NIWA

Taihoro Nukurangi

Stewart Island Marine Recreational Fishing Survey 2002/2003

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Final Research Report for
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Final Research Report

Report Title		Stewart Island Marine Recreational Fishing Survey 2002/2003
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7. Objective:

To characterise the recreational fishing activity around Stewart Island for management purposes.

Specifically:

To determine the areas fished, species targeted and caught, and methods used by recreational fishers around Stewart Island.

8. Executive Summary

The recreational fishery around Stewart Island was surveyed over twelve months from October 2002 to September 2003. Data on areas fished, fishing effort, fishing methods used, and numbers of all species caught, kept, and released, were collected from visitors leaving the Island and hunting parties using exit questionnaires, and from charter vessel operators and private fishers using diaries.

Bottom lining was the most commonly used method, and blue cod were by far the most frequently targeted species. Other methods used in decreasing order of importance included potting for blue cod and rock lobsters, dredging for oysters, set netting for butterfish, moki and sand flounder, hand gathering of paua and mussels, diving for scallops and rock lobster, and spearing of sand flounder. Most fishing was recorded along the central eastern coast.

Blue cod was the dominant species caught, comprising 86% and 76% of the catch taken by the two most commonly used methods, bottom line and potting, respectively. Of the 30 finfish species caught by bottom lining, only six (besides blue cod) made up more than 1% of the total catch, of which trumpeter and spiny dogfish were the most common.

Blue cod catch rates were relatively uniform by month and area around Stewart Island, suggesting relatively uniform fish abundance, but were somewhat lower in Paterson Inlet. This may be because it is less favourable habitat and/or the result of increased accessibility and fishing effort.

The proportion of fish retained by fishers varied considerably between species, averaging 64% for blue cod but ranged from 94% - 100% for highly sought after species such as trumpeter, moki, and butterfish.

Of particular interest was the observation that retention rates for blue cod increased markedly with distance from the main population centre (Halfmoon Bay), suggesting that in more accessible and frequently fished areas, the mean size of blue cod has declined. Differences in fish size by area need to be quantified using a standardised and repeatable survey method. It is recommended that a potting survey be undertaken to determine mean length of blue cod by area around Stewart Island, in order to better assess the state of the fishery.

9. Methods

Data collection

We developed a multi-faceted survey to characterise the recreational fishery around Stewart Island. The data collection phase was conducted from 1 October 2002 through to 30 September 2003, and comprised three principal techniques:

- exit questionnaires to sample fishers who left Stewart Island via the two main departure points - the ferry and airline terminals, and to sample hunting parties on the Island.
- daily diary records kept by charter boat operators and private fishers who fished frequently;
- a series of aerial surveys using a light aircraft on days when fishing effort was likely to be high, to determine the distribution and number of boats, and methods used by boat fishing parties around Stewart Island.

The novel exit questionnaires were compact with a format similar to golf-score-type cards (Appendix 1a and 1b) so that people who had fished whilst visiting Stewart Island could quickly and easily fill in important information on their fishing activities as they waited to depart. The questionnaire (Appendix 1b) asked for information on fishing practices (from charter or private vessel or shore, dates, and time of day), areas fished, methods used, and species caught. Two thousand questionnaires were printed and made available at the two main departure points on the Island – the ferry and airline terminals. Some were also supplied to the Department of Conservation to mail out to all hunting parties along with hunting permits. During a liaison visit to the Island in September 2002, arrangements were made with key staff in the ferry and airline terminals to set up displays publicising the survey, with questionnaires available for departing visitors to complete. Staff at the terminals monitored the displays throughout the year and returned batches of completed questionnaires to NIWA when necessary. In addition some hunting parties who also fished during their stay completed questionnaires and sent them back to NIWA.

Diary logbooks were provided to some charter operators and private fishermen. Charter boat operators were contacted initially by phone and letter, and then visited personally in early

October 2002 to explain details of the data collection process. Of the approximately 15 charter boat businesses based in Oban, Bluff, and Riverton and which operated around Stewart Island, several in Oban concentrated on ecotours and we agreed it was not sensible to include them in this survey. Of the others who engaged in a moderate amount of fishing activity during their charters, six returned completed diary forms for part or all of the year-long survey period. The diary logbooks supplied to charter boat operators were modified versions of those used in the national survey of recreational fishing from charter vessels undertaken in 1997-98 (James & Unwin 2000). Two serious private fishers on Stewart Island were also invited to participate and one kept extensive records, also using diary logbooks.

Aerial survey flights using a light chartered aircraft were scheduled for days (usually public holidays) when there were likely to be greater levels of recreational fishing activity, but flights often had to be postponed because of bad flying conditions or poor visibility. The aerial surveys were designed to augment the questionnaire and diary data by providing independent information on recreational fishing activity by boat fishing parties around the entire coastline of Stewart Island on specific days. Observations were made of the distribution and number of boats, number of fishers, and fishing methods used. Because there were relatively few methods and only a limited number of charter vessels involved, it was possible to identify these from the air in almost all cases.

In addition to the data collection methods described above, discussions were held with locals such as Department of Conservation staff, local charter boat operators and fishers, to develop an overview of fishing activities and any issues of concern.

For the purposes of this survey we divided the coastline of Stewart Island into 14 Zones within 4 Regions, using readily recognisable coastal features (Appendix 1a). The Regions were described as Northeast, Paterson Inlet, Southeast, and West, and contained 5, 5, 2 and 2 Zones each respectively which were labelled NE1 to NE4, PI1 to PI5, SE1 and SE2, and W1 and W2. An additional Zone, used only for the aerial surveys, was Ruapuke Island (RUP). For the purposes of analysis, we treated this Zone as part of the Northeast Region.

A key factor in the success of the survey was the interest and support from many locals, especially the generosity of local fishers who contributed time keeping records, and staff at the ferry and airline terminals who monitored the displays and encouraged departing visitors to complete questionnaires. Good support was initiated during the liaison visit to the Island at the commencement of the survey, and communication was maintained with data contributors through regular monthly phone calls, and provision of extra recording forms and Freepost envelopes for mailing back data when required.

Data collected were more extensive than those specified in the objectives, as it took little extra effort to collect and analyse some additional information. Additional data included the numbers of fish of each species killed and discarded, and for the diary records only, the number of fishers per trip, whether they were from NZ or overseas, and the amount of time spent fishing. Information on fishing effort was used to estimate catch rates for the major species by area and month, which in turn allowed for examination of variability in the relative abundance of species. Data were entered into a Microsoft Access database, and analysed using Microsoft Excel pivot tables.

Data Analysis

Given that the survey objectives emphasised qualitative aspects of the recreational fishery (specifically: areas fished, methods used, and species caught) rather than quantitative aspects such as catch per unit effort (CPUE), our general approach was to maximise coverage by pooling data from both the diary survey and exit questionnaire whenever possible. In practice, there is likely to have been a small degree of overlap between the two data sources, in that some exit questionnaires for charter fishing trips may have been filled in by individuals whose fishing activity had already been captured by one of the diarists. However, since only 9 (16%) of the 56 exit questionnaire records for charter fishing trips potentially matched vessel names and fishing dates provided by the diarists, it is likely that any such overlap was small. We therefore ignored any possible duplication in the combined data sets, treating all 439 trip records as independent. All of the following analyses use pooled data unless otherwise stated.

