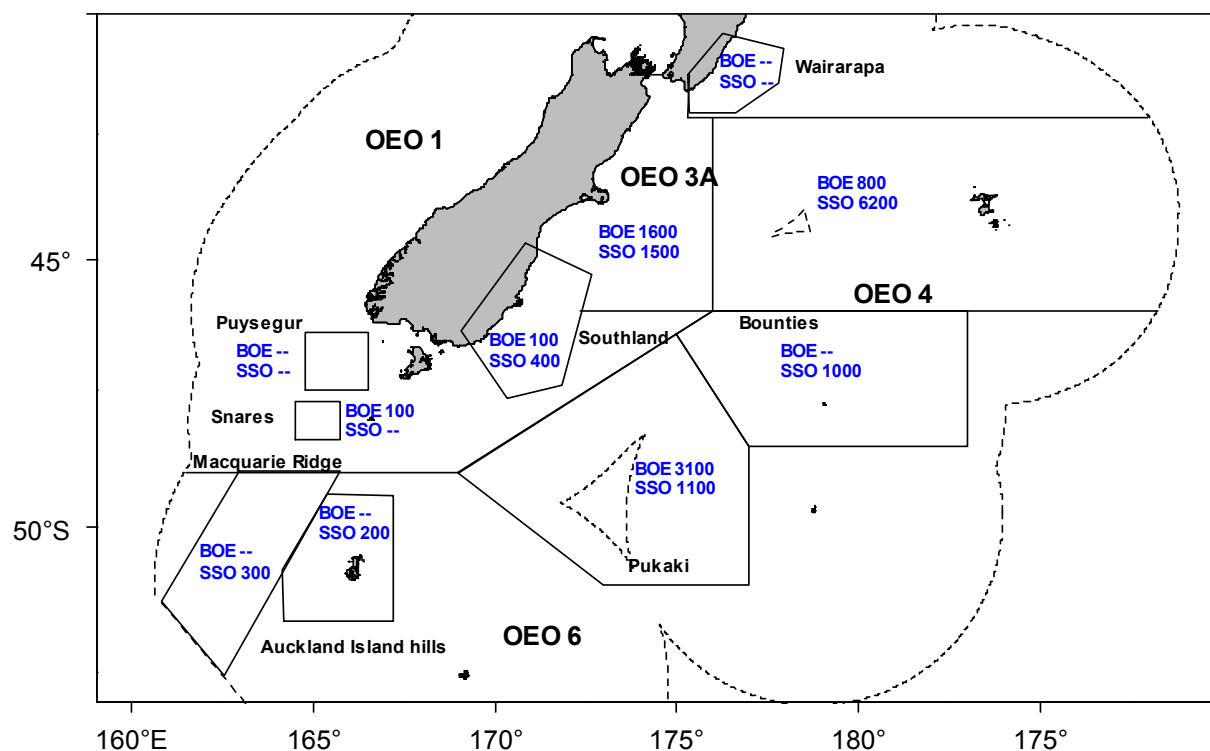


Figure 17: Mean annual estimated catch (t) of black oreo (BOE) and smooth oreo (SSO) by fishing area from 2007–08 to 2009–10. —, catch less than 100 t.

