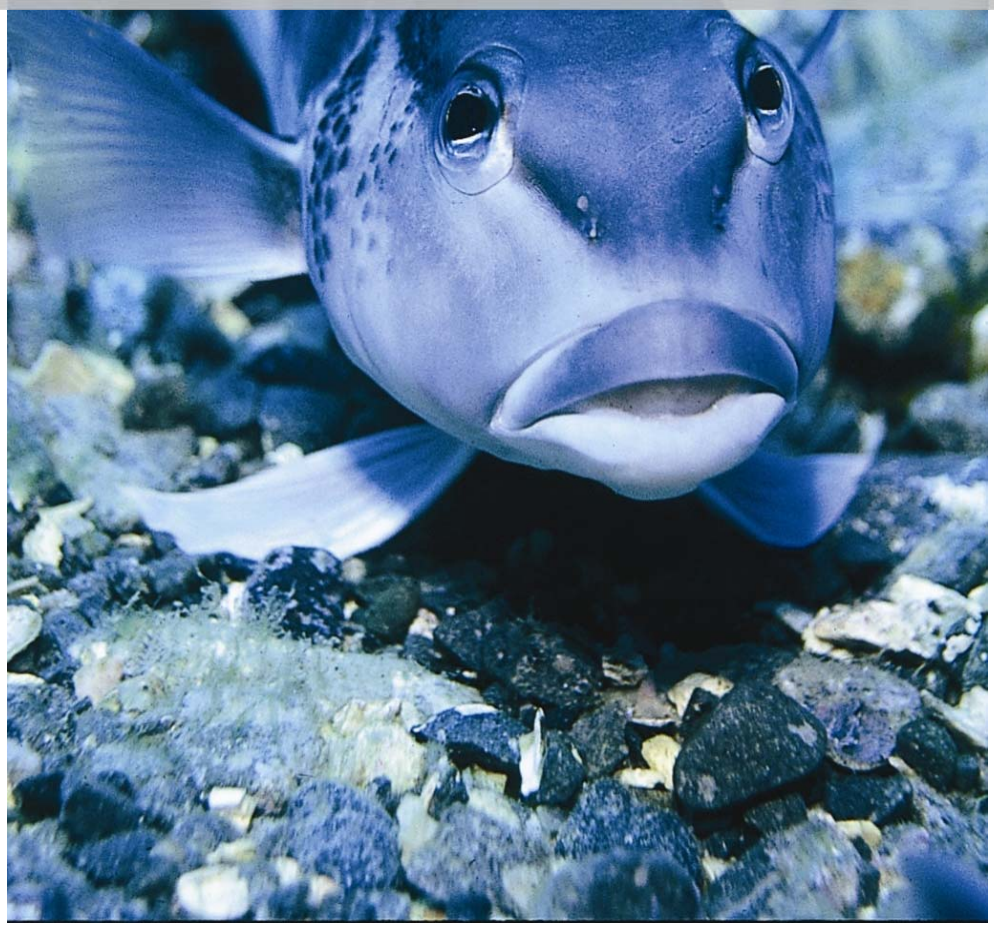
June 2015

APPENDIX ONE: BLUE COD FISHERY CHARACTERISATION



In support of the Marlborough Sounds blue cod regulatory review

CONTENTS

INTRODUCTION

Blue cod are often considered to be the most important recreational finfish species in the South Island. They are an iconic species in the Marlborough Sounds Area and Challenger (East) area, where they have become a topic of much concern over the years given the strong recreational fishing pressure in this area and their vulnerability to localised depletion.

The Blue Cod Management Group was formed late in 2008 by the then Minister of Fisheries. They were tasked with developing a management plan for the recreational blue cod fishery in the Marlborough Sounds Area to support its reopening after it was closed in 2008. The Group finished their plan in 2010, and the fishery was reopened with a suite of management measures in 2011 following consultation. The Group is now tasked with undertaking a review of rules that have been in place since 2011.

This document characterises the blue cod fishery in the Marlborough Sounds Area and Challenger (East) area with the best information available at the time of writing. It is intended to support the 2015 review of the blue cod fishing rules by providing a foundation of information while considering potential options for the future management of the fishery.

BIOLOGY OF BLUE COD

Blue cod (*Parapercis colias*) is a bottom-dwelling species endemic to New Zealand. It is not a true cod, but a member of the weaver family (also known as a sandperch). This species is distributed throughout New Zealand near foul ground to a depth of 150 m, and is most abundant south of Cook Strait and around the Chatham Islands.

In the Marlborough Sounds Area, blue cod are associated with habitat comprised of jagged bedrock, sand, shell hash, and also tube worms. These types of habitats are considered to be complex and heterogeneous (made up of multiple different components), and are particularly important for blue cod. Blue cod are typically absent from 'homogeneous' (similar or few components) sand habitats.

Blue cod are relatively slow growing and long lived. The growth rate of blue cod differs across locations[1] and between sexes (with males typically growing faster and to a larger size than females[2]). The maximum recorded age for this species is 32 years. Size-at-sexual maturity also varies according to location. In the Marlborough Sounds Area it is estimated to be reached at 21 - 26 cm total length (TL) at 3-6 years[3].

Hermaphrodites have both functional male and female reproductive organs at some point in their life. Blue cod are protogynous hermaphrodites[4]. This means that females are capable of changing sex from female to male, and then reproduce as males (though not all females change sex). Size-at-sex change is also variable, and is likely to be influenced by social and behavioural cues.

Males that are derived from sex changed females are known as secondary males. However, not all male blue cod are derived from sex change. A proportion of the population is comprised of primary males, which sexually differentiate as males from larvae, and never go

through a female stage. This is called diandry (when individuals may start life as either sex, as opposed to monandry, where all individuals start life as the same sex).

The rate of recruitment of primary males and secondary males into a population determines the overall sex ratio of a population. What determines how many fish will become primary males or change sex into secondary males is an important but complicated question. There is evidence to suggest that the sexual differentiation of larvae of protogynous hermaphrodites into male or female is influenced by external social cues, such as the population size present on the reef when larvae settle (and is not genetically predetermined)[5, 6]. Given that the rate of recruitment of primary males appears to fluctuate in the Marlborough Sounds Area, it is possible that sexual differentiation of larvae into males or females is influenced by external cues in these populations.

The rate of sex change (recruitment of secondary males) is also variable. Sex change is thought to be most strongly influenced by the presence of socially dominant males[7], as they prevent females from changing sex. As a result, removing large blue cod from the population may remove dominant males and lead to more females changing sex at smaller sizes[6]. This can have knock-on effects on the overall reproductive output of a population; less females means there will be less eggs overall to be fertilized and contribute to the next generation.

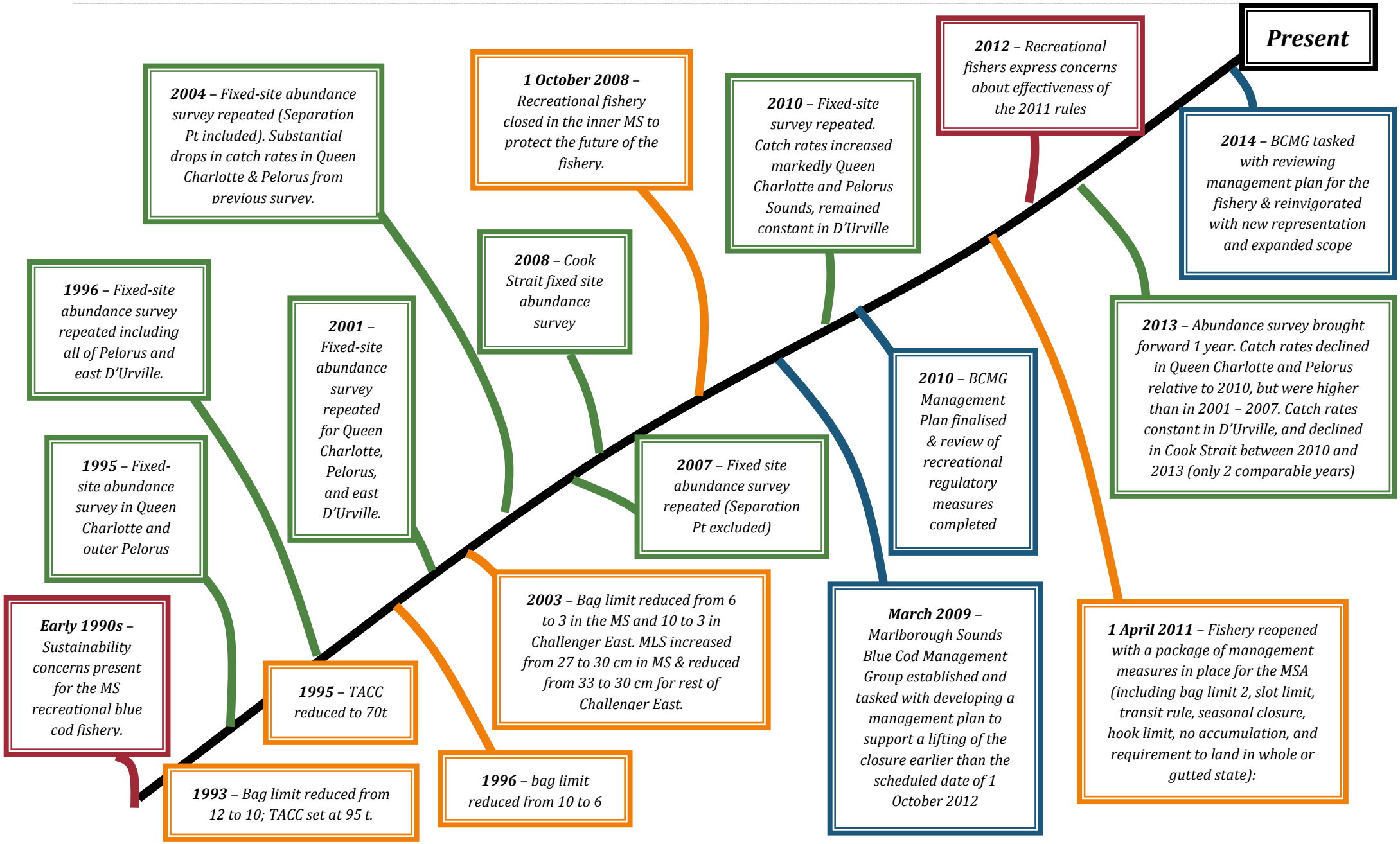
Blue cod have an annual reproductive cycle with an extended spawning season during late winter and spring. Spawning aggregations have been reported within inshore and mid shelf waters, but likely occurs in outer shelf waters. Ripe blue cod are found in all areas fished commercially by blue cod fishers during the spawning season. Eggs are pelagic (in the water column) for about five days after spawning, and the larvae are pelagic for about five more days before settling onto the seabed.

Distribution of blue cod populations is localised. Tagging experiments carried out in the Marlborough Sounds Area in the 1940s and 1970s found that most blue cod remained in the same area for extended periods, though some individuals moved away from the reef or headland where they were tagged (mean distance of 7.6 km)[8]. A more recent tagging experiment carried out in Foveaux Strait showed that although some blue cod moved as far as 156 km, 60% travelled less than 1 km[9]. A similar pattern was found in Dusky Sound where four fish moved over 20 km, but 65% had moved less than 1 km[10]. Larger movements observed during this study were generally eastwards into the fiord. The inner half of the fiord was found to drain the outer fiord, and had 100% residency. Anecdotal evidence suggests that blue cod will form mass migrations from time to time, but evidence of this is rare relative to studies suggesting high localised residency for the majority of blue cod in a population.

Blue cod are fairly generalist predators, eating a variety of prey including small crustaceans, molluscs (including octopus), fish, polychaetes, and echinoderms[11, 12, 13]. Diet tends to differ across environmental gradients and between separate locations subject to prey availability. They are known by fishers to be voracious and non-selective feeders that easily take bait.

Overall, the biological characteristics of blue cod, including hermaphroditism, localised populations, and generalist feeding habits, make them susceptible to the effects of fishing and to localised depletion.

OVERVIEW OF RECENT RESEARCH AND MANAGEMENT



FISHERY RESEARCH

The Marlborough Sounds Area and Challenger (East) area is part of the wider 'BCO 7' fishstock (see Figure 6 for a map of the area). The status of blue cod in the wider BCO 7 management area is currently unknown. No B_{MSY} proxy target reference level has been set for BCO 7, and it is unknown where the current stock size is in relation to a target or other limits. However, there is currently no information to suggest a stock-wide sustainability issue.

There are concerns about the health of the blue cod fishery in the Marlborough Sounds Area. Periodic relative abundance potting surveys are used to provide information on the abundance, sex ratio, size frequency, and age frequency of blue cod populations in this area over time. This enables the Ministry for Primary Industries (MPI) to monitor changes in relative abundance and the other parameters outlined above over time, to understand how the fishery is responding to fishing pressure. These potting surveys are currently considered to be the most effective way of collecting this information. The surveys have been conducted for a number years in a row and therefore provide an important time series for relative abundance.

SURVEYS

Eight surveys have been conducted for blue cod in and around the Marlborough Sounds Area and west D'Urville Island, with some differences over the years (Table 1)[14, 15, 16, 17, 18, 19].

Table 1: Surveys conducted in the Marlborough Sounds Area and Challenger (East) area by year, and regions sampled.

Year	Area Surveyed				Comments
	Queen Charlotte Sound	Pelorus Sound	D'Urville Island	Cook Strait	
1995	✓	**Outer only**	×	×	
1996	×	✓	**East only**	×	
2001	✓	✓	**East only**	×	
2004	✓	✓	✓	×	Included Separation Point
2007	✓	✓	✓	×	Separation Point dropped
2008	×	×	×	✓	
2010	✓	✓	✓	✓	2001 and 2008 surveys reanalysed so that they were consistent with methods used for recent surveys
2013	✓	✓	✓	✓	1995 and 1996 surveys reanalysed

For the purpose of these surveys, the whole area is split into smaller survey areas, called strata (Figure 1), within which a number of sites are used for sampling. All surveys before 2010 used fixed sites that were selected randomly from a wider list of fixed sites within a given stratum (Figure 1). These fixed locations are available to be used repeatedly on subsequent surveys in that area.[20] In 2010, a suite of random locations were added to the fixed sites in selected strata. Random sites may have any location and are generated randomly within each stratum. In 2013, full random and full fixed site surveys were conducted. However, only the fixed site components of the 2010 and 2013 surveys are considered comparable to the earlier surveys.