Opportunities for analysing catch per unit effort (CPUE) were limited to the diary records, as the exit questionnaire did not provide sufficiently precise data on effort. We also concentrated solely on bottom line fishing for blue cod, which preliminary analysis showed was by far the most important fishery. We estimated total effort (in passenger-hours) by multiplying the total number of passengers carried by the total hours fished. This procedure is likely to overestimate total effort, as it assumes all passengers fish throughout the duration of the trip, and also implicitly assumes that average fishing ability is the same for all trips. When conducting these analyses we became aware of ten records for trips which carried school parties (averaging 31 passengers per trip), but which yielded catches which were very low in relation to total passenger-hours (average 47 per trip). Given that a school party is likely to violate at least one, and probably both, of the assumptions listed above, we discarded these records from the data set used to analyse variation in blue cod CPUE.

10. Results

Fishing activities

By Season

Diary records provided good coverage of fishing activity in all months except August and September 2003, with a total of 240 fishing trips recorded over the twelve month survey period (Table 1). Exit questionnaire coverage was more uneven, particularly for individuals whose fishing activity had involved a charter vessel, but provided good coverage of private fishing trips over the seven months from December 2002 to June 2003 (Table 1).

By Region/Zone

Examination of trip records by Region and Zone suggested that the diarist and private fishing records tended to be complementary, with each data set giving coverage of Zones which were poorly represented in the other (Table 2). Diary records (and also charter records from the exit questionnaire) were predominantly for trips in the Northeast Region, which accounted for 85% of all trips (see Appendix 1a for maps of Regions and Zones). Zone NE3 (the Muttonbird Islands) was by far the most frequently visited, but Zones NE2 and NE4 (to the north and south of Halfmoon Bay) were also popular. A further 9% of diary trips were recorded in Zone W1, on the west coast north of the Ernest Islands, with the remaining 6% in Paterson Inlet (mostly in the outer reaches) or in Zone SE1. By contrast, private fishing trips recorded by exit questionnaire respondents provided useful numbers of records for Zone HB (Halfmoon Bay and Horseshoe Bay) and the inner reaches of Paterson Inlet, particularly for shore-based activity. Private vessel trips were the main source of data for the Southeast Region (and the

only data source for Zone SE2, centred on Port Pegasus), while shore-based trips added significantly to records for the West Region (Table 2).

By Fishing Method and Target Species
Analysis of diary records by primary target species and fishing method confirmed that bottom lining was the most commonly used method, and that blue cod were by far the most frequently targeted species (Table 3). All bottom lining trips targeted blue cod, as did all but one of 40 potting trips. Most such trips did not specify a secondary target species, but of those that did only trumpeter (for bottom lining trips) and rock lobster (for potting) were mentioned more than once. Of the remaining 38 trips, 28 involved dredging for oysters, six involved set netting for butterfish, three involved diving for rock lobsters, and one involved spearing for flounder.

Analysis of fishing method by area and zone for all diary and exit questionnaire trips showed that bottom line fishing and hand gathering were widespread activities, whereas dredging for oysters and potting for blue cod and rock lobster were more localised (Table 4).

By Origin of Fishers
Fishing trips reported by diarists carried an average of 6.6 passengers, of whom 14% were from overseas (Table 5). However, there was a marked difference in the proportion of overseas visitors on trips recorded by Stewart Island based charter fishing diarists, compared with those recorded by other charter operators based in Bluff and Riverton and private fisher diarists (grouped as "Other" in Table 5). Overseas passengers accounted for 20% of those carried on Stewart Island based charters, but only 1% of those carried by the "Other" diarists. Mean passenger-hours per trip varied little between the two groups, averaging 18.7 h and 17.9 h, respectively, and 18.3 h overall.

Aerial surveys were undertaken primarily to ascertain whether fishing occurred in areas outside of the areas reported by the diarist and exit questionnaire respondents. Table 6 shows the coverage of the Stewart Island coastline during the eleven aerial survey flights. There were a few gaps in coverage, due to poor visibility or flying conditions, but given the small numbers of vessels likely to have been missed, we have assumed that any resulting bias in the raw (i.e., unadjusted) data can be ignored. These data are analysed further in Table 7.

Analysis of the aerial survey data confirmed that almost all recreational fishing observed was concentrated in the central eastern areas of Stewart Island (Table 7), similar areas to where the diarist and exit questionnaire respondents fished. Thus the data collected for this survey from diarist and exit questionnaire respondents appear to be very representative of recreational fishing around Stewart Island. It is notable that there was no recorded recreational fishing activity in the remote western southernmost area (W2), and almost none in the eastern southernmost area around Port Pegasus (SE2). No activity was recorded in the north-eastern region (NE1), and the small amount of activity in the north-western area (W1) was mostly associated with charter vessel operations based in Riverton.

Estimates of the number of fishers on vessels observed during the aerial surveys provided a spatial picture of the distribution of fishing effort (Table 7). On the 82 private and 17 charter vessels engaged in bottom line fishing, there were an estimated 230 and 155 fishers respectively, and for the 28 private and 6 charter vessels engaged in diving, there were an estimated 78 and 39 individual divers respectively.

Fish Catch

Blue cod were by far the most commonly caught finfish species, accounting for 86% of the fish caught by bottom lining, and 78% of those caught by potting (Table 8). Of 30 species caught by bottom lining, only six (besides blue cod) made up more than 1% of the total catch, of which trumpeter (4.3%) and spiny dogfish (3.3%) were the most common. Retention rates varied considerably between species, averaging 64% for blue cod but ranging from 94% - 100% for highly sought after species such as trumpeter, moki, and hapuku, to 20% or less for species such as spotty and most sharks. Perhaps surprisingly, 34% of spiny dogfish caught were retained by fishers. Relatively few species (six in total) were taken by set netting, but the four most abundant (butterfish, blue moki, sand flounder and trumpeter) were all highly valued, as evidenced by retention rates of 75% to 100%. Numerically, oysters were the second most commonly taken species (Table 8), being caught predominantly by dredging (solely in Zone NE2; Table 4), but also (along with paua and mussels) by hand gathering. Rock lobster were taken by potting and diving, with an overall retention rate (for both methods combined) of 326 out of 347 (94%). Of the other shellfish, scallops were taken by diving (100% retained), and paua and mussels by hand gathering. The only other method recorded was spear fishing for flounder, predominantly in the innermost reaches of Paterson Inlet (Tables 4, 8).

There were few obvious seasonal patterns in the pooled catch data by species (Table 9). Bottom line catches of trumpeter and spiny dogfish showed some tendency to peak in autumn (March – May), but most other species were caught throughout the 10-11 months for which data were available. Oyster dredging was primarily limited to autumn and winter (March – July), consistent with seasonal restrictions, while diving (and hence most rock lobster catches) was confined to the summer months, from December to January. Set netting, which yielded most of the butterfish and blue moki taken during the survey, was primarily a winter activity, consistent with the period when hunting parties operate and combine set netting with hunting (Table 9).

Analysis of catches by Region and Zone (Table 10) also showed few systematic patterns, other than those which reflected the tendency for specific fishing methods to be associated with specific areas. For example, hand gathering (and hence catches of species such as paua and mussels) was primarily restricted to Paterson Inlet, whereas set netting for butterfish and moki occurred mostly in Zones NE2, NE3, and SE1.

Analysis of catch rates for blue cod showed little evidence of any consistent variation between seasons (Table 11) or Regions (Table12), suggesting that blue cod are not markedly less abundant in Zones closer to Halfmoon Bay. However, a comparison of retention rates by Region provided strong evidence of variation in average fish size between and within Regions (Table 12). The data clearly show an increase in retention rates with distance from Halfmoon Bay. Retention rates for Paterson Inlet (45%) and Northeast Zones NE2 to NE4 (53-61%) were substantially lower than for the more remote Northeast Zone NE1 (76%) or Southeast and West Regions (81% and 94%, respectively). Assuming that retention rates directly reflect the proportion of blue cod taken that are above the legal size limit, it is possible that catches in the vicinity of Halfmoon Bay, the Muttonbird Islands, and Paterson Inlet have been high enough to significantly reduce the number of fish of takeable size. In the absence of length data for individual fish we are unable to confirm this explanation, but it would be relatively easy to implement a follow-up survey to collect the relevant data.