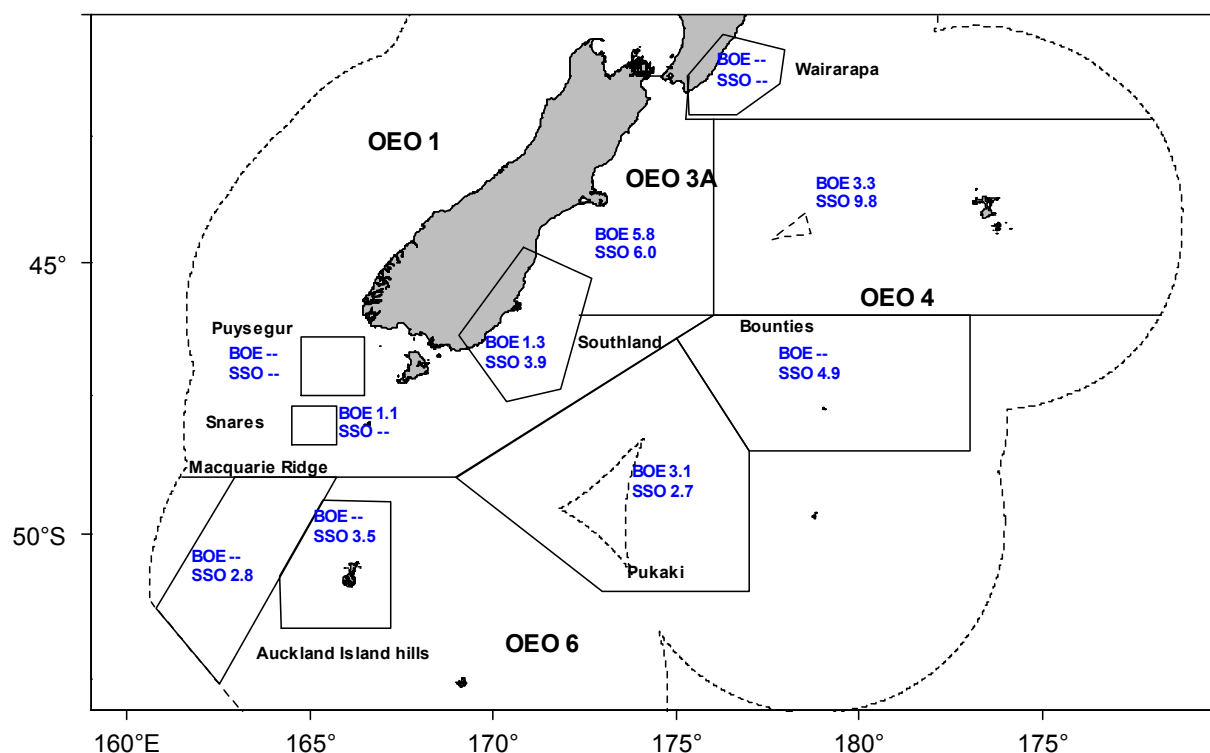


Figure 18: Mean annual unstandardised target CPUE (t/tow) of black oreo (BOE) and smooth oreo (SSO) by fishing area from 2007–08 to 2009–10, taken from tows that target fished for black oreo or smooth oreo. —, insufficient data (fewer than 50 target tows).

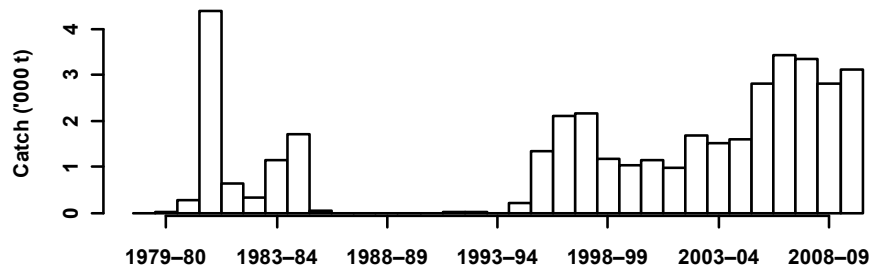


Figure 19: Black oreo annual estimated catch (t) from Pukaki Rise.