The gradual shift to a random site survey has come about as a result of an international review and recommendations for methodology. The use of the random site methodology is experimental, and the MPI Science Working Group is yet to determine if the random methodology will be a useful way to survey the fishery in the future. MPI is proposing to carry out three separate surveys before considering a move to a random survey design.

The use of a multibeam sonar system to identify suitable blue cod habitat in the 2013 survey means that the results from this survey were comparable to results from previous surveys, despite involving a new skipper. Blue cod pots can draw fish in from some distance away, and the same pot design has been used for each fixed site survey.

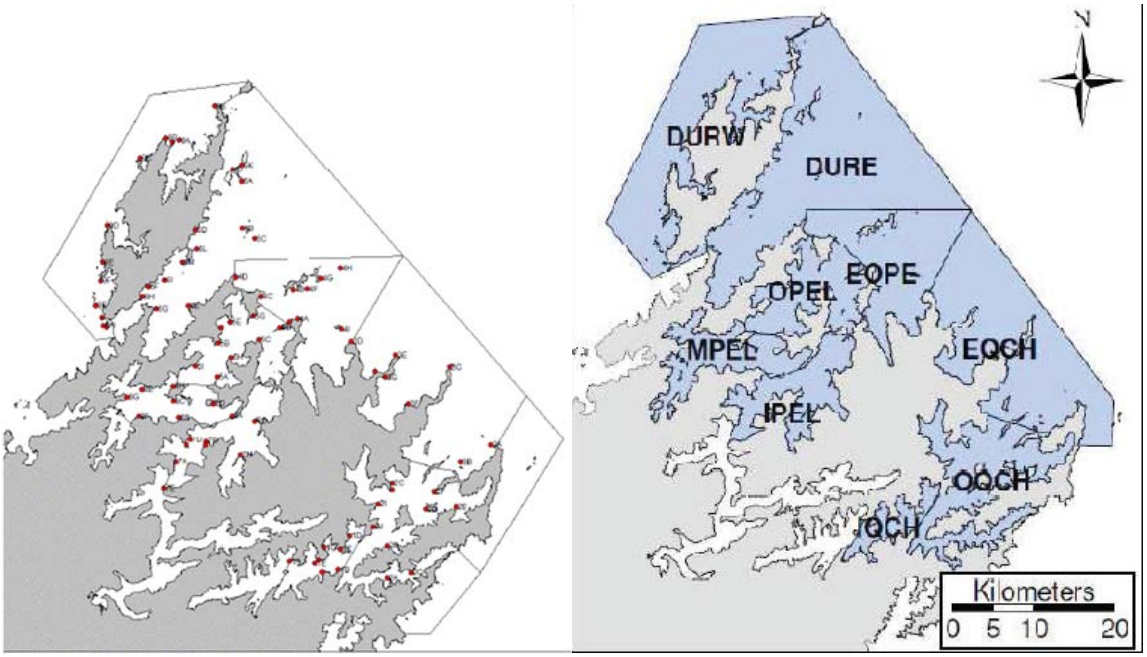


Figure 1: All possible fixed sites (left) and research strata (right) available for the blue cod relative abundance potting surveys in the Marlborough Sounds.

CATCH RATES

Throughout the potting surveys, catch rates of total and "recruited" blue cod (30 cm and over in length) have been similar between Queen Charlotte Sound and Pelorus Sound, highest around D'Urville Island, and lowest in Cook Strait (Figures 2 to 5; Table 4).

Queen Charlotte Sound and Pelorus Sound

In April 2011, a suite of management measures was introduced for recreational fishers for the Marlborough Sounds Area (Figure 6). The 2013 potting survey was carried out two years after the management regime had been in place, with recruited blue cod catch rates for both Queen Charlotte and Pelorus Sounds declining compared to 2010, but remaining higher than 2001 to 2007, when the fishery was open (Figures 2 and 3).

Catch rates by stratum and size class indicate that catches tended to be higher in the outer strata for all size classes in the 2013 survey (Table 2). Table 2 also shows how catch rates have changed amongst strata and between years (2007, 2010, and 2013 surveys).

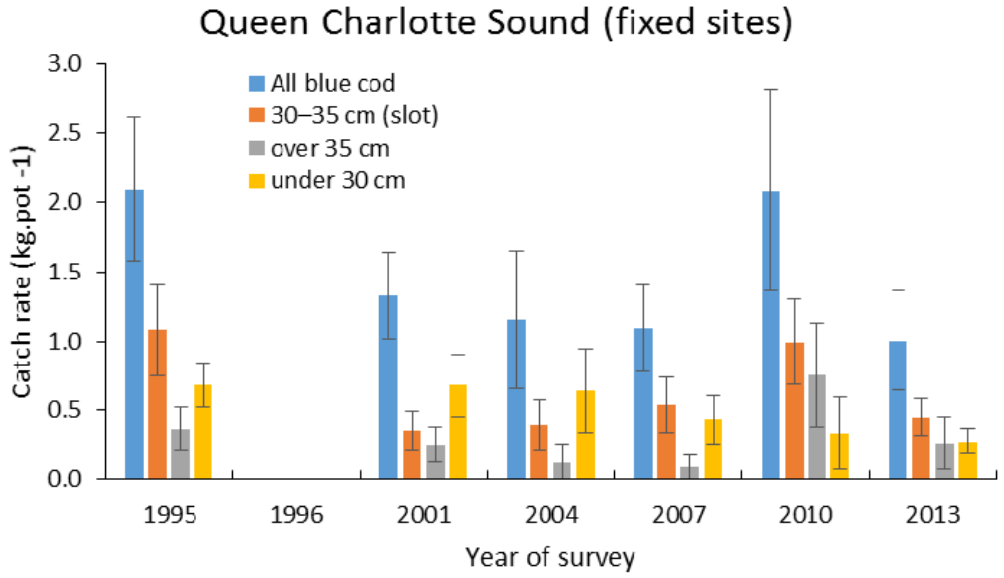


Figure 2: Scaled catch rates of blue cod from Queen Charlotte Sound fixed sites from 1995 to 2013. Catch rates are shown for all blue cod, blue cod within the slot limit (30-35 cm), recruited blue cod (35 cm over), and for pre-recruited blue cod (under 30 cm). Error bars are 95% confidence intervals. NOTE: the catch rate scale differs from other figures and goes from 0 – 3.0.

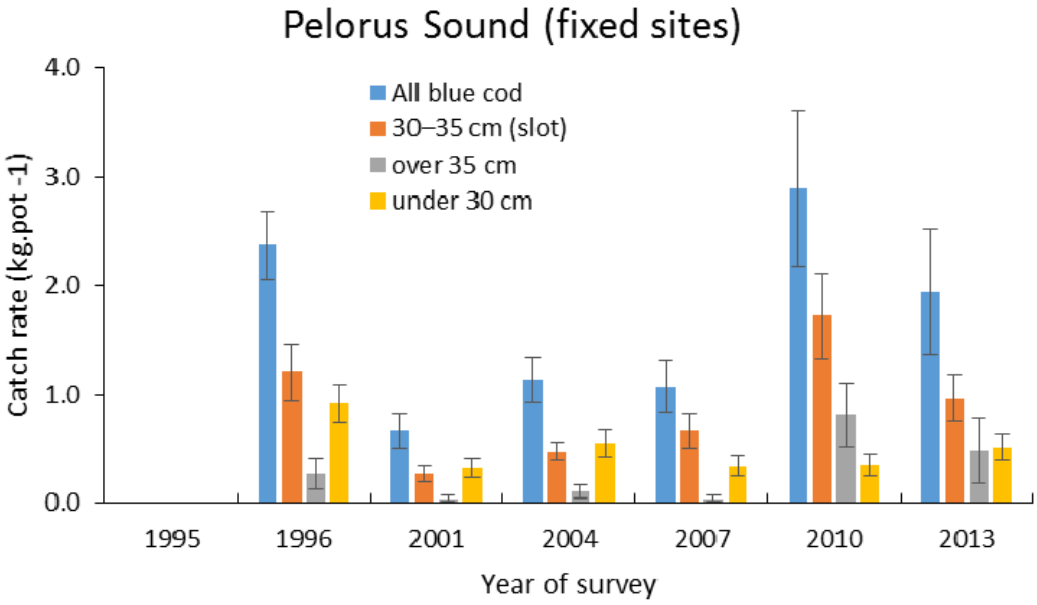


Figure 3: Scaled catch rates of blue cod from Pelorus Sound fixed sites from 1996 to 2013. Catch rates are shown for all blue cod, blue cod within the slot limit (30-35 cm), recruited blue cod (35 cm over), and for pre-recruited blue cod (under 30 cm). Error bars are 95% confidence intervals. NOTE: the catch rate scale differs from other figures and goes from 0 to 4.0

D'Urville Island

In the D'Urville Island strata, catch rates for recruited blue cod between 2004 to 2013 have been stable (Figure 4). D'Urville was not closed to fishing in October 2008, but D'Urville East was included in the management area where specific measures have been applicable since April 2011. Catch rates tended to be higher in D'Urville alongside the other outer strata than in the inner sounds for all size classes in 2013 (Table 2).

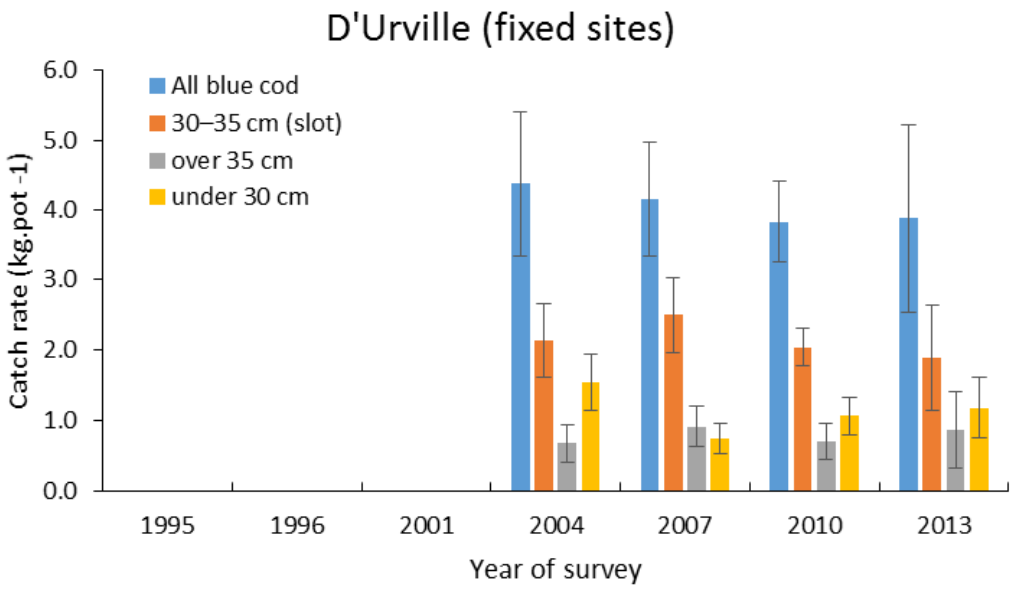


Figure 4: Scaled catch rates of blue cod from D'Urville region fixed sites from 2004 to 2013. Catch rates are shown for all blue cod, blue cod within the slot limit (30-35 cm), recruited blue cod (35 cm over), and for pre-recruited blue cod (under 30 cm). Error bars are 95% confidence intervals. NOTE: the catch rate scale differs from other figures and goes from 0 to 6.0

Cook Strait

Cook Strait has had only two comparable surveys using a random design (2010 and 2013). The first survey in 2008 was a fixed site survey. Recruited blue cod catch rates from the random survey years were higher in 2010 in comparison to 2013 (Figure 5). The Cook Strait region has not been subject to the same rules that have applied to the Marlborough Sounds Area.

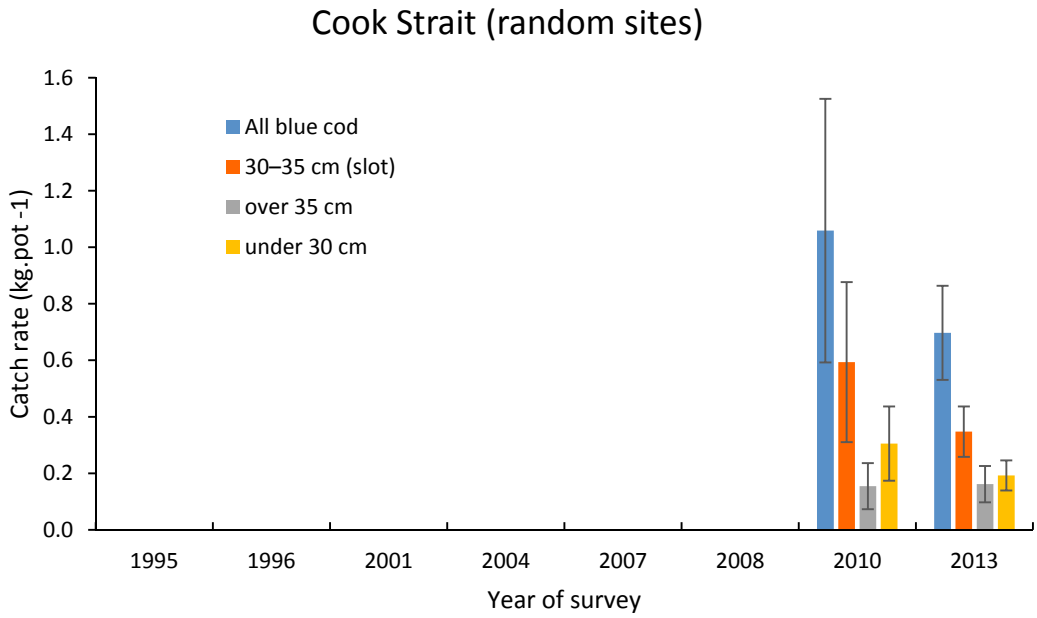


Figure 5: Scaled catch rates of blue cod from Cook Strait region random sites in 2010 and 2013. Catch rates are shown for all blue cod, blue cod within the slot limit (30-35 cm), recruited blue cod (35 cm over), and for pre-recruited blue cod (under 30 cm). Error bars are 95% confidence intervals. NOTE: the catch rate scale differs from other figures and goes from 0 to 1.6

Table 2: Mean catch rates (kg.pot^{-1}) for blue cod by size category and for individual strata from the 2013 Marlborough Sounds fixed-site potting survey. Catch rates are pot-based. (Note: 2013 CVs are set-based and range from 12.6 - 58.6% for fish under 30 cm, 14.8 - 74.8% for 30-35 cm, and 29.1 - 100.0% for fish over 35cm.) Strata considered to be in the 'outer Sounds" are shaded dark blue, and 'inner Sounds' strata are shaded light blue (see Figure 1).