11. Discussion

General trends

The recreational fishery around Stewart Island is strongly dominated by blue cod. This was by far the most frequently targeted species, with all bottom lining trips and almost all potting trips targeting this species. Blue cod also accounted for most (86%) of the total catch, with about two thirds of all blue cod caught being retained. Whereas trumpeter was the next most important finfish species, it formed only 4% of the bottom line catch. However, 94% of trumpeter caught were retained. Only five other species each comprised more than 1% of the bottom line catch: spiny dogfish, banded wrasse, sea perch, spotty, and scarlet wrasse. Relatively few of each of these species were retained. A further 23 finfish species made up the remainder of the catch, and of these tarakihi, moki, sand flounder, hapuku, and butterfish are of highest recreational value.

Of the other methods used, potting was used by a few fishers to target blue cod and rock lobsters. In addition there was limited dredging for oysters, diving for scallops, rock lobster, moki and butterfish, set netting mostly by hunting parties in winter for butterfish, moki, trumpeter, and sand flounder, and hand gathering of paua, mussels and oysters, again mostly by hunting parties.

About 20% of passengers carried by Stewart Island-based charter vessels were from overseas, a figure markedly higher than the national average of 7% obtained during the national diary of charter boat fishing in 1997-98 (James & Unwin 2000). The equivalent figure for just the southern area including Stewart Island during 1997-98 was 6%. This substantial increase from just 6 years ago probably reflects an increase in tourists over this period.

The distribution of fishing activity as determined by aerial surveys confirmed that almost all recreational fishing observed during the flights was concentrated in the central eastern areas of Stewart Island, a pattern very similar to the data recorded by our diarist and exit questionnaire respondents. Thus we have concluded that data collected for this survey from diarist and exit questionnaire respondents are representative of recreational fishing activities around Stewart Island.

The general patterns of fishing effort and catch were also consistent with the results of the 1993 to 1998 Paterson Inlet recreational fishing diary survey (Carbines 1998). Both surveys concluded that within Paterson Inlet most fishing effort is focused around Ulva Island targeting blue cod with lines from boats.

Fishery issues

Of considerable significance was the finding that the proportion of blue cod caught retained by fishers increased markedly with distance from Halfmoon Bay. This provided strong evidence that the mean size of blue cod is less in areas that are more accessible and fished more frequently. It seems likely that catches in the vicinity of Halfmoon Bay, the Muttonbird Islands, and Paterson Inlet have been high enough to significantly reduce the number of fish of takeable size. In the absence of length data for individual fish we are unable to confirm this explanation. Quantified differences in fish size by area and bench mark estimates of relative abundance should now be obtained by a standardized and repeatable survey method. It is recommended that a potting survey (e.g., Beentjes & Carbines 2003, Carbines & Beentjes 2003) be undertaken to determine relative abundance and mean length of blue cod by areas around Stewart Island to support and evaluate the effect of management decisions should these be required in the future

Whereas blue cod CPUE was relatively uniform by month and area around Stewart Island, suggesting relatively uniform fish abundance, catch rates were somewhat lower in Paterson Inlet than around the outer coast. This may be because the Inlet is shallower and thus less preferred habitat for blue cod, although it could also be because it is more readily accessible and is subject to greater fishing effort.

12. Conclusions and Recommendations

1. Results of a survey from October 2002 to September 2003 showed that the recreational fishery around Stewart Island is dominated by rod and line fishing, primarily for blue cod but with minor catches of trumpeter and a few other valuable recreational species.
2. Most fishing was recorded along the central eastern coast of the Island.
3. Temporal and spatial variability in catch rates for blue cod was low, suggesting the fishery is relatively uniform throughout the survey region.
4. Retention rates for blue cod increased markedly with distance from Halfmoon Bay, suggesting that in areas that are more accessible and fished more frequently the mean size of blue cod has declined. Differences in fish size by area could be confirmed by undertaking a quantitative survey, and information would then be available if management decisions were required in the future.
5. It is recommended that a potting survey be undertaken to determine mean length and relative abundance of blue cod by areas around Stewart Island.

13. Publications

This report.

14. Data storage

Currently in an Access database at NIWA Christchurch. When finalised on the Empress database at NIWA, Greta Point.

15. Acknowledgements

We are very grateful to the owners and staff of the Foveaux Express ferry service and Stewart Island Flights for their support, and in particular to Jon Spraggon and Barry Rhodes who supervised the exit questionnaire displays and returned completed forms to NIWA. DoC staff and hunters assisted with providing records of fishing activities during hunting trips. Grateful thanks are also due to those charter vessel operators and individual private fishers who kept detailed diaries over extended periods. Without all of these, this survey would not have been possible.

16. References

Beentjes, M. P., Carbines, G. D. (2003). Abundance of blue cod in Banks Peninsula in 2002. *New Zealand Fisheries Assessment Report 2003/16.* 25 p.

Carbines, G.D. (1998). Estimation of recreational catch and effort in Paterson Inlet from a diary survey. *Final Research Report for Ministry of Fisheries Project REC9704 Objectives 1 & 2.* 13 p.

Carbines, G. D., Beentjes, M. P. (2003) Relative abundance of blue cod in Dusky Sound in 2002. *New Zealand Fisheries Assessment Report 2003/37.* 25 p.

James, G.D., Unwin, M.J. (2000). National marine diary survey of recreational fishing from charter vessels, 1997–98. *NIWA Technical Report 70.* 40 p.

17. Appendices

Appendices 1 and 2 contain the exit questionnaire and diary forms used in the survey.

Table 1. Number of fishing trips recorded by diarists and exit questionnaire respondents, by month. Exit questionnaire trips are subdivided according to whether they involved a charter vessel, or were private fishing trips.

			Exit questionnaire		
Years	Month	Diarists	Charter	Private	Total
2002	October	17	6	6	29
	November	35	6	4	45
	December	28	5	24	57
2003	January	16	16	24	56
	February	21	6	14	41
	March	41	7	17	65
	April	30	5	20	55
	May	21	2	18	41
	June	12	-	12	24
	July	16	1	3	20
	August	3	1	1	5
	September	-	-	1	1
	Total	**240**	**55**	**144**	**439**

Table 2. Number of fishing trips recorded by diarists and exit questionnaire respondents, by Region and Zone. Exit questionnaire trips are subdivided as for Table 1; private trips are further subdivided according to whether fishing was shore or vessel based. See Appendix 1a for Region and Zone descriptions.

			Exit questionnaire			
				Private		
Region	Zone	Diarists	Charter	Shore	Vessel	Total
Northeast	HB	-	3	14	4	21
	NE1	2	-	3	3	8
	NE2	55	1	2	11	69
	NE3	121	28	1	6	156
	NE4	27	7	1	6	41
	Total	**205**	**39**	**21**	**30**	**295**
Paterson Inlet	PI1	1	-	1	12	14
	PI2	-	-	11	3	14
	PI3	4	12	7	16	39
	PI4	6	2	-	-	8
	PI5	-	-	1	3	4
	Total	**11**	**14**	**20**	**34**	**79**
Southeast	SE1	3	-	2	23	28
	SE2	-	1	1	4	6
	Total	**3**	**1**	**3**	**27**	**34**
West	W1	21	-	7	-	28
	W2	-	1	2	-	3
	Total	**21**	**1**	**9**	**-**	**31**
Total, all Regions		**240**	**55**	**53**	**91**	**439**

Table 3. Number of diarist fishing trips by primary and secondary target species, and fishing method.