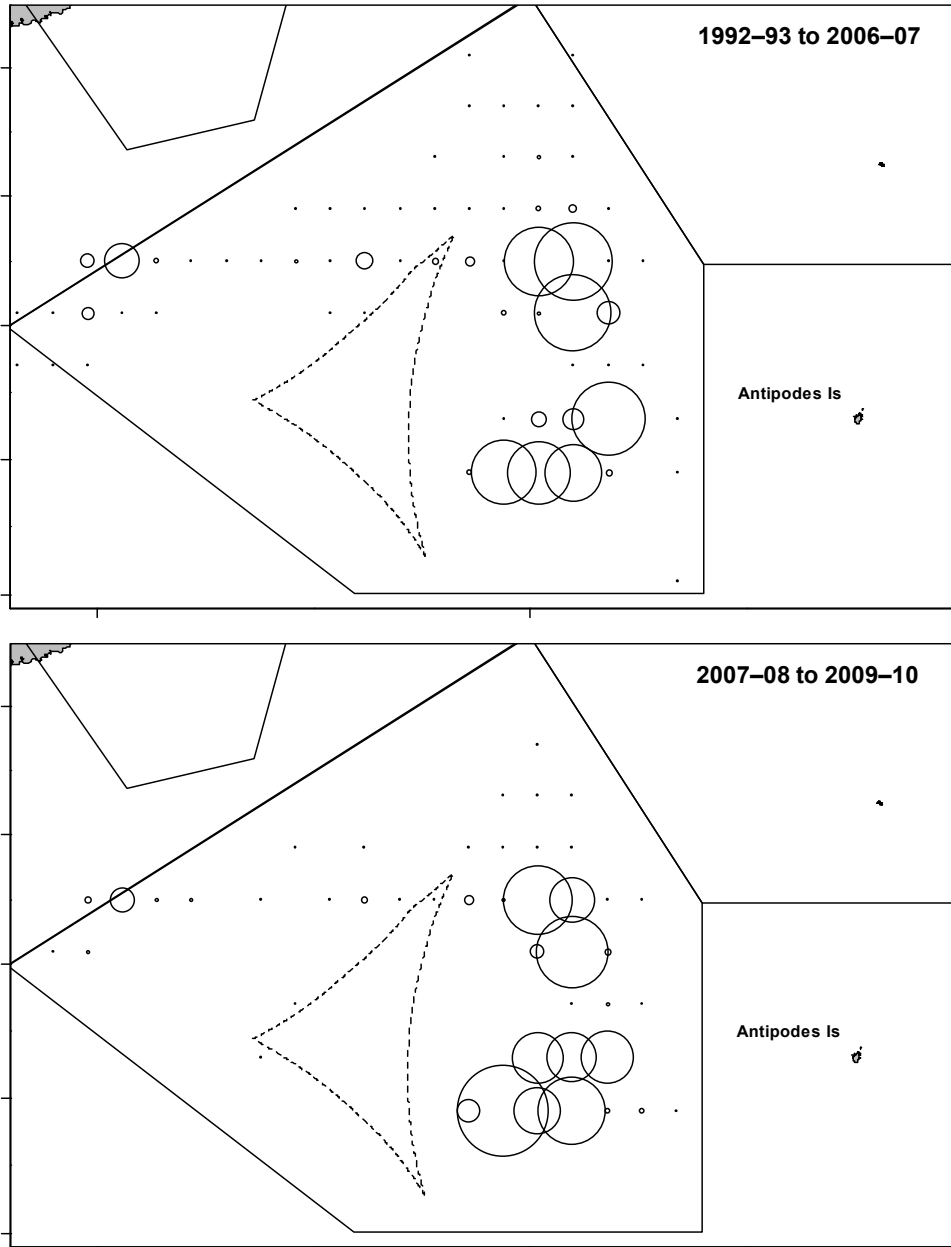


Figure 20: Black oreo from Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) top, and for the recent period (2007-08 to 2009-10) bottom. The dashed line marks the EEZ, maximum circle size = 4.3 t (top) and 1.9 t (bottom).

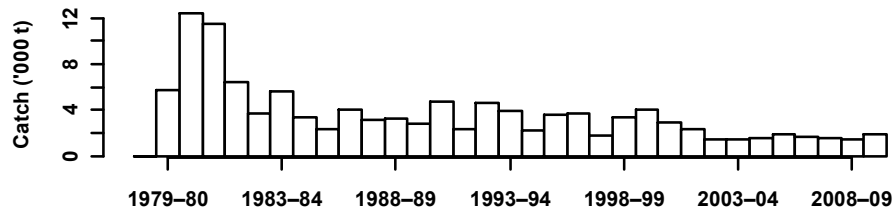