		< 30 cm			30 – 35 cm			> 35 cm		
		2007	2010	2013	2007	2010	2013	2007	2010	2013
Queen Charlotte Sound	Inner	0	0.12	0.19	0	0.28	0.08	0	0.2	0.06
	Outer	0.43	0.37	0.33	0	1.02	0.46	0.19	1.16	0.32
	Extreme Outer	0.67	0.38	0.21	0.34	0.43	0.62	1.57	1.06	0.26
Pelorus Sound	Inner	0.17	0.25	0.20	0.00	1.09	0.11	0.11	1.14	0.03
	Middle	0.18	0.22	0.17	0.00	0.53	0.34	0.21	0.85	0.12
	Outer	0.34	0.31	0.52	0.03	1.13	1.35	0.43	2.42	0.63
	Extreme Outer	0.77	0.72	1.31	0.16	0.29	2.32	2.26	2.52	1.32
D'Urville	East	0.60	0.79	1.10	0.50	0.27	1.54	1.87	1.08	0.75
	West	0.89	1.37	1.26	1.38	1.18	2.28	3.19	3.09	1.01

AGEING

No ageing results, including estimates of total mortality (Z) and spawner biomass per recruit, are presented here from the 2013 survey because they are under consideration by the MPI Science Working Group. The age distributions derived from the 2013 survey differed substantially from those obtained in previous surveys. Therefore, an ageing protocol for blue cod is under development, and this will ensure ageing methodology is applied consistently across all future blue cod studies. Ageing results for the 2013 survey will be reassessed against this protocol once it is complete.

SEX RATIO

Regional sex ratios have been dominated by males over all surveys, apart from D'Urville Island in 2004 when it was 50% male (Table 4). Analysis at the strata level shows that sex ratios are also dominated by males apart from a handful of examples (Table 3). This is unusual, and a higher proportion of females to males would typically be expected in a natural population. The reasons for these sex ratios are not clear, as there are other impacts that may affect the blue cod populations in area other than fishing pressure (see *Other Impacts*). A high ratio of males to females is considered indicative of a heavily fished population[18].

The 2013 fixed-site survey indicates that sex ratio varies depending on location, with males dominating the sex ratio in most strata (Table 3). Sex ratio also varies depending on size class (Table 3).

Table 3: Sex ratios (percent male) for blue cod by size category for individual strata, for the fixed-site 2013 Marlborough Sounds potting survey. Sex ratios are shown in bold and the sample size is shown in brackets (the number of fish the sex ratio was able to be derived from).

		< 30 cm			30 – 35 cm			> 35 cm		
		2007	2010	2013	2007	2010	2013	2007	2010	2013
Queen Charlotte Sound	Inner	**n/a** (0)	**46.8** (19)	**46.2** (15)	**n/a** (0)	**68.9** (16)	**100** (6)	**n/a** (0)	**100** (15)	**100** (2)
	Outer	**48.8** (60)	**35.2** (57)	**45.2** (59)	**81.1** (15)	**75.1** (99)	**41.3** (83)	**n/a** (0)	**88.1** (58)	**82.4** (25)
	Extreme Outer	**61.4** (103)	**53.5** (58)	**94** (13)	**90.7** (143)	**90.3** (105)	**86.5** (39)	**100** (18)	**96.9** (32)	**100** (9)
Pelorus Sound	Inner	**53.3** (22)	**50.2** (16)	**89.4** (19)	**70.9** (7)	**94.7** (54)	**84.1** (6)	**n/a** (0)	**100** (37)	**100** (1)
	Middle	**50.1** (51)	**45.9** (37)	**70.9** (15)	**80.2** (21)	**87.2** (70)	**94.7** (20)	**n/a** (0)	**100** (29)	**51.1** (3)
	Outer	**57.0** (122)	**69.7** (39)	**80.8** (38)	**93.9** (70)	**90.4** (165)	**97.4** (79)	**100** (3)	**100** (51)	**100** (19)
	Extreme Outer	**73.9** (192)	**71.2** (69)	**72.6** (87)	**96.1** (334)	**90.4** (168)	**93.7** (146)	**100** (17)	**100** (14)	**100** (42)
D'Urville	East	**58.4** (220)	**43.2** (154)	**66.7** (74)	**77.9** (418)	**68.8** (122)	**76.7** (102)	**95.1** (74)	**93.9** (17)	**100** (24)
	West	**52.2** (233)	**56.0** (384)	**50.4** (74)	**70.1** (589)	**70.3** (541)	**68.2** (151)	**98.0** (150)	**94.9** (119)	**93.3** (31)

FISH UNDER 30 CM

The type of pots used to survey blue cod in the Marlborough Sounds has been consistent across all the surveys so as to make results comparable within the time series. However, these pots do not retain many fish under 30 cm because of escape gaps. There are two methods available to MPI for investigating this information.

The available information on fish under 30 cm caught in pots may underestimate the overall abundance, but it still provides some indication of relative abundance when viewed across a time series, as the methodology is consistent across this time (Figures 2 – 5). However, it is not clear if there is any inherent bias in sampling sex ratio of these smaller size classes as this could be affected by behaviour (if one sex is more likely to compete and stay in the pot).

Additionally, drift underwater video (DUV) can be used to estimate abundance of fish that are too small to be caught efficiently in the pots. This data has not completed peer review through the MPI Science Working Group, but will be available to the public once it has been peer reviewed and accepted.

Table 4: Summary statistics from standardised blue cod potting surveys in the Marlborough Sounds up to 2013 by region. Mean length and sex ratios are derived from the scaled population length distributions. Results for each region are shown only for surveys where strata have remained the same throughout the time series. All surveys were fixed site except Cook Strait in 2010 and 2013, which were random.

		Mean Length (cm)		CPUE (kg.pot^{-1})		Sex ratio
Region	**Year**	**Male**	**Female**	**Overall**	**Range (CV)**	**Sex ratio (% male)**
Queen Charlotte Sound	**1995**	31.0	28.0	2.1	0.74–2.91 (12%)	59%
	1996	-	-	-	-	-
	2001	28.5	24.3	1.33	0.58–1.69(12%)	61%
	2004	27.9	24.2	1.16	0.35–2.01(22%)	51%
	2007	29.8	25.7	1.09	0–2.60(15%)	69%
	2010	33.2	29.0	2.09	0.60–2.56(18%)	71%
	2013	31.7	29.8	1.0	0.32–1.12 (18%)	62%
Pelorus Sound	**1995**	-	-	-	-	-
	1996	29.8	26.2	2.4	1.0–3.3 (7%)	70%
	2001	27.8	22.2	0.67	0.19–1.46(12%)	64%
	2004	28.2	23.5	0.96	0.20–2.70(11%)	66%
	2007	29.2	24.5	1.07	0.28–3.24(11%)	77%
	2010	32.8	28.3	2.9	1.6–3.86(13%)	87%
	2013	31.3	27.2	1.95	3.3–4.94(15%)	89%
D'Urville	**1995**	-	-	-	-	-
	1996	-	-	-	-	-
	2001	-	-	-	-	-
	2004	30.7	27.8	4.23	3.75–4.67(11%)	50%
	2007	32.2	29.5	4.15	2.92–5.49(10%)	71%
	2010	31.3	28.7	3.82	2.15–5.64(8%)	64%
	2013	31.7	29.4	3.88	3.37–4.44(18%)	70%
Cook Strait	**2008**	31.9	26.4	1.50	0.30–4.20(15%)	88%
	2010 (random sites)	30.5	25.6	1.06	0.11–1.74(22%)	84%
	2013 (random sites)	31.7	28.4	0.70	0.14–1.62(12%)	83%

CATCH LIMITS AND ALLOWANCES

The Marlborough Sounds Area and Challenger (East) area are part of the wider Challenger/Central Management Area, known for blue cod as BCO 7 (orange line in Figure 6). Blue cod was introduced to the quota management system in 1986 with the setting of a total allowable commercial catch (TACC) only. There was no requirement to set a total allowable catch (TAC) and non-commercial allowances at the time blue cod entered the quota management system. The current TACC for BCO 7 is 70 tonnes.

A TAC and non-commercial allowances were set in 2003 and have remained unchanged (Table 5).

Table 5: BCO 7 TAC, TACC, and allowances (tonnes)

TAC	TACC	Customary Allowance	Recreational Allowance	Other sources of fishing-related mortality
343	70	27	177	69

A recreational allowance of 177 tonnes was based on two-thirds of the average total catch estimates of the 1995-96 and 2000-01 surveys (239 and 288 tonnes, respectively). Setting the allowance at this level was not intended to reduce the recreational allowance from historical levels, but to reflect that harvest levels were most likely over-estimated by the assessment methodology used at the time.

SECTOR PROFILES

The BCO 7 fishery involves customary, commercial, and recreational fishing. The commercial fishery is managed as one stock across the Challenger/Central Management Area (BCO 7). Recreational management has been focused specifically on the Marlborough Sounds Area since the early 1990s (red shaded area in Figure 6), given strong recreational fishing pressure and the vulnerability of blue cod to localised depletion. The Challenger (East) area (blue shaded area in Figure 6) is part of the wider BCO 7 stock, and is also treated as a unit for management purposes for recreational fisheries.

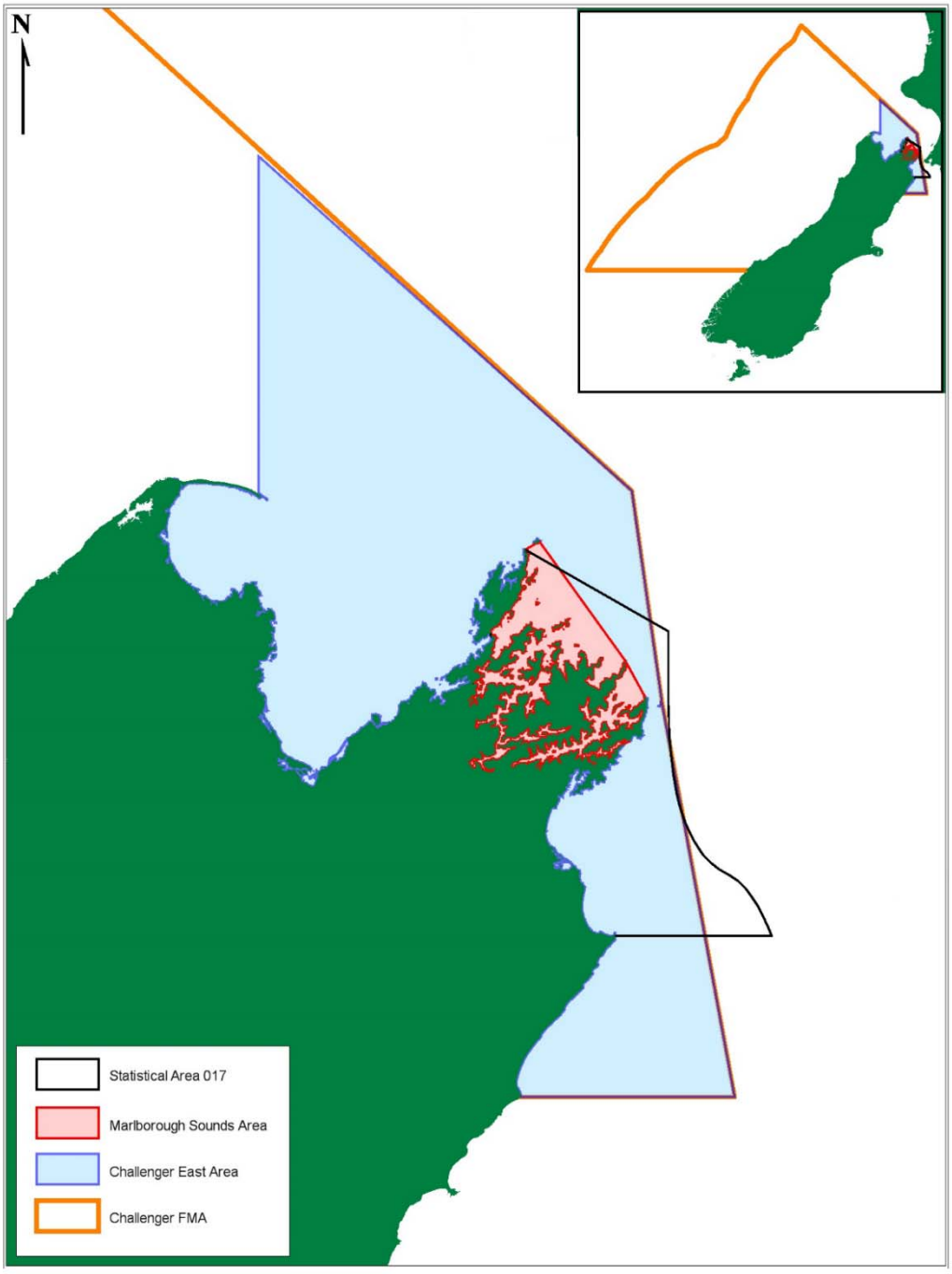


Figure 6: Marlborough Sounds Area (red), Challenger East (blue), and the quota management area for BCO 7 (orange line; Challenger FMA). Statistical Area 017 is also shown (black line).

COMMERCIAL PROFILE

OVERVIEW

Blue cod is predominantly an inshore fishery. A small but regionally significant commercial target cod pot fishery occurs in the outer Marlborough Sounds and Kahurangi Shouls on the west coast South Island.

The TACC was first set in 1986 at 110 tonnes. The TACC increased to a high of 136 tonnes in 1989 based on decisions of the Quota Appeal Authority and was reduced for sustainability reasons to 95 tonnes in 1994, and to 70 tonnes in 1996 where it has since remained (Figure 7).

BCO 7 commercial landings initially declined when the TACC was first set. Landings declined again in response to the TACC reductions in 1994 and in 1996. Since 2006-07, annual landings in BCO 7 have remained constant at, or just below, the level of the TACC. In 2013-14, the TACC was not fully caught (Figure 7), which may have been due to a number of factors such as Annual Catch Entitlement availability and subsequent deemed value levels, and market driven or operational variances by the commercial fishers targeting other fisheries.