Target species		Fishing method						
Primary	Secondary	Bottom lining	Potting	Dredging	Set netting	Diving	Other	Total
Blue cod	Trumpeter	17	-	-	-	-	-	17
Blue cod	Rock lobster	-	6	-	-	-	-	6
Blue cod	Tarakihi	1	-	-	-	-	-	1
Blue cod	Wrasse	1	-	-	-	-	-	1
Blue cod	Unspecified	143	33	-	-	-	-	151
Total, all secondary spp.		**162**	**39**	**-**	**-**	**-**	**-**	**201**
Butterfish		-	-	-	6	-	-	6
Rock lobster		-	1	-	-	3	-	4
Oyster		-	-	28	-	-	-	28
Sand flounder		-	-	-	-	-	1	1
Total, all target species		**162**	**40**	**28**	**6**	**3**	**1**	**240**

Table 4. Combined diary and exit questionnaire trips by fishing method, Region, and Zone. See Appendix 1a for Region and Zone descriptions.

Region	Zone	Bottom line fishing	Potting	Dredging	Set netting	Hand gathering	Diving	Other	Total, all methods
Northeast	HB	20	-	-	-	-	1	-	21
	NE1	7	-	-	-	1	-	-	8
	NE2	15	20	29	4	-	1	-	69
	NE3	136	17	-	2	-	1	-	156
	NE4	37	1	-	1	1	-	1	41
	Total	**215**	**38**	**29**	**7**	**2**	**3**	**1**	**295**
Paterson Inlet	PI1	11	-	-	1	1	-	1	14
	PI2	10	-	-	-	4	-	-	14
	PI3	38	-	-	-	1	-	-	39
	PI4	5	3	-	-	-	-	-	8
	PI5	3	-	-	-	1	-	-	4
	Total	**67**	**3**	**-**	**1**	**7**	**-**	**1**	**79**
Southeast	SE1	21	-	-	6	1	-	-	28
	SE2	4	-	-	-	1	1	-	6
	Total	**25**	**-**	**-**	**6**	**2**	**1**	**-**	**34**
West	W1	25	-	-	-	1	2	-	28
	W2	3	-	-	-	-	-	-	3
	Total	**28**	**-**	**-**	**-**	**1**	**2**	**-**	**31**
Total, all zones		**335**	**41**	**29**	**14**	**12**	**6**	**2**	**439**

Table 5. Number of fishing trips, origin of passengers, and total passenger-hours, for diary records provided by Stewart Island based charter vessels ("SI charter"), and other diarists ("Other"). Mean number of fishers per trip are shown in parentheses.

Diarist category	Number of trips	Number of passengers			Overseas passengers (% of total)	Total passenger-hours
		NZ	Overseas	Total		
SI charter	130	895 (6.9)	224 (1.7)	1119 (8.6)	20%	2426 (18.7)
Other	110	472 (4.3)	4 (0.04)	476 (4.3)	1%	1971 (17.9)
Total	240	1367 (5.7)	228 (1.0)	1595 (6.6)	14%	4396 (18.3)

Table 6: Aerial survey coverage by Region and Zone, 2 December 2002 to 20 April 2003. For each survey, the shading for each Zones indicates the level of coverage (no shading = full coverage; grey shading = partial coverage; solid shading = no coverage). See Appendix 1a for Region and Zone descriptions.

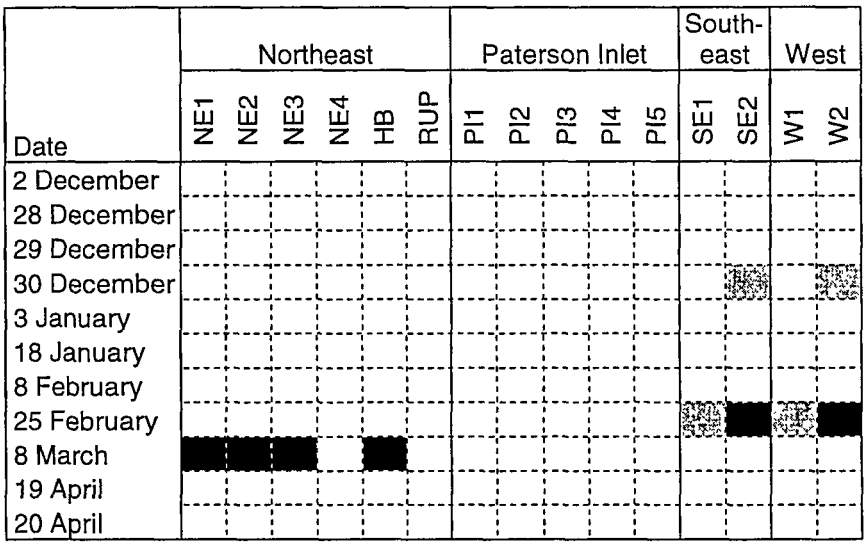


Table 7: Fishing activity recorded during the Stewart Island aerial surveys, December 2002 to April 2003, by fishing method, Region, and Zone. Data shown are the number of vessels associated with each activity, and (in parentheses) the number of individuals involved when this could be accurately judged from the air. The final two rows show, for each fishing method, the percentage of vessel counts for which counts of individual fishers were possible, and adjusted counts of total fishers based on this percentage. Thus of the 82 vessels engaged in private line fishing, individual fishers were counted on 50% of the total (41 vessels), leading to an estimated adjusted count of 230 individuals for all 82 vessels. See Appendix 1a for Region and Zone descriptions.

Region	Zone	rod or handline (private)	diving (private)	rod or handline (charter)	diving (charter)	Dredging	drag netting	Total (all methods)
Northeast	HB	12 (25)	3 (7)	-	-	-	-	15 (32)
	NE1	-	-	-	-	-	-	0
	NE2	1	3 (8)	-	-	4 (11)	-	8 (19)
	NE3	12 (19)	6 (4)	5 (22)	1	-	-	24 (45)
	NE4	9 (13)	3	2 (10)	1	-	-	15 (23)
	RUP	9 (10)	5 (2)	-	-	-	-	14 (12)
Paterson Inlet	PI1	-	1 (2)	-	-	-	1 (5)	2 (7)
	PI2	1	-	-	-	-	-	1
	PI3	14 (10)	1	3 (21)	-	-	-	18 (31)
	PI4	6 (7)	-	4 (16)	1	-	-	11 (23)
	PI5	4 (5)	-	-	-	-	-	4 (5)
Southeast	SE1	10 (18)	2 (5)	-	-	-	-	12 (23)
	SE2	1	1	-	-	-	-	2
West	W1	3 (8)	3	3 (31)	3 (13)	-	-	12 (52)
	W2	-	-		-	-	-	
Total (all zones)		82 (115)	28 (28)	17 (100)	6 (13)	4 (11)	1 (5)	138 (272)
% of vessels counted		50%	36%	65%	33%	100%	100%	50%
Adjusted fisher count		230	78	155	39	11	5	544

Table 8. Combined diary and exit questionnaire catches, by fishing method and species, showing the number of fish kept, the number of fish released alive, and the total catch (both as raw counts, and as the percentage of the total for each fishing method). The final column shows, for each species, the percentage of fish which were kept.