Figure 21: Black oreo annual estimated catch (t) from OEO 3A (minus catch from Southland).

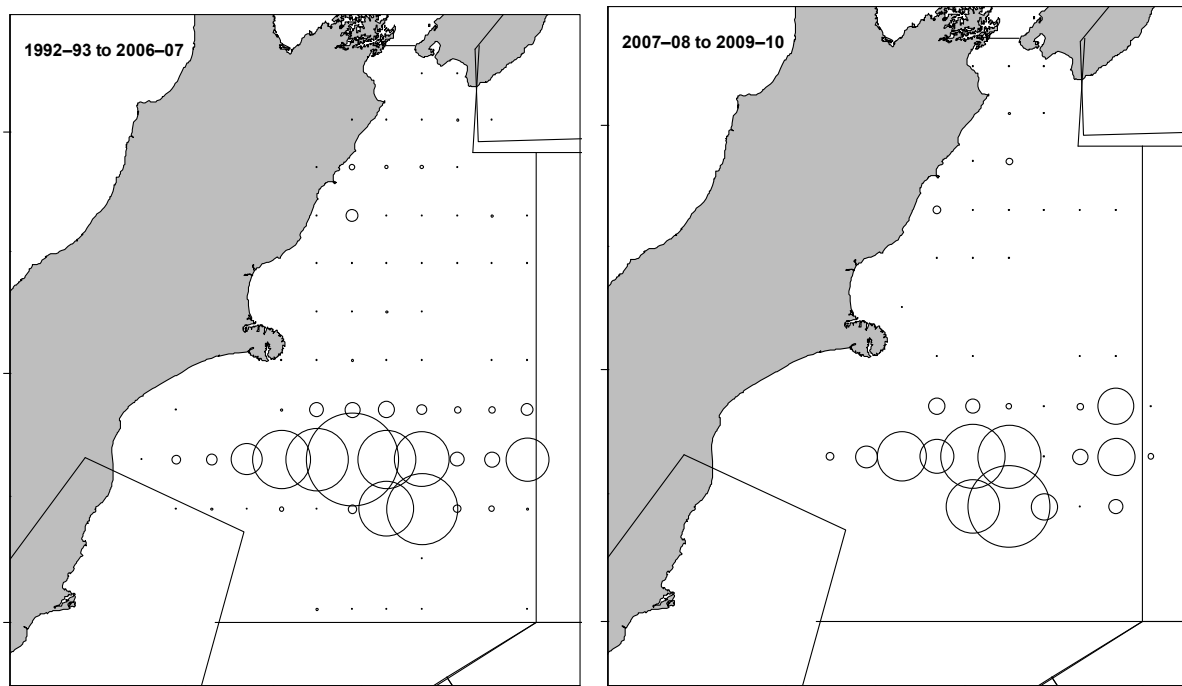


Figure 22: Black oreo from OEO 3A (minus catch from Southland) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) left panel, and for the recent period (2007-08 to 2009-10) right panel. Maximum circle size = 8.6 t (left), 1.1 t (right).