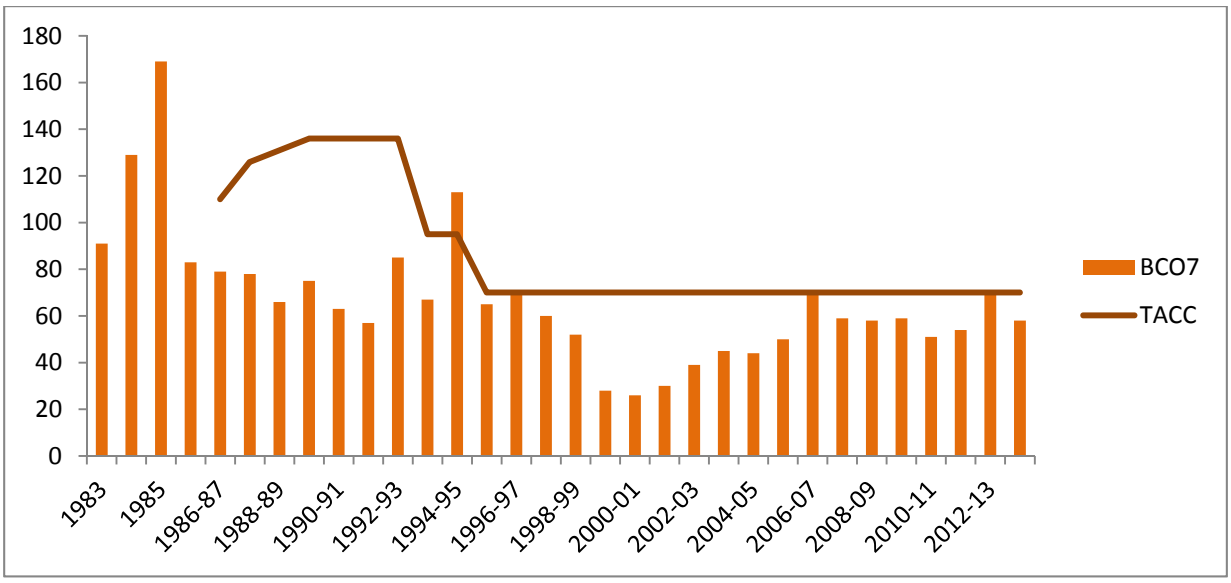


Figure 7: Reported commercial landings of blue cod from 1983 to 2013-14 and actual BCO 7 TACCs from 1986-87 to 2013-14 (tonnes, greenweight).

ESTIMATED CATCHES BY STATISTICAL AREA

There are a number of commercial fisheries in the Challenger/Central Management Area that can be differentiated by target species, area fished and fishing methods. Within FMA 7 there are 6 Statistical Areas in full (017, 033, 034, 035, 036 and 038) and 5 Statistical Areas in part that overlap into FMA 7 (018, 032, 037 and 039). Some fisheries are concentrated in one or two statistical areas, while others are fairly evenly distributed throughout the Challenger/Central Management Area.

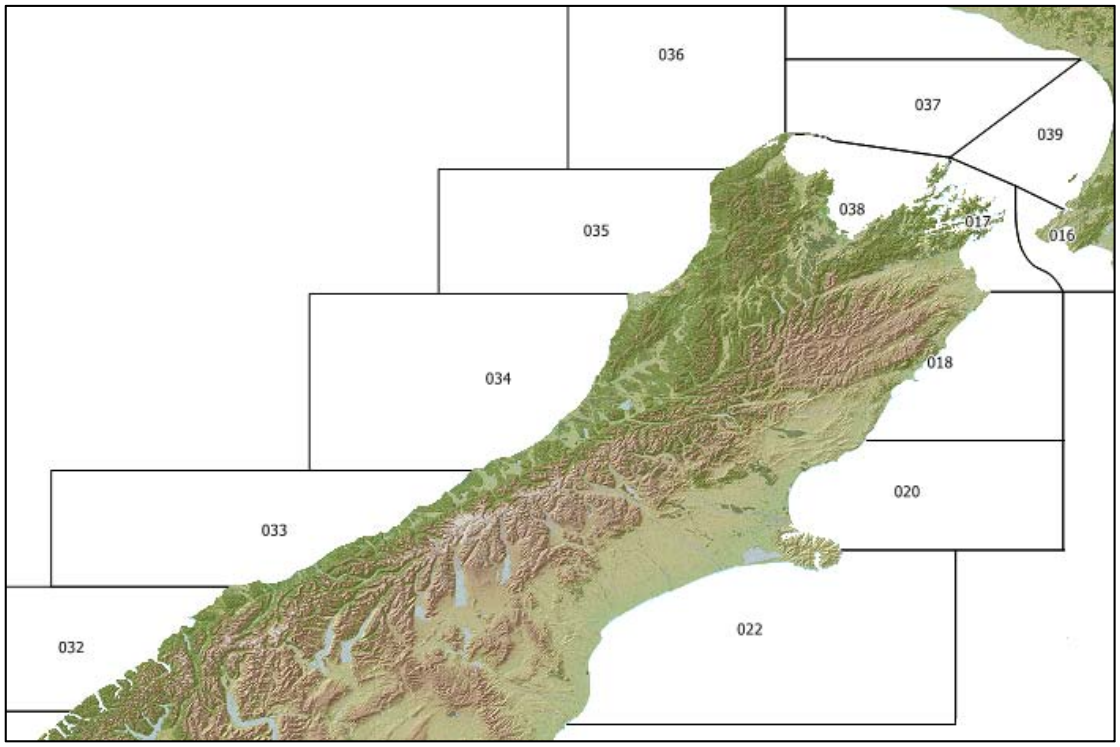


Figure 8: General inshore Statistical Areas used to report commercial catches within FMA 7.

The majority of BCO 7 commercial catches are taken from Statistical Area 017, which includes the Marlborough Sounds Area (Figure 8), but extends over a wider area as shown. Since 2005/06, annual estimated catches in Statistical Area 017 have varied in a narrow range between an estimated 22 to 33 tonnes (Figure 9). It is understood that a majority of these catches are from the outer sounds area of Statistical Area 017 due to a voluntary agreement for commercial blue cod potters not to fish the inner sounds.

The next most important Statistical Area is 038 (Figure 8) where blue cod are primarily caught west of D'Urville Island in Tasman Bay. Since 2005/06, annual estimated catches in Statistical Area 038 have varied within 7 to 15 tonnes (Figure 9).

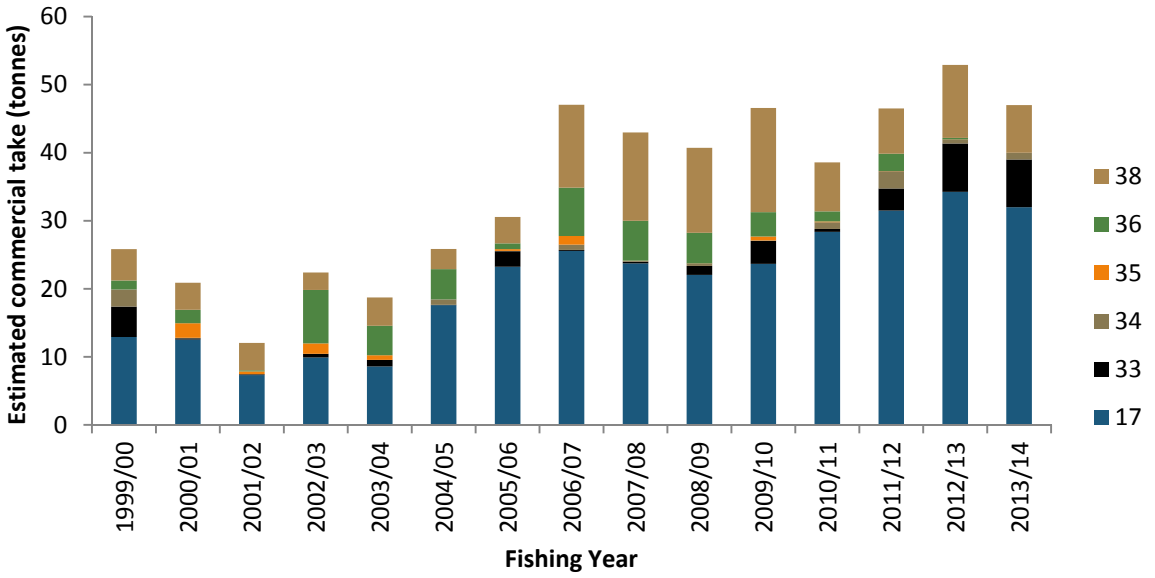


Figure 9: Estimated commercial catch of blue cod by fisheries statistical area from 1990-00 to 2013-14 (tonnes, greenweight).

It is important to note the commercial reporting regime requires fishers to report up to 5 or 8 species (depending on form type) by estimated weight in the effort section of a return. If blue cod does not make the top 5 or 8 species it is reported in the landed section only. This explains why in 2013/14 the weighed landings totaled 58 tonnes, and the estimated catches totaled 47 tonnes.

As shown in Figure 10 below, almost 92% of the most recent five years of reported commercial catch of BCO 7 was taken by cod pots (CP). Lesser amounts are taken by hand lining (4.3%), bottom trawl (3.3%). Small amounts are taken by bottom longlines, rock lobster pots, diving, Dahn lines and setnets.

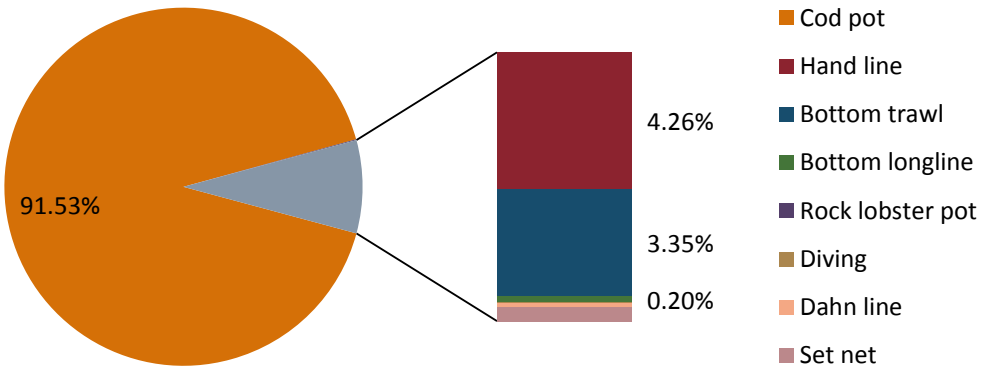


Figure 10: Proportion of estimated commercial catch of blue cod (BCO 7) by fishing method for the past five fishing years (2009 to 2014).

Almost 96% of the most recent five years of reported commercial catch of BCO 7 has been taken by the blue cod target fishery (Figure 11). The other 4% of the blue cod catch is bycatch of other target fisheries. The amount of bycatch reported is modest with estimates of annual catch ranging from 0.9 tonnes (2012-13) to 2.2 tonnes (2009-10).

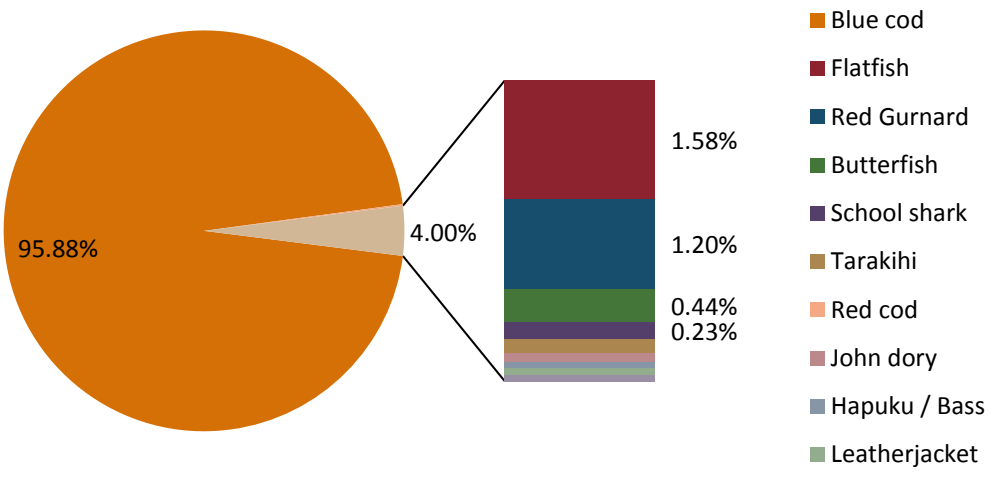


Figure 11: Proportion of estimated commercial catch of blue cod (BCO 7) by target species for the past five fishing years (2009 to 20114).

The majority of the reported blue cod bycatch from the Marlborough Sounds Area is taken by the trawlers that are fishing for flatfish and gurnard. Blue cod is also a minor bycatch of trawling for tarakihi, and red cod to the south east of the Sounds.

The most important commercial fisheries for other species operate principally within statistical areas 017 and 038. Barracouta, red cod, flatfish, ghost shark, gurnard, spiny dogfish, tarakihi, blue warehou and snapper are the main species caught. These fisheries operate over a relatively broad depth range, from the shallow waters of Tasman Bay and Golden Bay to about the 50 metre depth contour, principally at the entrance to Tasman and Golden Bays.

COMMERCIAL USE

Number of Vessels

128 vessels have reported catching blue cod in Statistical Area 017 over the past four fishing years through targeting or from bycatch in a number of other fisheries that are not specific to the blue cod fishery. However, only 26 vessels over that period have reported catching blue cod consistently or in volumes totaling 1 tonne or greater. Ten of these vessels report targeting blue cod (Table 6).

The key fishing ports in the Challenger (East) area are Nelson, and Picton, but some vessels are also based at smaller ports such as Havelock and Port Underwood.

Table 6: Number of commercial vessels reporting catches of blue cod in Statistical Area 017 and their base port (through all fishing methods).

Port	Number of vessels that report blue cod catches of 1 tonne or greater in total during the past four years in statistical area 017	The number of vessels in column 1 that also report target blue cod fishing in statistical area 017
Nelson	16	2
Picton	5	4
Havelock	1	1
Port Underwood	4	3

Quota Holdings and Annual Catch Entitlement

In the Quota Management System (QMS), commercial fishing rights are allocated as individual transferable quota (ITQ). Quota is a harvesting right that allows people to own a share of the TACC for a particular species in a defined area. The main characteristics of quota are: it is owned by an individual or company (or any other legal entity); only New Zealanders can own quota; it is perpetual (lasts forever); it secures a fixed percentage of the TACC; it can be bought or sold; it is fully transferable and divisible; and it is an asset that enables owners to borrow against the quota.