	Kept		Released		Total		% Kept
Common name	N	%	N	%	N	%	
Bottom line fishing							
Blue cod	9 713	86.9%	5 401	84.2%	15 114	85.9%	64%
Trumpeter	718	6.4%	45	0.7%	763	4.3%	94%
Spiny dogfish	198	1.8%	388	6.1%	586	3.3%	34%
Banded wrasse	88	0.8%	120	1.9%	208	1.2%	42%
Sea perch	84	0.8%	115	1.8%	199	1.1%	42%
Spotty	40	0.4%	157	2.4%	197	1.1%	20%
Scarlet wrasse	112	1.0%	76	1.2%	188	1.1%	60%
Tarakihi	105	0.9%	41	0.6%	146	0.8%	72%
Barracouta	30	0.3%	16	0.2%	46	0.3%	65%
Gurnard	12	0.1%	8	0.1%	20	0.1%	60%
Red cod	9	0.1%	11	0.2%	20	0.1%	45%
School shark	7	0.1%	8	0.1%	15	0.1%	47%
Rig	3	0.0%	9	0.1%	12	0.1%	25%
Longtailed stingray	11	0.1%	0	0.0%	11	0.1%	100%
Blue moki	10	0.1%	0	0.0%	10	0.1%	100%
Sand flounder	9	0.1%	0	0.0%	9	0.1%	100%
Skate	6	0.1%	3	0.0%	9	0.1%	67%
Hapuku	6	0.1%	0	0.0%	6	0.0%	100%
Carpet shark	1	0.0%	4	0.1%	5	0.0%	20%
Octopus	2	0.0%	2	0.0%	4	0.0%	50%
John dory	3	0.0%	0	0.0%	3	0.0%	100%
Wrasses	3	0.0%	0	0.0%	3	0.0%	100%
Butterfish	2	0.0%	0	0.0%	2	0.0%	100%
Leatherjacket	1	0.0%	1	0.0%	2	0.0%	50%
Shark	0	0.0%	2	0.0%	2	0.0%	0%
Sole	0	0.0%	2	0.0%	2	0.0%	0%
Blue shark	0	0.0%	1	0.0%	1	0.0%	0%
Kahawai	0	0.0%	1	0.0%	1	0.0%	0%
Pigfish	0	0.0%	1	0.0%	1	0.0%	0%
Sevengill shark	0	0.0%	1	0.0%	1	0.0%	0%
Total, all species	**11 173**	**100.0%**	**6 413**	**100.0%**	**17 586**	**100.0%**	
Dredging							
Oysters	4 484	100.0%	819	100.0%	5303	100.0%	85%
Potting							
Blue cod	310	84.2%	19	36.5%	329	78.3%	94%
Rock lobster	40	10.9%	27	51.9%	67	16.0%	60%
Banded wrasse	12	3.3%	6	11.5%	18	4.3%	67%
Leatherjacket	5	1.4%	0	0.0%	5	1.2%	100%
Blue moki	1	0.3%	0	0.0%	1	0.2%	100%
Total, all species	**368**	**100.0%**	**52**	**100.0%**	**420**	**100.0%**	**88%**

Common name	Kept N	Kept %	Released N	Released %	Total N	Total %	% Kept
Hand gathering							
Paua	158	47.9%	24	27.0%	182	43.4%	87%
Mussels	136	41.2%	40	44.9%	176	42.0%	77%
Oysters	36	10.9%	25	28.1%	61	14.6%	59%
Total, all species	**330**	**100.0%**	**89**	**100.0%**	**419**	**100.0%**	**79%**
Diving							
Scallop	250	88.3%	0	0.0%	250	87.7%	100%
Rock lobster	16	5.7%	2	100.0%	18	6.3%	89%
Blue moki	8	2.8%	0	0.0%	8	2.8%	100%
Butterfish	6	2.1%	0	0.0%	6	2.1%	100%
Blue cod	3	1.1%	0	0.0%	3	1.1%	100%
Total, all species	**283**	**100.0%**	**2**	**100.0%**	**285**	**100.0%**	**99%**
Set netting							
Butterfish	73	40.3%	3	10.0%	76	36.0%	96%
Blue moki	48	26.5%	0	0.0%	48	22.7%	100%
Sand flounder	40	22.1%	8	26.7%	48	22.7%	83%
Trumpeter	18	9.9%	6	20.0%	24	11.4%	75%
Banded wrasse	2	1.1%	9	30.0%	11	5.2%	18%
Spiny dogfish	0	0.0%	4	13.3%	4	1.9%	0%
Total, all species	**181**	**100.0%**	**30**	**100.0%**	**211**	**100.0%**	**86%**
Other							
Sand flounder	46	97.9%	0	0.0%	46	93.9%	100%
Blue cod	1	2.1%	2	100.0%	3	6.1%	33%
Total, all species	**47**	**100.0%**	**2**	**100.0%**	**49**	**100.0%**	**96%**

Table 9. Combined diary and exit questionnaire catches (total fish caught, including those released alive), by fishing method, species, and month.

Fishing method	2002			2003									Total
Common name	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Bottom lining													
Blue cod	1 175	1 646	1 744	2 052	1 194	2 972	1 936	1 453	244	454	227	17	15 114
Trumpeter	4	34	49	57	79	169	126	113	63	40	28	1	763
Spiny dogfish	10	20	33	50	92	141	138	59	4	34	5	-	586
Banded wrasse	24	27	17	-	29	69	12	10	13	1	6	-	208
Sea perch	2	20	15	9	74	31	10	-	-	19	19	-	199
Spotty	7	-	20	2	5	9	42	112	-	-	-	-	197
Scarlet wrasse	25	5	30	15	48	26	19	12	4	2	2	-	188
Tarakihi	-	2	24	13	7	17	36	40	2	4	1	-	146
Barracouta	-	-	5	-	1	17	21	-	1	1	-	-	46
Gurnard	-	2	1	-	5	5	6	-	1	-	-	-	20
Red cod	-	-	2	-	2	3	3	10	-	-	-	-	20
School shark	-	-	7	1	2	1	4	-	-	-	-	-	15
Rig	-	-	1	-	8	2	1	-	-	-	-	-	12
Longtailed stingray	-	-	-	11	-	-	-	-	-	-	-	-	11
Blue moki	-	-	-	8	-	-	-	-	2	-	-	-	10
Sand flounder	-	-	-	3	1	5	-	-	-	-	-	-	9
Skate	-	-	1	3	2	-	1	1	1	-	-	-	9
Hapuku	1	-	5	-	-	-	-	-	-	-	-	-	6
Carpet shark	-	-	-	3	2	-	-	-	-	-	-	-	5
Octopus	-	-	-	-	-	-	3	1	-	-	-	-	4
John dory	-	-	-	-	-	3	-	-	-	-	-	-	3
Wrasses	-	-	-	-	-	-	-	-	3	-	-	-	3
Leatherjacket	-	-	-	-	-	-	2	-	-	-	-	-	2
Shark	-	-	-	-	-	-	2	-	-	-	-	-	2
Sole	-	-	-	-	-	-	2	-	-	-	-	-	2
Blue shark	-	-	1	-	-	-	-	-	-	-	-	-	1
Kahawai	-	-	-	-	-	-	-	-	-	-	1	-	1
Pigfish	-	-	-	-	1	-	-	-	-	-	-	-	1
Butterfish	-	-	1	-	-	-	-	-	-	1	-	-	2
Sevengill shark	-	-	-	-	-	1	-	-	-	-	-	-	1
Total, all species	**1 248**	**1 756**	**1 956**	**2 227**	**1 552**	**3 471**	**2 364**	**1 811**	**338**	**556**	**289**	**18**	**17 586**
Dredging													
Oysters	-	-	650	-	-	1 659	1 440	640	835	79	-	-	5 303
Potting													
Blue cod	40	24	51	4	39	28	32	48	47	16	-	-	329
Rock lobster	53	13	-	-	-	-	-	-	-	1	-	-	67
Banded wrasse	7	1	4	-	3	3	-	-	-	-	-	-	18
Leatherjacket	-	-	-	-	-	-	-	-	-	5	-	-	5
Blue moki	-	-	-	-	-	1	-	-	-	-	-	-	1
Total, all species	**100**	**38**	**55**	**4**	**42**	**32**	**32**	**48**	**47**	**22**	**-**	**-**	**420**