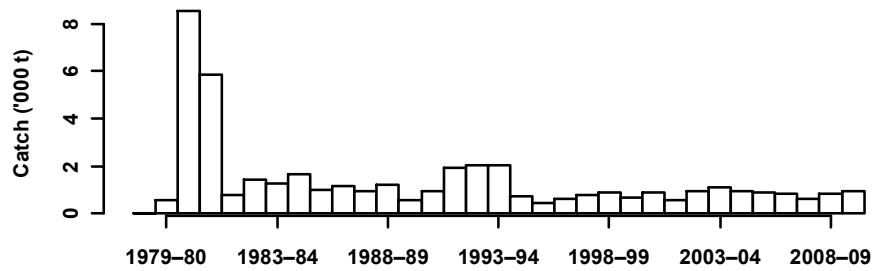


Figure 23: Black oreo annual estimated catch (t) from OEO 4.

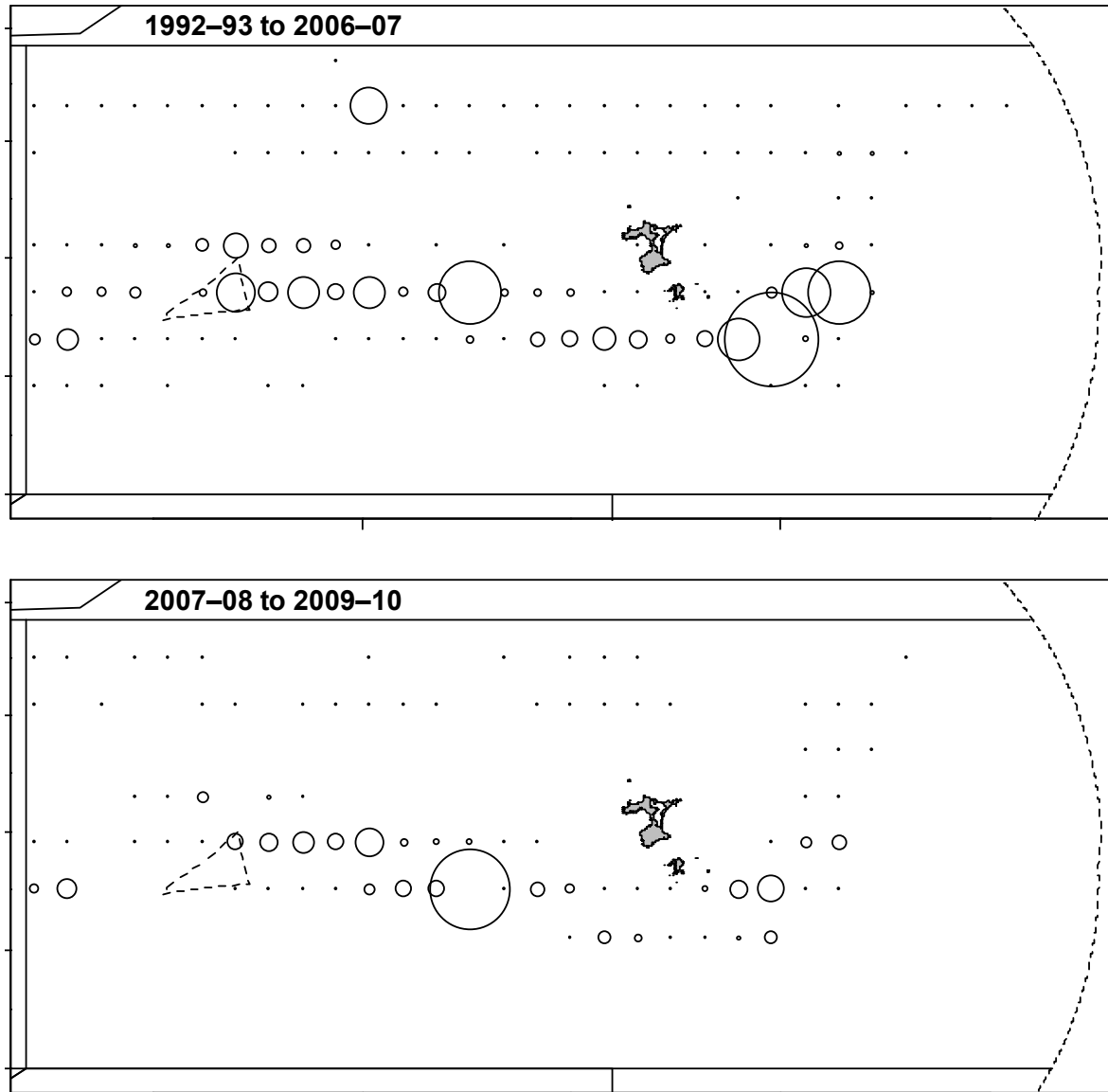


Figure 24: Black oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) top, and for the recent period (2007-08 to 2009-10) bottom. Maximum circle size = 3.4 t (top), 1.2 t (bottom).

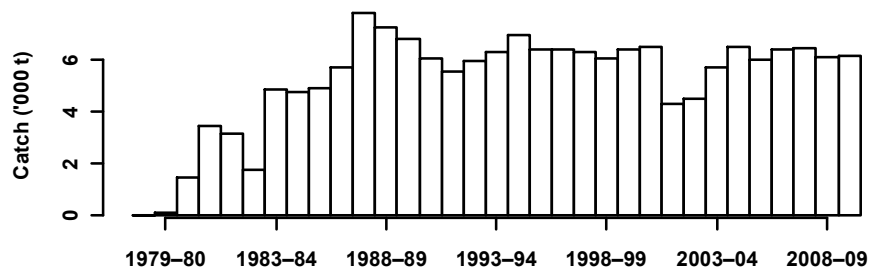


Figure 25: Smooth oreo annual estimated catch (t) from OEO 4.