Quota is expressed as a share of 100 million (i.e. there are 100 million shares for each and every QMS fish stock). Therefore, if someone has five million shares of BCO 7 quota, that person owns the ability to harvest 5 per cent of the BCO 7 TACC or 3.5 tonnes at the current TACC of 70 tonnes.

Quota ownership in the FMA 7 fishery is dominated by a small number of quota-holding companies who either fish against their own quota, or lease Annual Catch Entitlement (ACE) to other owner-operator companies. For BCO 7, there are 45 quota holders with an average shareholding of 2,222,222 shares. Seven of the top 10 quota owners are companies that have held quota since it was first allocated in 1986.

The top 10 companies that have quota ownership of BCO 7 are listed in Table 7 below. The majority of quota owners are represented by Southern Inshore Fisheries Management Company and the fishers are represented by the Federation of Commercial Fishers.

Within the commercial catch limit, access is determined by ownership of ACE and the possession of a fishing permit. ACE provides the right to harvest a specific amount of a particular species in a defined area. ACE is generated in proportion to the amount of quota owned by a person at the start of each fishing year (i.e. ACE has a one year lifetime). ACE is the annual tonnage equivalent of the quota share (Table 7).

Table 7: Top 10 quota owners in BCO 7 and their quota holdings in the 2014-15 fishing year.

Major BCO 7 Quota Holders	Percentage of Total Quota Held	Annual Catch Entitlement at current TACC (rounded to nearest tonne)
Talley's Group Management Ltd	30%	21 t
Private individual	15%	10 t
Aotearoa Quota Brokers Ltd	11%	8 t
Solandar Marine Ltd	6%	4 t
Westfleet Seafoods Ltd	6%	4 t
Ngai Tahu Fisheries Settlement Limited	4%	3 t
Starfish supply Ltd	3%	2 t
Aotearoa Fisheries Ltd	3%	2 t
Sanford Ltd	2%	1 t
Tempest Fishing Company Ltd	2%	1 t

Economic impact and value of the Commercial Sector

MPI last surveyed the economic impact of fishing by region in 2006[i]. The Marlborough region includes the Marlborough Sounds, Cloudy and Clifford Bay areas. It is assumed much of Marlborough's economic activity from fishing occurs within the Marlborough Sounds.

The seafood industry is relatively important to Marlborough's economy, contributing $85 million in value added (5.7% of total Gross Regional Product (GRP)) and employing 1,057 full time employees (5.6% of the total regional working population). The processing sub-sector makes the greatest contribution to the industry accounting for 66% of industry GRP and 53% of employment. Most of this economic impact is contributed by aquaculture.

However, only 3% of New Zealand's fishing operations and 2% of processing operations are located in Marlborough. Seafood processing activity is centered in Spring Creek, Riverlands, Picton and Blenheim.

[i] The Economic Impacts of the Seafood Sector in New Zealand: Market Economics 2008.

The total value of finfish excluding processing in 2006 was estimated to be $9 million (adjusted for inflation in 2015). As an approximate point of comparison, the port price paid for the estimated commercial catch of blue cod within the Marlborough Sounds is $150,000.

Commercial value of blue cod is demonstrated by way of the port price paid to fishers ($4,330 per tonne), the ACE price ($750 per tonne), and the quota value ($14,999 per tonne), which are the future anticipated earnings from the commercial share of the BCO 7.

Deemed Values

Under the Fisheries Act 1996, overfishing is controlled in the first instance by the application of graduated monetary payments, known as interim and annual deemed values. Interim deemed values are incurred during the fishing year and are refunded if sufficient ACE is acquired to cover the BCO 7 catch at the end of the fishing year. Interim deemed values are set at $0.67 per kg and annual deemed values start at $1.34 per kg.

The deemed value framework provides a further incentive for fishers to acquire sufficient ACE to balance against catch. Payments are ramped according to the proportion of catch in relation to ACE held. These are known as differential deemed value rates (Table 8).

Table 8: Current differential deemed value rates for BCO 7 in the 2014-15 fishing year.

Catch in excess of ACE holdings	Deemed value rate
0-20 %	$1.340 per kg
> 20 %	$1.608 per kg
> 40 %	$1.876 per kg
> 60 %	$2.144 per kg
> 80 %	$2.412 per kg
> 100 %	$2.680 per kg

Insignificant deemed value payments have been made for catches of BCO 7 in excess of catch entitlements. Annual deemed value payments average $200-300 and have never exceeded $1,000. The low deemed value payments reflect that the majority of the BCO 7 catch is the result of directed target fishing effort where fishers hold sufficient ACE.

COMMERCIAL REGULATIONS

A range of commercial spatial restrictions apply over large areas of the inshore zone within BCO 7 (see Figure 12 for a selected range of restriction, noting not all restrictions are shown). These restrictions are in place mostly to protect juveniles and spawning aggregations (for species other than blue cod) from the impacts of fishing. Notable is the banning of Danish seine from inshore waters, and set nets from eastern inshore waters. Parts of the inner Sounds are closed to the taking of all species of mussels, kina and scallops. There are a number of seasonal and other conditions in place on the use of trawl nets, drag nets and setnets.

Juvenile blue cod are not caught by commercial potting because of mandatory escape gaps that provide selective measures to allow small blue cod to escape. Therefore, blue cod is not vulnerable to the main commercial fishing method until they are mature.

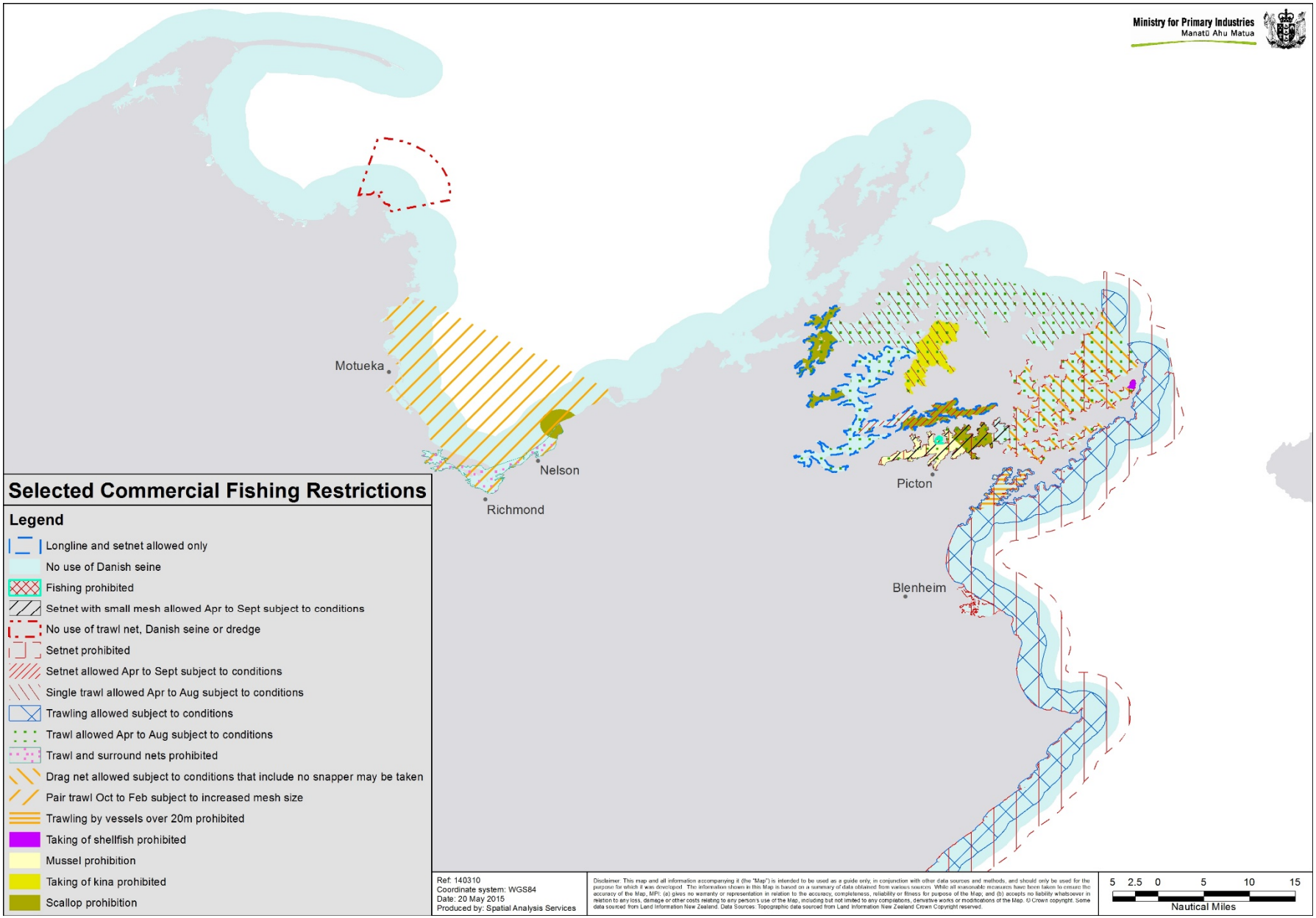


Figure 12: A selected range of commercial fishing restrictions within the Challenger (East) area.

RECREATIONAL PROFILE

OVERVIEW

Blue cod is an iconic recreational fish. Nationally blue cod is the third most popular finfish behind snapper and kahawai. It is the most important recreational finfish in the South Island. This is also reflected in FMA 7 where in 2011/12 the National Panel Survey of Marine Recreational Fishers estimated that blue cod was the third most harvested by weight (76.8 tonnes) behind kahawai (137.4 tonnes) and snapper (89.5 tonnes)[21]. Of the 76.8 tonnes, the National Panel Survey estimated 32.6 tonnes was caught within the Marlborough Sounds Area.

SUMMARY OF RECREATIONAL REGULATIONS

From 1993, the amateur bag limit for blue cod in BCO 7 was reduced and the minimum size increased from 30 cm to 33 cm for both amateur and commercial fishers. However, this was amended in 1993–94 for the Marlborough Sounds where the amateur size limit was reduced to 28 cm. Bag limits were also reduced for the Marlborough Sounds in 1993-94 and in 2003 the amateur minimum legal size and daily bag limit in the Marlborough Sounds was changed to 30 cm and 3 fish per person respectively (Table 9).

Table 9: Changes to minimum legal size (MLS) and the daily bag limit (DBL) for the Marlborough Sounds amateur blue cod fishery.

Year	MLS (cm)	DBL
1986	30	12
1993	33	10
1994	28	6
2003	30	3

A decline in blue cod abundance was evident from a series of fishery independent surveys (1995-2007) that indicated the fishery did not recover despite the progressive reduction in the daily bag limit.

In October 2008, the fishery was closed to amateur fishing for a four-year period in response to concern at the decline in blue cod abundance. The intent of the closure was to prevent further declines of blue cod abundance in the closed areas and to "provide a window of opportunity for all interested parties to work together to think about how they want their fishery to be managed".

On 28 March 2009, the Minister of Fisheries announced the formation of the Marlborough Sounds Blue Cod Management Group and tasked the Group with formulating a management plan to support lifting of the closure earlier than 1 October 2012.

In December 2011, the blue cod recreational fishery was re-opened with the introduction of additional new management measures for the Marlborough Sounds Area. These measures included:

- A seasonal opening from 20 December to 31 August;
- A maximum bag limit of two blue cod per person per day;
- A minimum legal size limit of 30 cm and a maximum legal size limit of 35 cm (a 'slot size limit');
- A hook limit of a maximum two hooks per line;
- An accumulation limit of one daily bag limit of blue cod;
- A requirement to possess blue cod in a whole or gutted state, unless for immediate personal consumption;
- A no take zone around Maud Island;
- A transit rule where only two blue cod can be possessed per fisher at any one time. This applies even if the fish were caught outside the area and they were being transported through the Marlborough Sounds Area.

The measures outlined above still apply to date.

An overview of the methods restrictions and other conditions that apply to recreational fishers in the Challenger (East) area are shown in Figure 13.

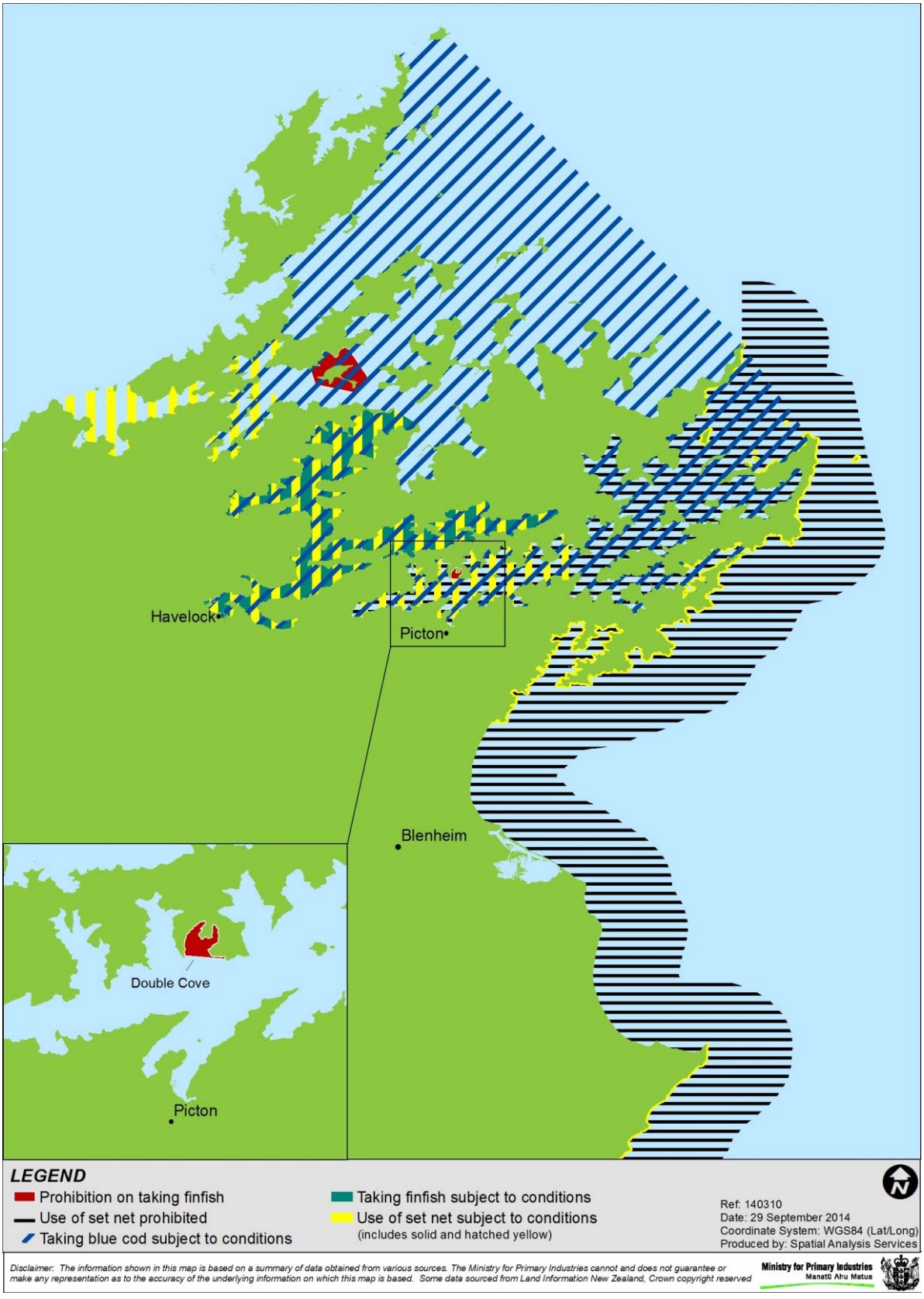


Figure 13: Overview of method restrictions and other conditions that apply to recreational fishing in the Challenger (East) area.