Fishing method	2002			2003									Total
Common name	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Hand gathering													
Paua	-	-	2	10	-	70	40	-	16	44	-	-	182
Mussels	-	-	-	-	-	-	40	76	-	60	-	-	176
Oysters	-	-	-	-	-	-	-	61	-	-	-	-	61
Total, all species	**-**	**-**	**2**	**10**	**-**	**70**	**80**	**137**	**16**	**104**	**-**	**-**	**419**
Diving													
Scallop	-	-	-	250		-	-	-	-	-	-	-	250
Rock lobster	-	-	14	4		-	-	-	-	-	-	-	18
Blue moki	-	-	-	6	2	-	-	-	-	-	-	-	8
Butterfish	-	-	-	4	2	-	-	-	-	-	-	-	6
Blue cod	-	-	-	3		-	-	-	-	-	-	-	3
Total, all species	**-**	**-**	**14**	**267**	**4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**285**
Set netting													
Butterfish	-	-	4	-	-	-	5	25	23	19	-	-	76
Blue moki	-	-	8	-	-	-	10	16	12	2	-	-	48
Sand flounder	-	-	-	-	-	-	-	48	-	-	-	-	48
Trumpeter	-	-	-	-	-	-	12	-	12	-	-	-	24
Banded wrasse	-	-	-	-	-	-	-	2	1	8	-	-	11
Spiny dogfish	-	-	-	-	-	-	4	-	-	-	-	-	4
Total, all species	**-**	**-**	**12**	**-**	**-**	**-**	**31**	**91**	**48**	**29**	**-**	**-**	**211**
Other													
Blue cod	3	-	-	-	-	-	-	-	-	-	-	-	3
Sand flounder	1	-	-	-	-	-	45	-	-	-	-	-	46
Total, all species	**4**	**-**	**-**	**-**	**-**	**-**	**45**	**-**	**-**	**-**	**-**	**-**	**49**

Table 10. Combined diary and exit questionnaire catches (total fish caught, including those released alive) by fishing method, species, Region, and Zone. See Appendix 1a for Region and Zone descriptions.

Fishing method	Northeast						Paterson Inlet						Southeast			West			
Common name	HB	NE1	NE2	NE3	NE4	Total	PI1	PI2	PI3	PI4	PI5	Total	SE1	SE2	Total	W1	W2	Total	Total
Bottom lining																			
Blue cod	228	310	474	6 319	1 779	9 110	382	58	938	235	18	1 631	716	178	894	3 412	67	3 479	15 114
Trumpeter	21	31	11	311	27	401	4	-	9	-	-	13	169	11	180	164	5	169	763
Spiny dogfish	2	15	5	266	18	306	87	1	148	2	2	240	13		13	27		27	586
Banded wrasse	1	18	-	58	2	79	-	1	7	-	-	8	33	25	58	58	5	63	208
Sea perch	2	6	-	45	20	73	-	-	4	-	-	4	60	62	122	-	-	-	199
Spotty	13	-	1	-	-	14	6	4	145	-	-	155	-	-	-	28	-	28	197
Scarlet wrasse	18	-	-	82	5	105	6	3	8	8	-	25	56	2	58	-	-	-	188
Tarakihi	8	11	13	44	3	79	-	-	34	-	-	34	33	-	33	-	-	-	146
Barracouta	1	2	4	29	-	36	-	-	2	-	-	2	8	-	8	-	-	-	46
Gurnard	1	5	-	3	-	9	-	2	1	-	-	3	8	-	8	-	-	-	20
Red cod	-	-	-	5	-	5	-	2	1	-	2	5	10	-	10	-	-	-	20
School shark	-	-	-	7	-	7	2	-	1	-	-	3	-	1	1	4	-	4	15
Rig	-	-	-	1	-	1	2	3	6	-	-	11	-	-	-	-	-	-	12
Longtailed stingray	-	-	-	-	-	-	-	-	3	-	-	3	-	8	8	-	-	-	11
Blue moki	2	-	-	-	-	2	-	-	-	-	-	-	-	8	8	-	-	-	10
Sand flounder	-	-	-	3	-	3	5	-	-	-	-	5	-	-	-	-	1	1	9
Skate	-	-	-	8	-	8	-	-	-	-	1	1	-	-	-	-	-	-	9
Hapuku	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	5	-	5	6
Carpet shark	-	-	-	-	-	-	1	1	2	-	-	4	-	-	-	-	1	1	5
Octopus	-	-	-	2	-	2	-	1	1	-	-	2	-	-	-	-	-	-	4
John dory	-	-	-	-	-	-	-	-	3	-	-	3	-	-	-	-	-	-	3
Wrasses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3
Leatherjacket	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2
Shark	-	-	-	-	-	-	-	-	2	-	-	2	-	-	-	-	-	-	2
Sole	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2
Blue shark	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Kahawai	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Pigfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Butterfish	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	1	-	1	2
Sevengill shark	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1
Total, all species	**299**	**400**	**508**	**7 185**	**1 854**	**10 246**	**496**	**76**	**1 315**	**246**	**23**	**2 156**	**1 107**	**295**	**1 402**	**3 699**	**83**	**3 782**	**17 586**
Dredging																			
Oysters	-	-	5 303	-	-	5 303	-	-	-	-	-	-	-	-	-	-	-	-	5 303

Fishing method	Northeast						Paterson Inlet						Southeast			West			
Common name	HB	NE1	NE2	NE3	NE4	Total	PI1	PI2	PI3	PI4	PI5	Total	SE1	SE2	Total	W1	W2	Total	Total
Potting																			
Blue cod	-	-	151	146	8	305	-	-	-	24	-	24	-	-	-	-	-	-	329
Rock lobster	-	-	-	66	1	67	-	-	-	-	-	-	-	-	-	-	-	-	67
Banded wrasse	-	-	3	15	-	18	-	-	-	-	-	-	-	-	-	-	-	-	18
Leatherjacket	-	-	5	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	5
Blue moki	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Total, all species	-	-	**160**	**227**	**9**	**396**	-	-	-	**24**	-	**24**	-	-	-	-	-	-	**420**
Hand gathering																			
Paua	-	70	-	-	-	70	44	12	-	-	-	56	10	6	16	40	-	40	182
Mussels	-	-	-	-	-	-	60	-	40	-	76	176	-	-	-	-	-	-	176
Oysters	-	-	-	-	-	-	-	-	-	-	61	61	-	-	-	-	-	-	61
Total, all species	-	**70**	-	-	-	**70**	**104**	**12**	**40**	-	**137**	**293**	**10**	**6**	**16**	**40**	-	**40**	**419**
Diving																			
Scallop	-	-	-	-	-	-	-	-	-	-	-	-	-	250	250	-	-	-	250
Rock lobster	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	14	-	14	18
Blue moki	2	-	6	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	8
Butterfish	2	-	4	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6
Blue cod	-	-	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3
Total, all species	**4**	-	**13**	**0**	-	**17**	-	-	-	-	-	-	-	**254**	**254**	**14**	-	**14**	**285**
Set netting																			
Butterfish	-	-	22	15	4	41	4	-	-	-	-	4	31	-	31	-	-	-	76
Blue moki	-	-	2	10	2	14	8	-	-	-	-	8	26	-	26	-	-	-	48
Sand flounder	-	-	-	-	-	-	-	-	-	-	-	-	48	-	48	-	-	-	48
Trumpeter	-	-	-	12	-	12	-	-	-	-	-	-	12	-	12	-	-	-	24
Banded wrasse	-	-	10	-	-	10	-	-	-	-	-	-	1	-	1	-	-	-	11
Spiny dogfish	-	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	4
Total, all species	-	-	**34**	**41**	**6**	**81**	**12**	-	-	-	-	**12**	**118**	-	**118**	-	-	-	**211**
Other																			
Sand flounder	-	-	-	-	1	1	45	-	-	-	-	45	-	-	-	-	-	-	46
Blue cod	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
Total, all species	-	-	-	-	**4**	**4**	**45**	-	-	-	-	**45**	-	-	-	-	-	-	**49**