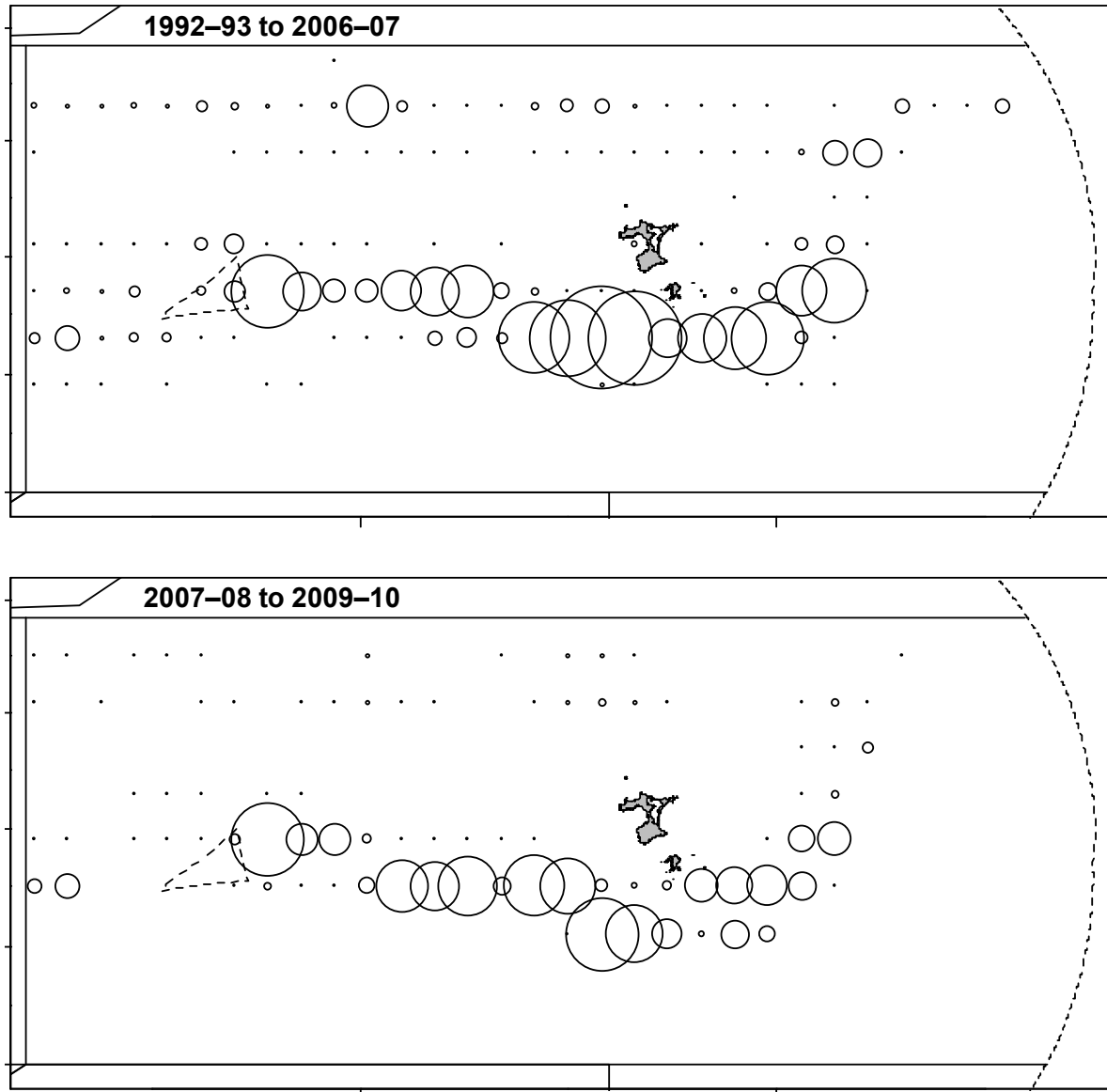


Figure 26: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) top, and for the recent period (2007-08 to 2009-10) bottom. Maximum circle size = 13.4 t (top), 2.2 t (bottom).

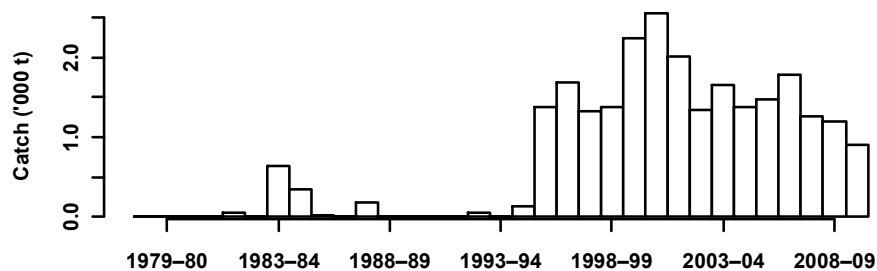


Figure 27: Smooth oreo annual estimated catch (t) from Pukaki Rise.