RECREATIONAL HARVEST ESTIMATES

Recreational harvest is known to vary in response to a combination of factors, including changes in availability and abundance of blue cod, seasonal variations in weather conditions, changes in social dynamics (e.g. state of the economy) and the fishing effort of the recreational sector.

Recreational fishers are not required to report the quantities of fish they catch or harvest. Research surveys are instead carried out to estimate recreational fisheries harvest. There are two broad approaches to estimating recreational harvest: the use of onsite methods, where fishers are interviewed and harvest is counted at the point of fishing or access to their fishing activity; and offsite methods where phone interviews and/or diaries are used to collect data from fishers.

Through the 1980s, 1990s, and early 2000s, various offsite phone diary surveys were used to try and estimate recreational blue cod catch.

These results are dated and considered unreliable.[ii]

A 2005/06 harvest estimate based on an onsite method (aerial overflight survey) is provided by Davey *et al*[22]. Batstone *et al*.[23] provide outcomes from a characterisation of recreational fishers undertaken in the Marlborough Sounds over the summer of 2008/09. This used both offsite and onsite techniques and made corrections for avidity when assessing catches of blue cod.

During the 2011-12 fishing year an offsite National Panel Survey was undertaken. This survey used face-to-face interviews to recruit a panel of fishers who were contacted regularly over a full year about their fishing activities. The 2011-12 results are considered more robust, in comparison to these two other surveys, because of the level of review they have been subject to and the use of concurrent surveys using multiple onsite and offsite methods to corroborate results between surveys.

The Davey *et al*. (2005) estimate of recreational catch for the outer Marlborough Sounds (which contributes 118 tonnes to the overall estimate), in particular, may not be accurate as a large proportion of the fishers in the outer Sounds fish from launches and other vessels which are not readily encountered during aerial overflight surveys. In addition the strengths and weaknesses of the aerial-access method are understood far better now than in 2005, and although methodological and analytical measures have been developed to address these in part, some of the shortcomings with the 2005–06 survey were survey design related.

[ii] For more detail, refer to the May 2014 Fisheries Assessment Plenary on the MPI website at: http://fs.fish.govt.nz/Page.aspx?pk=113&dk=23539

Table 10 provides a summary of results from Davey *et al.*, Batstone *et al*., and the National Panel Survey. The table also outlines the seasonal measures that applied at the time (the 3 fish daily bag limit and 30cm minimum legal size (apart from the slot limit) applied throughout the period covered by these surveys).

Table 10: Estimates of the number and weight of blue cod taken within the Marlborough Sounds by recreational fishers and applicable management measures.

Survey	Marlborough Sounds		Seasonal measures
	Number of fish caught	Weight (tonnes)	
Davey *et al.* (2005/06)	149,067	123.5	No restrictions
Batstone *et al.* (2009)	138,869	104.2	Inner Sounds closed but survey based on practices prior to closure
National Panel Survey (2011/12)	76,787	32.61	Open Dec-Aug Slot limit

In making comparison between the studies, consideration should be given to the differences in the methods and assumptions used to derive the estimates. The survey results depicted in Table 10 suggest that changes in blue cod abundance, seasonal closures and the imposition of the slot limit have impacted catches over time. The extent of this impact cannot be determined as the results of the first two surveys are highly uncertain.

At a finer-scale, of the 32.61 tonnes of blue cod estimated caught by recreational fishers in the Marlborough Sounds Area during 2011/12, it was estimated that 16.08 tonnes was taken from D'Urville Island and Pelorus Sound (subarea 26 in Figure 14) and 16.53 tonnes was taken from Queen Charlotte Sound (subarea 27).

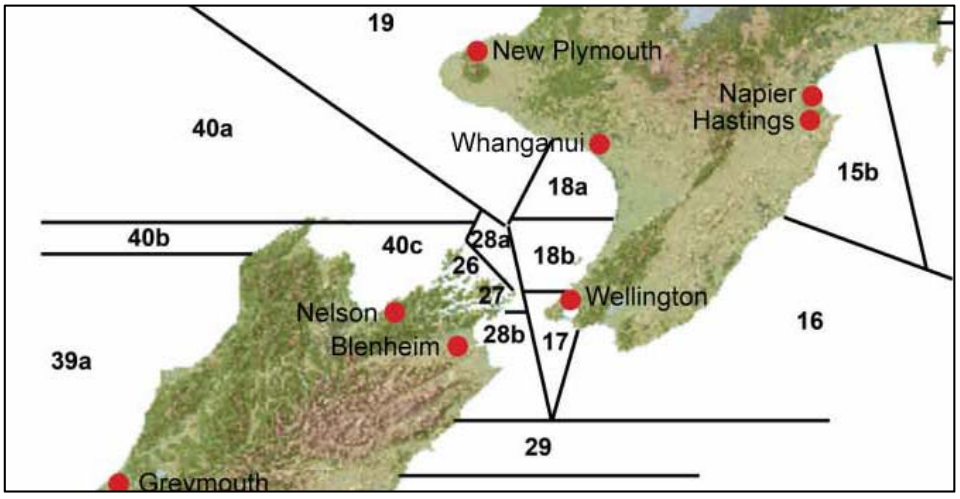


Figure 14: Location of subareas used in the 2011/12 National Panel Survey.

LOCATION OF RECREATIONAL FISHING IN THE MARLBOROUGH SOUNDS

The 2011/12 National Panel Survey found that over 99% of blue cod is taken by rod and line. Minor amounts are taken by longline and spearfishing. The survey also found that most blue cod is taken by trailer boat-based fishers (77%), and those fishing from launches (15%), yachts (2%), kayaks and dinghies (2%), but there is also targeting of blue cod by land-based fishers (2%).

Davey *et al*. (2005) assessed the location of recreational fishers fishing from trailer boats was assessed by an aerial survey. The importance of the inner Marlborough Sounds and the distribution of fishing effort close to launching points and populations centers are reflected in Figure 15. Anecdotal reports since 2005 suggests that there has been an increase in recreational fishing vessels in the D'Urville Island area (which is not reflected in Figure 15).

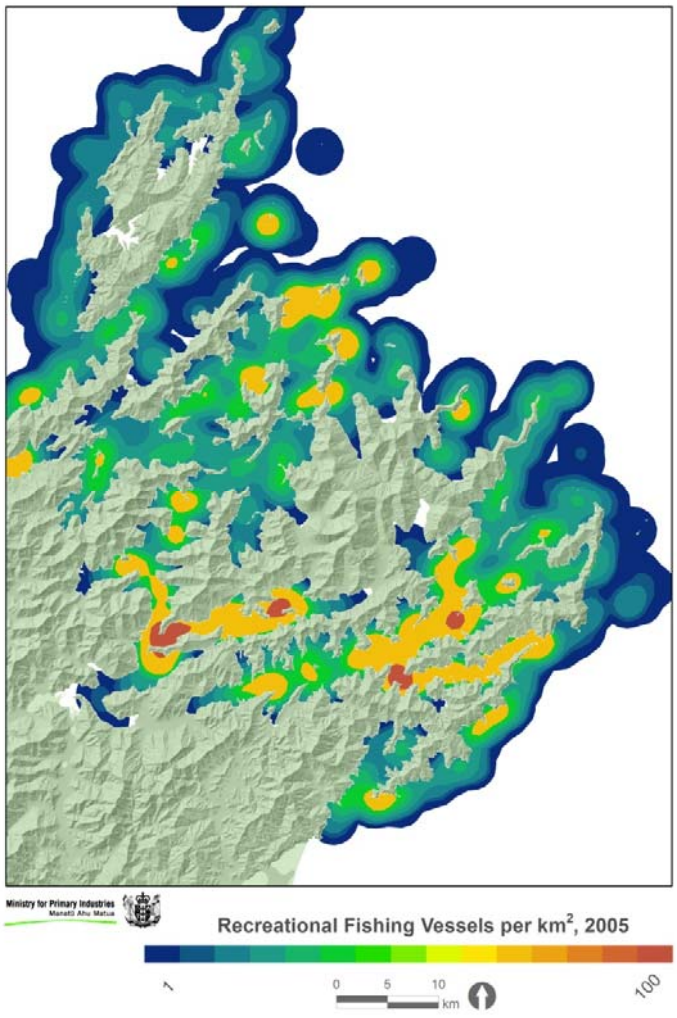


Figure 15: Locations of recreational fishing vessels per km^2 in the Marlborough Sounds, as reported by the 2005 aerial survey.

RECREATIONAL FISHER REPRESENTATION

Recreational fishing is an unstructured leisure activity within which common interest groups have formed. These groups have led to the formation of Councils and Clubs with membership, secretarial and leadership positions. These enable advocacy to MPI by means of contributing to Annual Fisheries Planning process through Recreational Fishing Forums, making submissions on management proposals and undertaking some research.

Nationally, recreational fishers are represented by the New Zealand Recreational Fishing Council (NZRFC), New Zealand Sport Fishing Council (NZSFC), Legasea (the public outreach brand of the NZSFC), NZ Angling and Casting Association (NZACA), Spearfishing NZ and the New Zealand Underwater Association.

Challenger (East) recreational fishers have representatives on MPI's FMA 7 Recreational Fishing Forum. Recreational fishers are also represented by a network of local recreational fishing groups, including Marlborough Combined Divers Association, Mapua Boat Club, TASFISH, Pelorus Boat Club, Marlborough Sounds Recreational Fishers Association, Dawnbreakers Fishing Club, Nelson Underwater Club, Tarakohe Sea Anglers and Tennyson Inlet Boat Club.

It is acknowledged that many recreational fishers are not members of representative organisations or groups. In 2009, Batstone *et al.* found that 7% of saltwater fishers in the Marlborough Sounds belonged to clubs.

AMATEUR-FISHING CHARTER VESSEL REPORTING INFORMATION

Amateur-fishing charter vessels (ACVs) are required to register with MPI and have been required to report blue cod fishing activity and catches (number caught and number retained) since November 2010.

A summary of the reported catches are provided in Table 11. For stocks such as blue cod around the country, catches from charter vessels are thought to comprise a significant proportion of the total recreational catch. The reported catch by ACVs in 2011/12 is 8.0% of the overall recreational catch estimated by the 2011/12 National Panel Survey (both values apply to the Marlborough Sounds).

Table 11: Summary of reported blue cod catches by amateur charter vessels from the 2010-11 to 2013-14 fishing years in the wider Marlborough Sounds area

ACV reported catch of retained fish in Marlborough Sounds	2010/11	2011/12	2012/13	2013/14
Tonnes	2.802	2.592	2.612	3.050
Number	6,598	6,104	6,151	7,182

Locations of areas fished around the Marlborough Sounds, as reported by charter vessel operators since 2010, are given in Figure 16. The most important areas by the number of fishers – for fishers targeting blue cod - are the junction of Tory Channel with Queen Charlotte Sound, French Pass, and east and north of D'Urville Island.

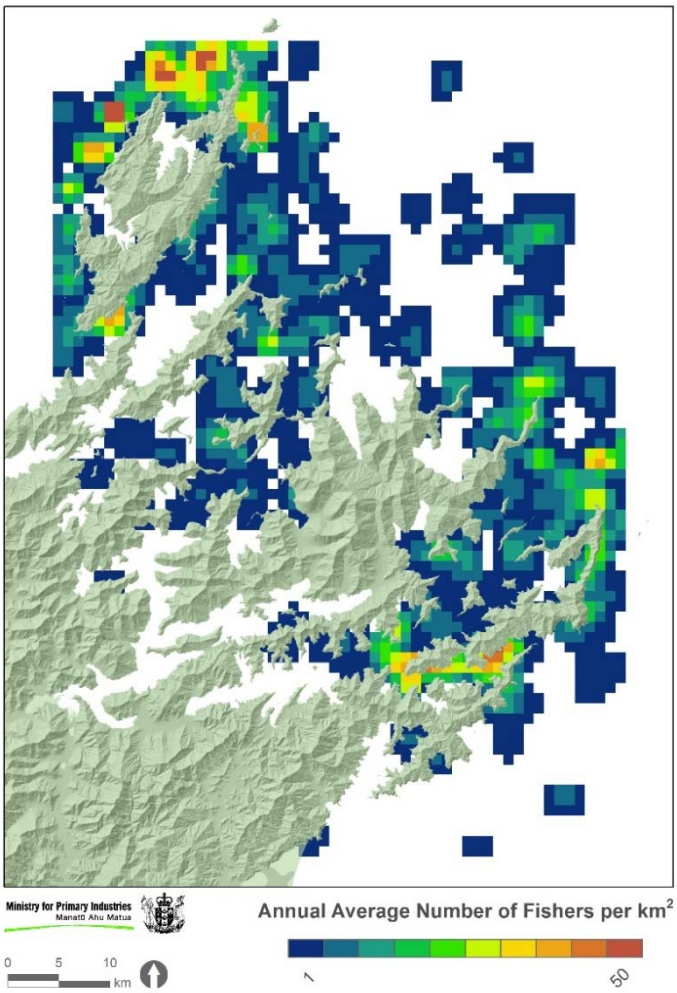


Figure 16: Locations of where charter vessel operators have reported the number of fishers aboard their vessel on fishing trips targeting blue cod in the Marlborough Sounds (in annual average number of fishers per km^2).