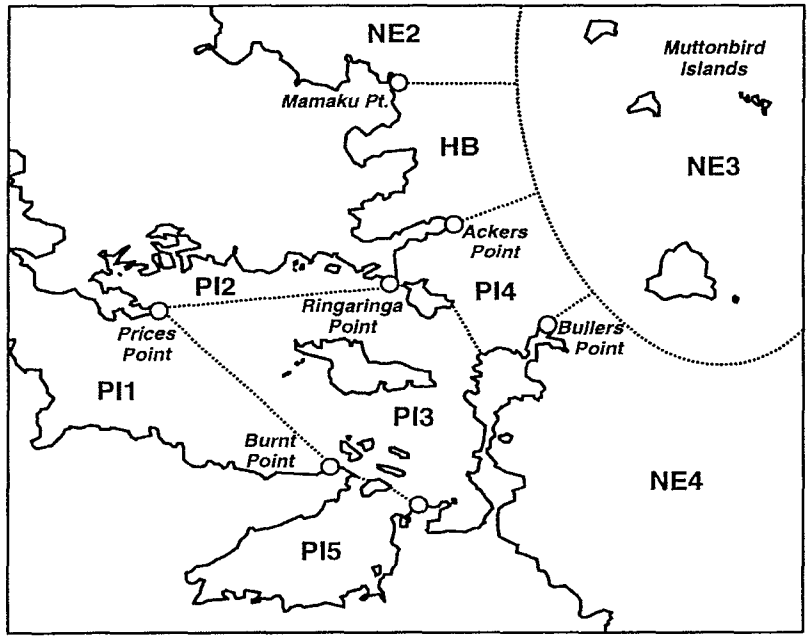
Table 11. Blue cod CPUE (fish per fisher-hour) and retention rate (% of fish kept) by month for charter trips using bottom lining to target blue cod. Ten school trips, with large numbers of passengers but very low catches, have been omitted.

Year	Month	Trips	Fishing hours	Total catch	CPUE	% kept
2002	Oct	13	283	889	3.1	62%
	Nov	24	324	1 382	4.3	57%
	Dec	17	342	1 404	4.1	85%
2003	Jan	15	259	1 100	4.2	57%
	Feb	14	179	727	4.1	42%
	Mar	28	740	2 296	3.1	69%
	Apr	17	422	1 499	3.6	71%
	May	10	386	1 003	2.6	87%
	Jun	2	7	59	8.4	51%
	Jul	8	161	370	2.3	60%
	Aug	3	87	187	2.1	62%
Total		**151**	**3 189**	**10 916**	**3.4**	**68%**

Table 12. Blue cod CPUE (fish per fisher-hour) and retention rate (% of fish kept) by Region and Zone for charter trips using bottom lining to target blue cod, using the same data set as for Table 11. See Appendix 1a for Region and Zone descriptions.

Region	Zone	Trips	Fishing hours	Total catch	CPUE	% kept
Northeast	NE1	2	37	146	3.9	76%
	NE2	3	43	155	3.6	57%
	NE3	97	1 280	5 253	4.1	53%
	NE4	20	403	1 394	3.5	61%
Total		**122**	**1 762**	**6 948**	**3.9**	**55%**
Paterson Inlet	PI3	4	80	158	2.0	47%
	PI4	3	52	168	3.2	43%
Total		**7**	**132**	**326**	**2.5**	**45%**
Southeast	SE1	3	170	237	1.4	81%
West	W1	19	1 125	3 405	3.0	94%
Total, all Regions		**151**	**3 189**	**10 916**	**3.4**	**68%**

Appendix 1a. Exit questionnaire – outside pages.



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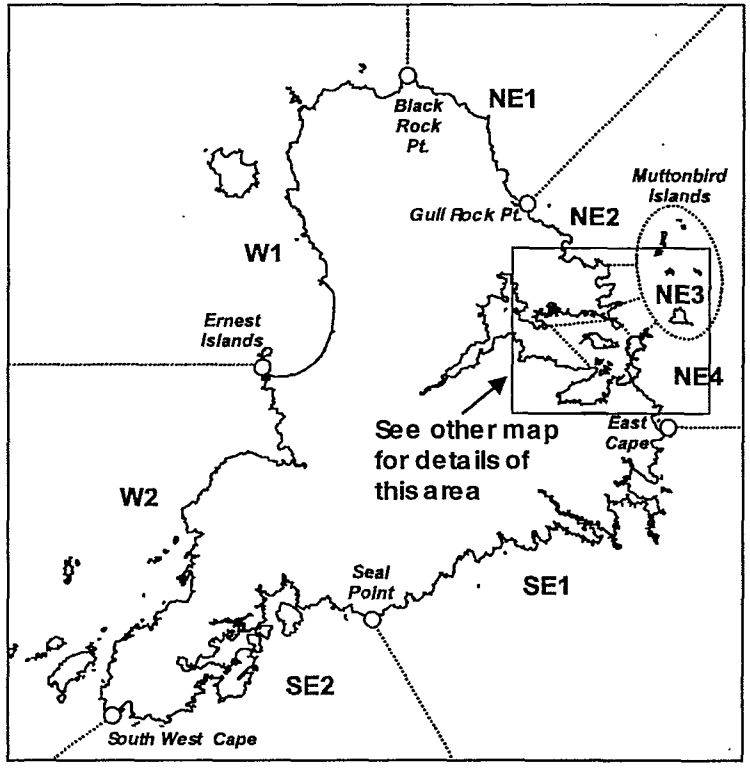
Fishing Method	Code
Bottom line fishing	1
Diving	2
Set netting	3
Potting	4
Trolling	5
Dredging	6
Hand gathering	7
Other	8

(This 12 month survey runs from 1 October 2002 to 30 September 2003)

NIWA
Taihoro Nukurangi

STEWART ISLAND 2002/03 RECREATIONAL FISHING SURVEY

NIWA (The National Institute of Water & Atmospheric Research) is undertaking a survey of recreational fishing around Stewart Island for the Ministry of Fisheries. If you have been fishing at all, we would be grateful if you could take the time to fill in this card, and return it to the issuing agency, or to:
NIWA, Freepost 83636, PO Box 8602, Christchurch.



Appendix 1b. Exit questionnaire – inside page.

STEWART ISLAND VISITORS RECREATIONAL FISHING SURVEY

During your time on Stewart Island, did you fish from a charter vessel? **YES** ☐ **NO** ☐

If yes, please write the company or vessel name ☐

If no, did you fish from a private vessel ☐ or was the fishing shore-based? ☐

When did you fish? **Date** d d m m y y and what time of day? **am** ☐ **pm** ☐

(If you fished on more than one occasion, please fill in a separate card for each occasion).