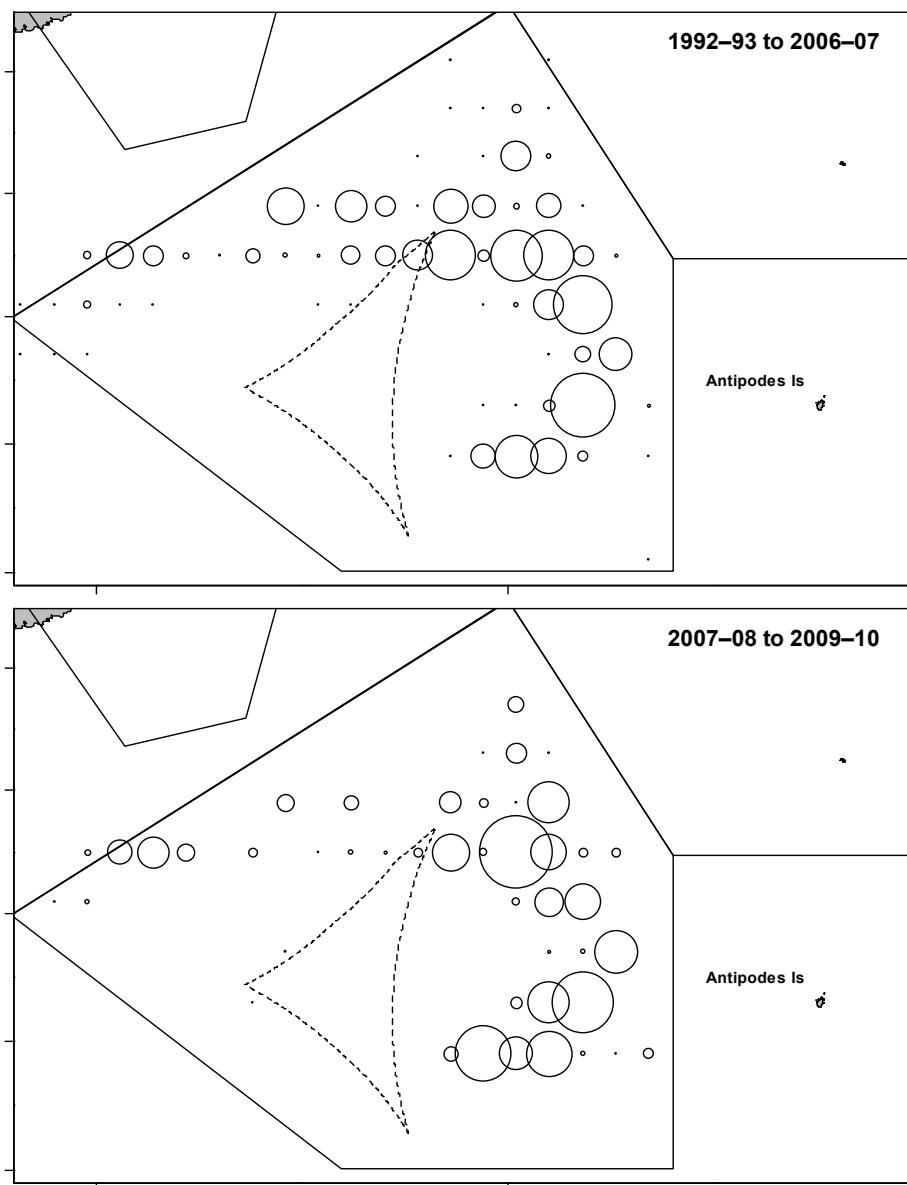


Figure 28: Smooth oreo Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) top, and for the recent period (2007-08 to 2009-10) bottom. Maximum circle size = 2.7 t (top), 0.5 t (bottom).

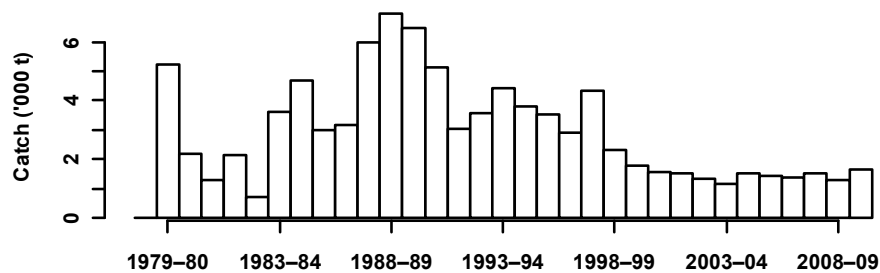


Figure 29: Smooth oreo annual estimated catch (t) from OEO 3A (minus Southland).

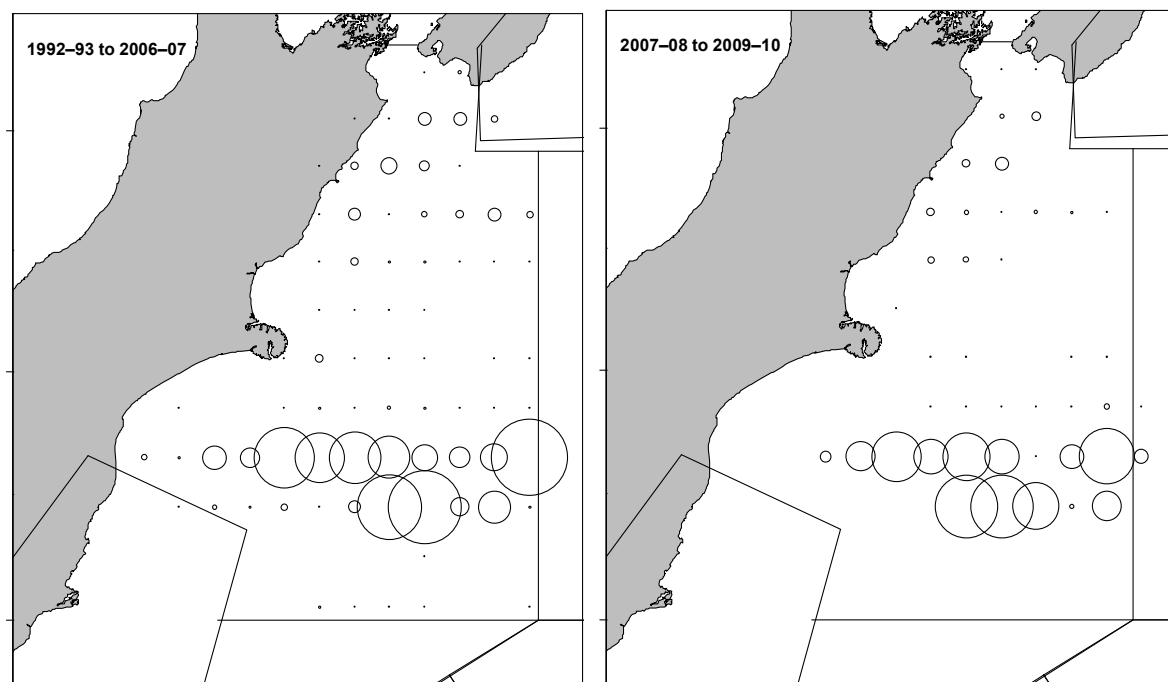


Figure 30: Smooth oreo OEO 3A relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) left panel, and for the recent period (2007-08 to 2009-10) right panel. Maximum circle size = 6.4 t (left), 0.7 t (right)