Locations where blue cod were retained aboard charter vessels fishing around the Marlborough Sounds since 2010 are given in Figure 17. The most important areas reflect the fishing effort shown in Figure 16. This is to be expected as charter vessels operators know the locations where their clients will be able to catch and retain fish.

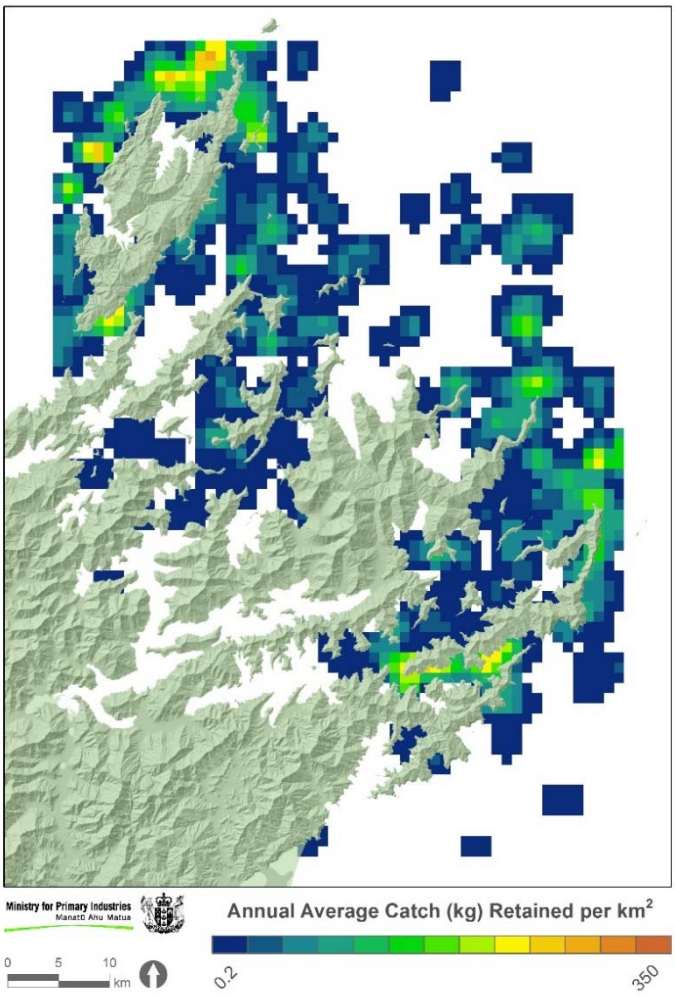


Figure 17: Locations of where charter vessel operators have reported the number of blue cod retained aboard their vessel on fishing trips targeting blue cod in the Marlborough Sounds (in annual average catch (kg) retained per km^2).

RECREATIONAL MOTIVATIONS AND PERCEPTIONS

Batstone *et al.* (2009) found that the preferred time of the year to go fishing in the Marlborough Sounds is the peak holiday period of December to February. Demographically, the fishery is largely made up of males 35 to 65 years of age who identify with a European / Pakeha ethnicity.

Batstone *et al.* (2009) also found that the most important motivations amongst recreational fishers were to be outdoors, to be close to nature, and to share the fun of fishing and the fish they catch with family and friends. In contrast, motivations associated with sports fisheries, such as the pursuit of trophy fish, technical aspects of fishing, and fishing skill development, were less important in the Marlborough Sounds. The report characterised fishers by their

response to questions in the survey designed to reflect a part of the recreation specialisation continuum from novice to expert as a Marlborough Sounds blue cod fisher. The population was segmented into one of four groups along the continuum according to this level of specialisation.

Batstone *et al*. (2009) found more specialised fishers have higher than expected catch rates. The implication is that changes to policy instruments such as reduction in daily blue cod bag limits would differentially impact the four segments. That is the more highly specialised and more frequently active fishers (avid fishers) are likely to be most constrained by the reduction. Batstone *et al*. (2009) considered the more avid fishers do not experience depletion because they know where to find the remaining fish. Therefore, they are likely to resist more active management as an imposition on their fishing activity that they perceive to be unnecessary.

There is a perception that there is widespread movement of fishers both from outside the region into the Marlborough Sounds, and of Marlborough Sounds residents moving to fish areas outside the region, as a result of management controls. However, Batstone *et al*. (2009) found that while Canterbury, Nelson / Tasman Bay and Wellington contribute significant fishing effort, the greater proportion of respondents' usual residential location was the Marlborough region. Those who visited the Sounds to fish stayed predominantly in holiday homes, or on yachts and launches.

A recent study of blue cod, sea perch and rock lobster recreational fisheries in Kaikoura/Motunau found less than 1% of fishers interviewed moved to fish in the these areas as a result of the blue cod fishery being closed in the Marlborough Sounds (n = 1927). See Annex One for the questions asked[24].

RECREATIONAL VALUE

Blue cod are sought by recreational fishers who employ a range of mostly boat-based fishing methods. Recreational fishers account for a large proportion of the total blue cod catch in BCO 7, making this one of only a few finfish fisheries nationally that have this characteristic (others include kahawai (KAH 1), kingfish (KIN 1), and snapper (SNA 1)).

Blue cod are fished mostly for the table and are not highly regarded as a sport fish. The value of recreational fishing is difficult to estimate because of the paucity of relevant data. Research on recreational fishing has tended to concentrate on producing harvest estimates instead of seeking participation rates or value estimates. Research that provides information about the value of recreational fishing in New Zealand was carried out by the South Australian Centre for Economic Studies (SACES) in 1998.[25]

Blue cod were assessed as the third most valuable of the five key recreational species evaluated. The methodology employed by SACES produced what remains the best available information on non-market values for the species covered by the assessment. However, there is considerable uncertainty in this information arising from the assumptions and methodology used as well as the time since the survey was undertaken.

The total recreational value per blue cod trip was estimated at $151 and the marginal value per kilogram of kept fish (equivalent to the ACE price as a point of comparison) was estimated at $3.23 per kg.

BLUE COD INCIDENTAL MORTALITY FROM RECREATIONAL FISHING

Estimates sourced from the amateur charter vessel reporting suggest 3.2 to 3.9 blue cod are caught for each blue cod retained. This means up to 3 blue cod are released for each fish kept. No studies have been undertaken to estimate the level of mortality on this level of releases, or impact it may have on abundance and productivity.

Incidental mortality to blue cod juveniles arises from catch and release of undersize fish, as required by minimum size regulation. Anecdotal evidence suggests that a portion of recreational catch returned to the water suffers mortality in the form of predation by shags, kingfish and barracouta. Recreational methods do not generally catch juveniles, but the survival of these fish is good if they are caught using large hooks (6/0) and returned to the sea quickly[26]. Batstone *et al*. (2009) assessed four methods aimed at reducing this level of mortality in terms of their effectiveness, ease of use and frequency of use (Table 12).

Table 12: Summary of perceptions of juvenile incidental mortality reduction measures (Batstone *et al.* 2009).

	Effectiveness	Ease of Use	Frequency of use
Use of 6/0 hooks or larger	55%	83%	75%
Use of circle hooks	50%	75%	68%
Moving away	50%	65%	70%
Release tubes	30%	30%	10%

CUSTOMARY PROFILE

OVERVIEW

Nine iwi have interests in the BCO7 area: Rangitane, Ngāti Apa, Ngāti Rarua, Ngāti Tama, Ngāti Kuia, Te Atiawa, Ngāti Koata, and Ngāti Toa, and Ngāi Tahu (Te Rūnanga of Ngāti Waewae-Hokitika; Te Rūnanga o Makaawhio – Bruce Bay), and Te Rūnanga o Kaikōura-Kaikōura.

All nine iwi belong to the Te Waka a Māui me ōna Toka (TWAM) Forum. The purpose of the Forum is "to collaborate on fisheries management issues within Te Waipounamu for the benefit of present and future generations, while recognising and providing for the traditional relationship of Iwi members with their respective customary and commercial fisheries". Forum members have worked collaboratively together to develop and implement the Te Waka a Māui me ōna Toka Forum Fisheries Plan. The TWAM Forum meets formally with MPI at least three times a year to participate in the fisheries planning process and to progress their fisheries objectives.

Rāwaru (blue cod) are a taonga species in the TWAM Fisheries Plan. Therefore, the first management objective of the plan, "to create thriving non-commercial fisheries that support the cultural well-being of South Island iwi and their whānau" is of particular relevance to rāwaru.

CUSTOMARY FISHING

Before and since the arrival of the first Polynesian voyagers to Aotearoa, 'ika' (fish) have always been an integral part of the Māori cultural identity. As an illustration, Maori have traditionally fished the oceans as a source of sustenance. Ika were traditionally caught during appropriate seasons and tides and shared at significant events, at daily meals when in season and stored in pataka to be used when required. A significant and special relationship between ika and Maori is the adventures of Maui whose exploits included landing the biggest fish of them all – Te Ika a Māui. In reference to the great fish of Maui also known today as the North Island of New Zealand. The South Island as Maui's canoe – Te Waka a Māui. The name of South Island iwi forum is in reference to the waka of Maui.

Traditionally, customary Māori fishing encompassed a range of activities, including

- Active protection and kaitiakitanga;
- Day-to-day papakāinga use, in which the fishing whānau was responsible for collecting seafood for the papakāinga (village) on a regular basis;
- Seafood collected on behalf of extended whanau living inland or elsewhere;
- Seafood collected as an exercise of manaakitanga (hospitality) for visitors and to support the mana of the marae;
- Seafood collected for hui or tangi, and
- Seafood collected and stored (pataka) for future use.

CUSTOMARY FISHING REGULATIONS

The government has an ongoing obligation under section 10 of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 to consult with tāngata whenua and develop policies to help recognise use and management practices of Māori in the exercise of their non-commercial fishing rights. The Fisheries (South Island Customary Fishing) Regulations 1999 (customary fishing regulations) enable the taking of fisheries resources for customary food gathering purposes from South Island fisheries.

Tāngata whenua can nominate Tāngata Tiaki/kaitiaki (guardians) to authorise customary take under the customary regulations. Within the BCO 7 management area, Tāngata Tiaki/kaitiaki have been appointed for the west coast of the South Island and in a small area known as Te Tai Tapu o Mohua, but not for the top of the South Island to date. The remaining area outside of this for customary fishing in the top of the South Island is managed under regulation 50 of the Fisheries (Amateur Fishing) Regulations 2013 (amateur fishing regulations), which can be authorised for the purpose of hui or tangi.

CUSTOMARY HARVEST

Reporting of customary harvest is a management tool for Tāngata Tiaki/kaitiaki to manage customary fisheries and also for MPI to manage each fishstock. Under the customary fishing regulations, it is mandatory for customary fishers to report actual catch to the authorising Tāngata Tiaki/kaitiaki, who reports back to MPI on a three-monthly basis.

Customary fishing in the top of the South Island is currently limited to a small area on the west coast namely Te Tai Tapu ki Mohua mataitai. Recording of customary harvest is limited to this area, meaning that MPI's records of customary take occurs only in this area for Te Tau Ihu.

Amateur regulations apply in the remainder area of Te Tau Ihu. Under the amateur fishing regulations, customary take is only required to be reported back to the permit authoriser if it is specified on the permit.

Records indicate that, over the past five years, an average of 15 permits per year have been issued for BCO 7, with an average of 501 fish per year being authorised. Reported actual take only amounts to an average of 88 fish per year.

MĀTAITAI RESERVES AND TAIĀPURE

Mātaitai Reserves can be established over traditional fishing grounds to recognise and provide for customary food gathering by Māori and the special relationship between tangata whenua and places of importance for customary food gathering. Taiāpure can be established over estuarine or coastal waters that have customarily been of special significance to an iwi or hapu as a source of food, or for spiritual or cultural reasons. Currently, there are no mātaitai in the Challenger (East) area. There is one taiāpure (Whakapuaka (Delaware Bay) Taiāpure) (see "*Spatial Management*" section below).

FISHERY COMPLIANCE

OVERVIEW

Fisheries management goals and objectives are dependent on high levels of compliance with the rules specified in legislation. Illegal harvest of blue cod can negatively impact on customary, recreational and commercial rights and interests, and undermine the fisheries management framework. Education and compliance services, including routine patrols, surveillance, audit and inspection, are essential to support the operation of fisheries management frameworks.

New Zealand's large coastline, the high number of accessible fishing grounds, the diversity of activity and the high value of species like blue cod make inshore finfish stocks susceptible to compliance risks. Reducing illegal fishing may require fisheries management or compliance intervention services, or a combination of these.

OFFENCES

Commercial

The commercial fisheries management regime is based on defined entities that are permitted and registered to allow them to access fisheries in New Zealand. Comprehensive reporting of commercial fishing activities supports the quota management regime and also enables catch to be balanced against Annual Catch Entitlement (ACE). MPI expects commercial fishing entities to be informed and operate in compliance with their legal obligations.

An evaluation of the key commercial offence types, opportunities to offend and their prevalence for the blue cod fishery are summarised in the following Table 13. In general, high

levels of compliance are observed in the commercial BCO 7 fishery. There have been some minor issues observed in relation to the take of undersized fish, but this generally makes up a small percentage of the overall commercial catch for BCO 7.

Table 13: Prevalence of key commercial offence types in the BCO 7 fishery.

Risk	Opportunity and incentives	Prevalence
Misreporting (quantity, area, weight)	Opportunities for misreporting arise from difficulties with compliance detecting offending – operators are highly mobile and there is a large coastline to monitor with limited resources. These conditions can provide fishers with opportunities to: • conceal their activity and information in order to stretch ACE holdings or to avoid deemed value charges (incentives for this behaviour increase as available ACE decreases); • sell their catch through unlicensed retailers in small localised markets. Fishers also have incentives to 'truck' fish when the catch limit in a neighbouring management area is under less pressure.	There are a small number of commercial fishers in the BCO 7 fishery, who demonstrate good compliance with reporting requirements. Trucking is not considered an issue, particularly given the large area BCO 7 encompasses. There are no ACE shortages in the fishery.
Dumping or high grading	Opportunities for this offence also arise from limited resources available to monitor fishing activities over a large coastline. Commercial arrangements between licensed fish receivers, fishing companies and fishing crews can encourage dumping.	BCO 7 is mainly a target pot fishery with very low mortality; therefore, the occurrences of dumping and highgrading are believed to be low. Blue cod are sometimes caught as bycatch in the trawl fishery, but MPI are unaware of issues in this fishery given any blue cod under the MLS must be returned to the sea.
Poaching and black market trade	Blue cod is a high value species, which can create an incentive to fish outside the system.	Poaching and black market trade is believed to be low for BCO 7.
Illegal gear, methods and area	Fishers can increase returns by maximising catch while minimising effort and cost by not complying with certain provisions.	BCO 7 is mainly a pot fishery and it is believed there is good compliance with gear, method and area provisions.
Non-harvesting offences	Relatively low level retail sector inspections allow offenders to conceal information from the recordkeeping requirements and to collude with fishers that misreport catch.	There are good compliance levels with administrative provisions. Retail level offences are believed to be low.