In what area did you mostly fish? ☐ (See maps on front and back of card)

What method did you use? ☐ (See list of methods on back of card)

Please list below species caught (see list of species on poster) and the number of fish kept and released

Species caught	(Leave blank)	**Number of fish kept**	**released**

Appendix 2. Copies of the instruction and data sheets in the diaries supplied to charter vessel operators. Very similar dairies were supplied to private fishers.

2002/2003 Stewart Island Recreational Fishing Survey

Thank you as a charter boat operator for taking part in the 2002/2003 survey of recreational fishing around Stewart Island, being undertaken for MFish. This information from charter boat operators will be combined with that from other sources (private boat fishers, fishing clubs, holiday-makers, and hunters), to help build an accurate and up to date picture of recreational fishing around Stewart Island. This information will be used by the Ministry of Fisheries to understand and better manage the recreational fishery in the future. Thank you once again for taking part.

INSTRUCTIONS

1. The diary scheme will run from 1 October 2002 until 30 September 2003. During this period, you should fill in the diary every time you make a charter trip with recreational fishers to catch fish or collect shellfish (including rock lobsters). For the purposes of this survey, **please note the definition of a charter "trip" on page 2 of these instructions**.
2. Each diary contains both fixed and detachable pages, each with space for recording five trips. The detachable pages are to be forwarded to NIWA, while the fixed pages (every second sheet) are for your own records.
3. Send in your completed pages every month (or earlier, if you are nearing the end of your book). Simply tear out the relevant page(s) and post them back in the envelopes provided (or any envelope) to FreePost 83636, Stewart island Recreational Fishing Survey, NIWA, PO Box 8602, Christchurch. No stamp is required. We will contact you regularly to sort out any problems and can supply new diaries when required.
4. Record the **total** catch and fishing effort for **all** fishers on your vessel, including yourself. It is very important to fill in the diary for **every day of every trip** you make, even if your clients caught nothing.
5. **Please send in a monthly trip record sheet even if you didn't do any charter fishing!** (Just write "didn't fish" across the sheet). This is because it is important to know what times of the year charter operators are not fishing.
6. If you also undertake commercial fishing, please **do not** include any trips where you caught fish or shellfish to sell.
7. The examples over the page show how the diary should be filled in.
8. If you have any questions about the diary or the survey, contact Gavin James or Martin Unwin by either:

Phone : 03-348-8987 Fax: 03-348-5548
email: g.james@niwa.co.nz (Gavin); m.unwin@niwa.co.nz (Martin)

TRIP RECORD (*this copy for yourself*)

Trip date	Zone	Locality	Number of fishers		Hours spent fishing	Fishing method	Target species	Species caught	Number of fish caught	
			NZ	Overse					Killed	Released

Example 1: A half day line fishing charter during which several species were caught.

Example 2: A one day fishing charter which included both line fishing and potting. Counts as two trips.

What is a Charter "Trip"?

For the purposes of this diary scheme, a **charter trip** is the basic unit used to record your fishing effort and catch. A charter boat "trip" is defined as one fishing charter, with one group of fishers, using one fishing method, for at most one day. For example:

- **a half-day** charter with one group of clients, for the sole purpose of line fishing, would be recorded as **one** trip
- **a one-day** charter with one group of clients, for the sole purpose of line fishing, would be recorded as **one** trip
- **a one-day** charter with one group of clients, which included line fishing and diving, would be recorded as **TWO** trips
- **two half-day** charters with two groups of clients, for the sole purpose of line fishing, would be recorded as **two** trips
- **a two-day** charter, which included both line fishing and potting on each day, would be recorded as **FOUR** trips

Trip date: Please record as day/month/year.

Zone: Please record the approximate depth (or depth range) fished.

Locality: Please record the code (e.g. B) for the area where your clients went fishing, diving etc., as shown on the accompanying map.

If you fished in more than one area during a single trip, please record only the area in which you spent the majority of your time.

Number of fishers: Please record separately the number of **New Zealand resident** and **overseas** fishers carried on this trip. **Do not** include any passengers who did not fish, but include yourself if you also took part.

Hours spent fishing: Please record, to the nearest hour, the length of time your clients actually spent fishing. This will normally be the number of hours during which your clients had their fishing gear in the water. **Do not** count the time you spent travelling or resting. When analysing the results, we will use this figure to estimate the total number of "fisher-hours" for each trip. For example, if you carried six clients, and recorded that you spent five hours line fishing, we would estimate a trip total of 30 fisher-hours.

Type of fishing method: Please specify which of the following fishing methods were used on this trip. If you prefer, you may use the corresponding one letter short code:

L	Bottom **L**ine Fishing	Includes bottom line fishing for blue cod, sea perch, tarakihi, hapuku (or groper) etc.
P	**P**otting	Includes potting for rock lobster, blue cod.
T	**T**rolling	Includes trolling for oceanic sharks, salmon etc.
D	Extractive **D**iving	Includes diving for rock lobster, paua, for consumption.
N	Set **N**etting	Includes set netting for bottom fish species.
O	**O**ther	Please specify. Could include longlining, dredging etc.

Species targeted: Please specify **the main** species that your clients set out to catch, using the names or codes on page 5.

Species caught: Please record **all** species of fish and/or shellfish that your clients caught, using the names or codes on page 5. Include any dead fish that you discarded or used as bait. Be as precise as you can when naming species. For example, was it a rig or school shark? Do not use general names such as "parrotfish", but refer to the species as (e.g.) banded wrasse, scarlet wrasse.

Number of fish caught: Please record the total catch of legal-sized fish by all fishers on the vessel, including yourself (if appropriate). Record separate tallies for fish killed (including fish discarded or used as bait), and legal-sized fish released alive.

Comments: If you wish to make any comments about a particular trip, please write these on the back of the trip record page.

Marine Fish Species: Optional Short Codes

For recording purposes, MFish uses a standard three letter code to identify all marine fish species found in New Zealand waters, some of which (for species likely to be taken by charter fishers) are listed below. To save time, and avoid possible confusion, you may wish to use these short codes on your diary sheet. However, if you encounter a species not listed here, or simply prefer to use the common name, we will assign the correct species code on receiving your data sheets.

Major species

albacore tuna	ALB
barracouta	BAR
bass groper	BAS
blue cod	BCO
bluenose	BNS
gurnard	GUR
hapuku	HAP
jack mackerel	JMA
john dory	JDO
kahawai	KAH
kingfish	KIN
ling	LIN
mako shark	MAK
red cod	RCO
rig	SPO
rock lobster	CRA
school shark	SCH
sea perch	SPE
skipjack tuna	SKJ
snapper	SNA
spiny dogfish	SPD
striped marlin	STM
tarakihi	TAR
trevally	TRE
trumpeter	TRU
yellowfin tuna	YFN

Other species:

banded wrasse	BPF
black marlin	BKM
blue mackerel	EMA
blue marlin	BEM
blue shark	BWS
broadbill swordfish	SWO
butterfish or greenbone	BUT
butterfly perch	BPE
common warehou	WAR
conger eel	CON
eagle ray	EGR
elephant fish	ELE
gemfish	SKI
hammerhead shark	HHS
koheru	KOH

Other species (continued):

moki	MOK
packhorse rock lobster	PHC
pink maomao	PMA
quinnat salmon	SAM
rattails	RAT
red pigfish	RPI
red snapper	RSN
sand flounder	SFL
scarlet wrasse	SPF
skate	SKA
slender tuna	STU
southern bluefin tuna	STN
thresher shark	THR
yellow-belly flounder	YBF