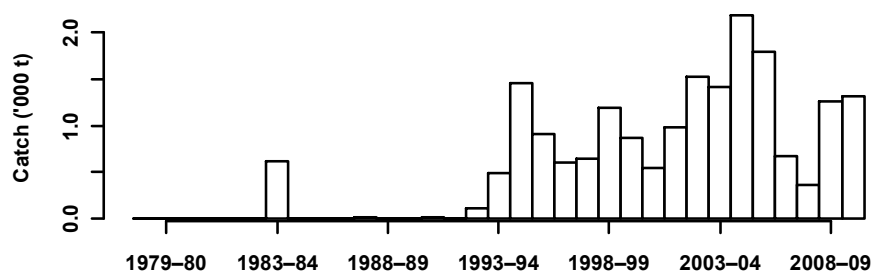


Figure 31: Smooth oreo annual estimated catch (t) from Bounty Plateau.

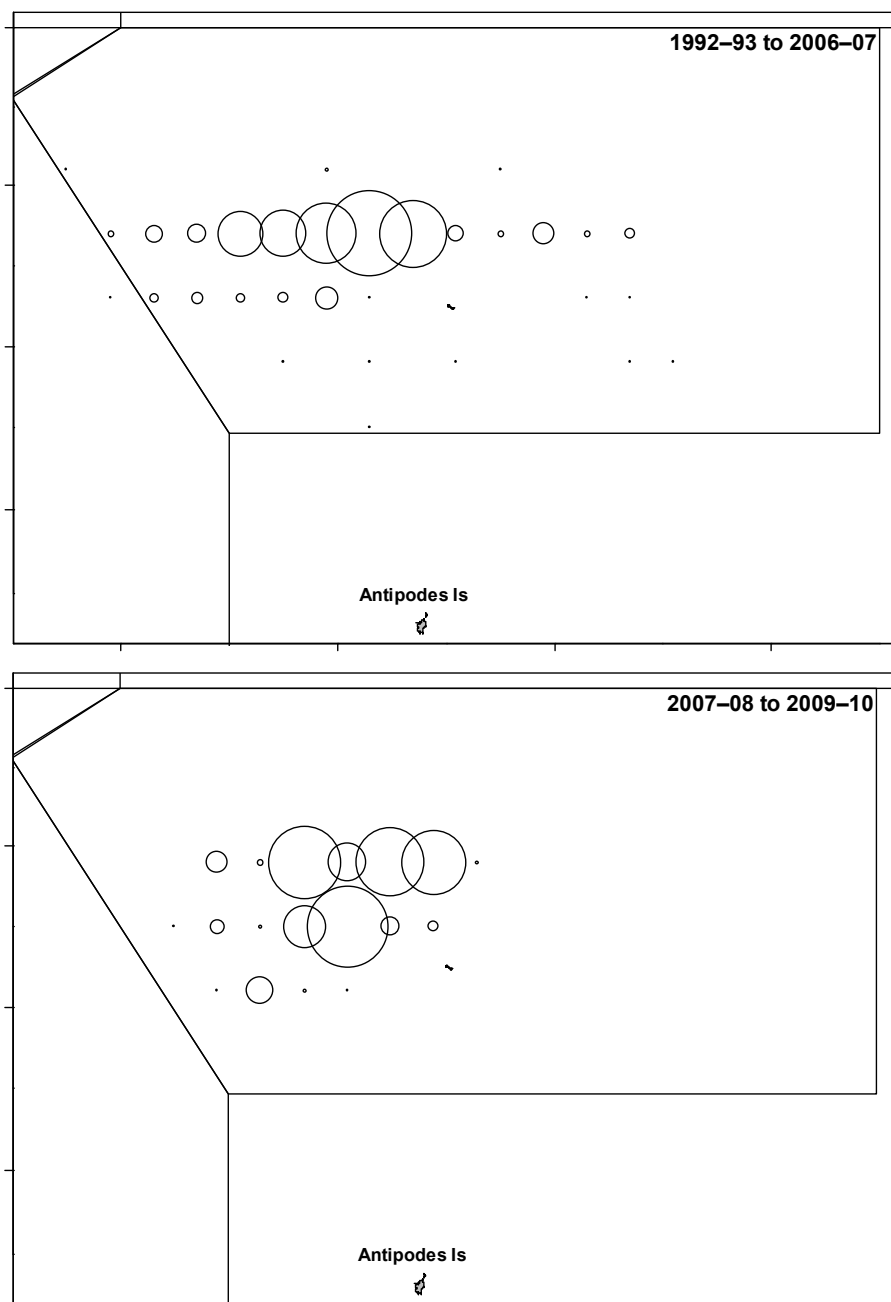


Figure 32: Smooth oreo Bounty Plateau relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2006-07) top, and for the recent period (2007-08 to 2009-10) bottom. Maximum circle size = 5.1 t (top), 0.7 t (bottom).