Recreational

Recreational fishers have unlicensed access to fisheries in New Zealand and there is no requirement to report the quantities of fish they catch. However, recreational fishing is subject to a number of regulatory restrictions as outlined in the 'Recreational Profile', page 27. Recreational fishers are expected to be aware of the fishing rules that apply to blue cod before they go fishing.

The high accessibility of fishing grounds for recreational fishers around Marlborough Sounds and limited resources available for surveillance, inspection and monitoring provide opportunities for recreational offences to occur. Table 14 provides a summary of the recreational offences that MPI compliance has detected in the whole of the BCO 7 fishery (including the Marlborough Sounds Area) from October 2009 to September 2014.

Table 14: Recreational offences in BCO 7 from October 2009 to September 2014.

Fishing year	In excess of limits	Less than prescribed size	Not in size limit	Unlawful state*	Taken in closed season	Total
2009/10	8	7	N/A	9	4	**28**
2010/11	20	16	61	24	8	**129**
2011/12	7	11	59	31	24	**132**
2012/13	14	4	54	8	8	**88**
2013/14	44	11	9	17	7	**88**

* means landing blue cod in prohibited area in unlawful state, or possessing blue cod not in a whole of gutted state in the Marlborough Sounds Area.

Offences that relate to the slot limit are most common. MPI compliance information indicates that slot limit offences fall into two main categories: 1) fishers do not know (or claim not to know) the rules; or 2) fishers fish outside the slot limit, albeit usually in a minor way by less than a centimeter. A main reason that MPI compliance is given for those caught with fish outside the slot limit is that they worry about mortality. While others are adamant they do not believe in the slot rule so flout it.

In most cases (except those who genuinely do not know rules), MPI considers that fishers perceive the risk of being inspected is low, particularly those who fish from a bach or in remote locations of the Sounds. MPI is aware that there are low levels of buy-in to the current suite of fishing rules amongst some recreational fishers, and as a consequence voluntary compliance levels with respect to some of the rules are considered to be low. This relates to the slot limit, but also the no filleting rule, excess bag limits and a lack of knowledge around the maximum of two fish at any one time, either at sea, in the bach or on SH1 going home (two fish is the maximum permitted anywhere, any time).

The offences outlined above have resulted in the following compliance action (Table 15). The numbers of warnings issued since the new rules were introduced in 2011 have increased, which relate mainly to non-compliance with the slot limit. Warnings are intended to increase a person's awareness of the rules; however, if there is knowledge, or previous warnings, an infringement is the likely outcome.

Table 15: Compliance actions resulting from recreational offences in BCO 7 from October 2009 to September 2014.

Fishing year	Discontinue	Infringement Notice	Prosecute	Warning	Total
2009/10	1	1	7	19	**28**
2010/11	5	33	5	86	**129**
2011/12	0	16	0	116	**132**
2012/13	6	36	0	46	**88**
2013/14	4	25	0	59	**88**

Customary

Customary fisheries management is based on self-governance through a customary permit regime (as described under "*Customary Profile*").

Accessible fishing grounds over a large coastline make it difficult for compliance to monitor catch against customary authorisation conditions. The prevalence of customary offences in the BCO 7 fishery are considered to be low and restricted to occasional and isolated incidents.

EFFECTIVE DETERRENT

MPI applies a Compliance Service Delivery Model that is graduated in its level of response to the activity concerned. This is known as the 'VADE' model and includes the following continuum:

- **V** – voluntary (complies and informed),
- **A** – assist (attempt to comply but uninformed),
- **D** – direct (propensity to offend, opportunistic),
- **E** – enforced (criminal intent and illegal activity).

Although 'VADE' is a graduated response model, depending on the case, MPI Compliance can go straight to "E". This relates to cases involving gross negligence or intent and is where MPI infringes or prosecutes. An example of this may be a fisher who launches alongside a ramp sign that clearly spells out the rules and he/she breaches that rule and does not have a measure on board.

INFORMATION AND EDUCATION

Education and information is an important step in the goal of maximising voluntary compliance. The key means with which to maximise compliance are to ensure stakeholders are aware of the purpose and implications of the specific legislative requirements (how these requirements support the stocks' sustainability and their access to the fisheries).

MPI places emphasis on providing information and involving stakeholders in the development of management measures and decision making for blue cod. Some of the activities that are currently in place for this purpose include engagement with the Blue Cod Management Group, Fishery Officer and Honorary Fishery Officer interactions with fishers, participation in community meetings, on-site signage at as many main fishing areas as possible, a free text '9889' service and MPI recreational fishing app for information about recreational fishing rules, the MPI website and rules brochures.

MPI considers that greater education of recreational fishers, not only from Nelson and Marlborough, is required for fishers from Christchurch and Wellington so that their awareness of the rules is raised. MPI considers that a great proportion of blue cod offenders come from outside the District. This is not to say locals do not offend, they do, but they are generally more familiar with the rules.

MONITORING AND SURVEILLANCE

MPI carries out monitoring and surveillance across the three sectors to ensure people operate in accordance with the legislative requirements governing their access to the fishery and their activity.

Commercial

MPI's monitoring services of the commercial sector are aimed at ensuring an optimal level of compliance by providing a system of checks and balances through all aspects of the supply chain from harvesting to retailers. The permitting process and regular monitoring allows for the clear identification of those with a commercial access right. Reporting and record-keeping requirements place a high level of responsibility on the commercial sector and are an essential part of MPI's monitoring efforts.

Records and catch returns are routinely furnished to report authorized commercial fishing and fishing-related activities and transactions. The auditing and analysis of these records and returns allows MPI to account for and track the movement of fish, and identify problems that require further analysis or discussion.

At sea surveillance and land based monitoring occurs randomly and within targeted operations. This type of monitoring is often used to combat poaching and black market trade. Additionally, surface and aerial surveillance can also detect potential offending that cannot be detected from other sources of information. This is supplemented with reports from the public (i.e. through the 0800 4 POACHER line). All of this information is then analysed to inform the compliance responses needed.

Recreational

MPI compliance activities for the recreational sector include raising awareness of the relevant rules among recreational users, land and sea patrols, and catch inspections.

To maximise compliance within the recreational sector, Fishery Officers carry out monitoring of fishing area restrictions, such as seasonal or area closures. During these patrols Fishery Officers also inspect the species, sizes and quantities of fish caught, and the fishing gear used. Fishery Officers inspections may take place on board vessels, at boat ramps, or along beaches and coasts. Surface surveillance is an important element in the detection of potential offences. There are three Fishery Officers based in Blenheim and six based in Nelson who routinely carry out recreational inspections.

Figure 18 provides a summary of the recreational inspections carried out in the Marlborough Sounds Area from the 2008-09 to 2013-14 October fishing year. It is assumed that the majority of recreational inspections involve blue cod. Over the last four years, the total number of recreational inspections has ranged between 1110 and 1400 inspections. The overall compliance rate during this period has ranged between 93.0% and 94.6%.

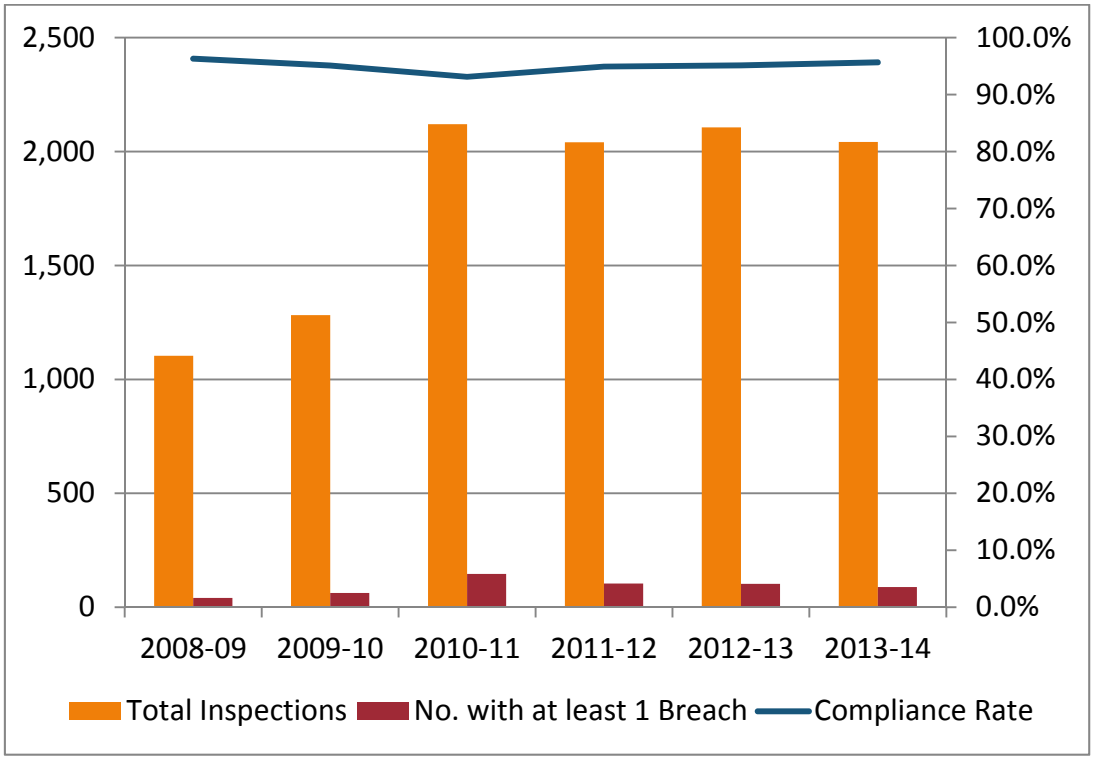


Figure 18: Summary of recreational inspections carried out by MPI Compliance for the Marlborough Sounds Area from the 2008-09 to 2013-14 fishing year.

In addition to Fishery Officers, Honorary Fishery Officers help increase the visibility of MPI amongst recreational fishers while also providing monitoring services and raising awareness about the relevant rules. There are eight Honorary Fishery Officers in Blenheim and ten in Nelson who commonly work the Marlborough Sounds Area.

Customary

MPI supports and protects the customary permit regime through activities, which include checking the validity of authorisations and ensuring that fishers are acting in accordance with the conditions outlined in them. Monitoring of customary fishing is generally done in conjunction with recreational efforts. Inspections of fish taken from the taiāpure area are also carried out by Fishery Officers to ensure compliance with the regulations.

MPI compliance activities of the customary sector also include support to those involved in the issue of customary fishing authorisations, initiatives to raise awareness, patrols, and inspections

DETERRENCE

MPI also uses strong deterrents to promote its goal of maximising voluntary compliance.

MPI carries out more specific and focused monitoring and surveillance to support investigations of potential or detected offending. These investigations, along with other enforcement activities, can lead to the prosecution of alleged offenders and feed back into targeted monitoring.

When found in possession of three times or above their daily bag limit, recreational offenders are considered to be operating more as commercial fishers and hence commercial offences apply. Minor breaches, on the other hand, can result in an infringement notice or a written warning that is also intended to improve the fisher's awareness of regulations. Although this is generally the case, the blue cod recreational regulations are unique in that any offending relating to the no filleting rule, the slot limit, and excess bag limits is deemed a serious non-commercial offence. Although MPI can infringe, if the circumstances warrant it a fisher could be prosecuted and the penalty ramps up to $20,000. For example, a breach of the slot limit, or three blue cod in excess of a limit of two can go to prosecution as a serious non-commercial offence.

Convictions can result in substantial financial penalties that reflect the difficulties associated with the detection of breaches. The severity of these penalties depends, in part, on the gravity of the offence in terms of its impact on the fisheries management framework, the rights of other users and the fishstocks.

Penalty levels will differ depending on the sector and the severity of the breach. These include forfeiture of property such as boats, gear, or any related item believed to have been used in a breach of legislation; forfeiture of quota; imprisonment; forfeiture of catch; and monetary fines. Recreational penalties for blue cod include an infringement of $500 (noting more than one can be issued for multiple offences e.g. excess and unlawful state etc.) and up to $20,000 if proceeded against summarily. Commercial penalties depend on the actual charge, but can range to from $100,000 to $250,000 and include forfeiture.

SPATIAL MANAGEMENT

In addition to the customary spatial management tools (mātaitai and taiāpure) described in the 'Customary Profile' section above, there are also three marine reserves in the Challenger (East) area.

MARINE RESERVES

Marine reserves are administered by the Department of Conservation (DOC). The three marine reserves within Challenger-East are: Tonga Island Marine Reserve and Horoirangi Marine Reserve, which fall outside the Marlborough Sounds Area, and the Long Island - Kokomohua Marine Reserve, which falls within the Marlborough Sounds Area (Figure 19). There is a complete prohibition on take of any kind in marine reserves.

Marine reserves around New Zealand have been shown to positively affect blue cod populations, including Tonga Island Marine Reserve and Long Island-Kokomohua Marine Reserve.[27] In the Long Island-Kokomohua Marine Reserve, blue cod increased in abundance in the years following implementation of the reserve.[28] Additionally, blue cod greater than 33 cm represented 35% of the population inside the marine reserve compared with < 1 % of the population at control sites outside of the reserve in 2000, 7 years after the reserve was implemented[28].

The most recent report published by the Department of Conservation for the Long Island-Kokomohua Marine Reserve[29] indicates that size and abundance of blue cod have been significantly higher in marine reserve sites than in control sites outside the marine reserve since 1995. We do not however have any data on the loading capacity for marine reserves and whether blue cod transit to other areas if the availability of food and habitat become a limiting factor inside the current marine reserves.

An often referenced benefit of marine reserves for fishers is the 'spillover' effect resulting from movement of fish from inside the marine reserve into outside areas where they can be taken by fishers. Cole *et al*. (2000) studied spillover in Long Island-Kokomohua Marine Reserve[30] and found no fish tagged within the marine reserve were observed outside the reserve. The authors also modeled potential dispersal from the reserve. They concluded overall that small marine reserves on contiguous reef may result in larger fish from inside the reserve becoming available to fishers outside the reserve. However, it was not clear that this occurred around Long Island, as it would require blue cod to migrate away from reef habitat to get to non-reserve reef sites on the adjacent coast.

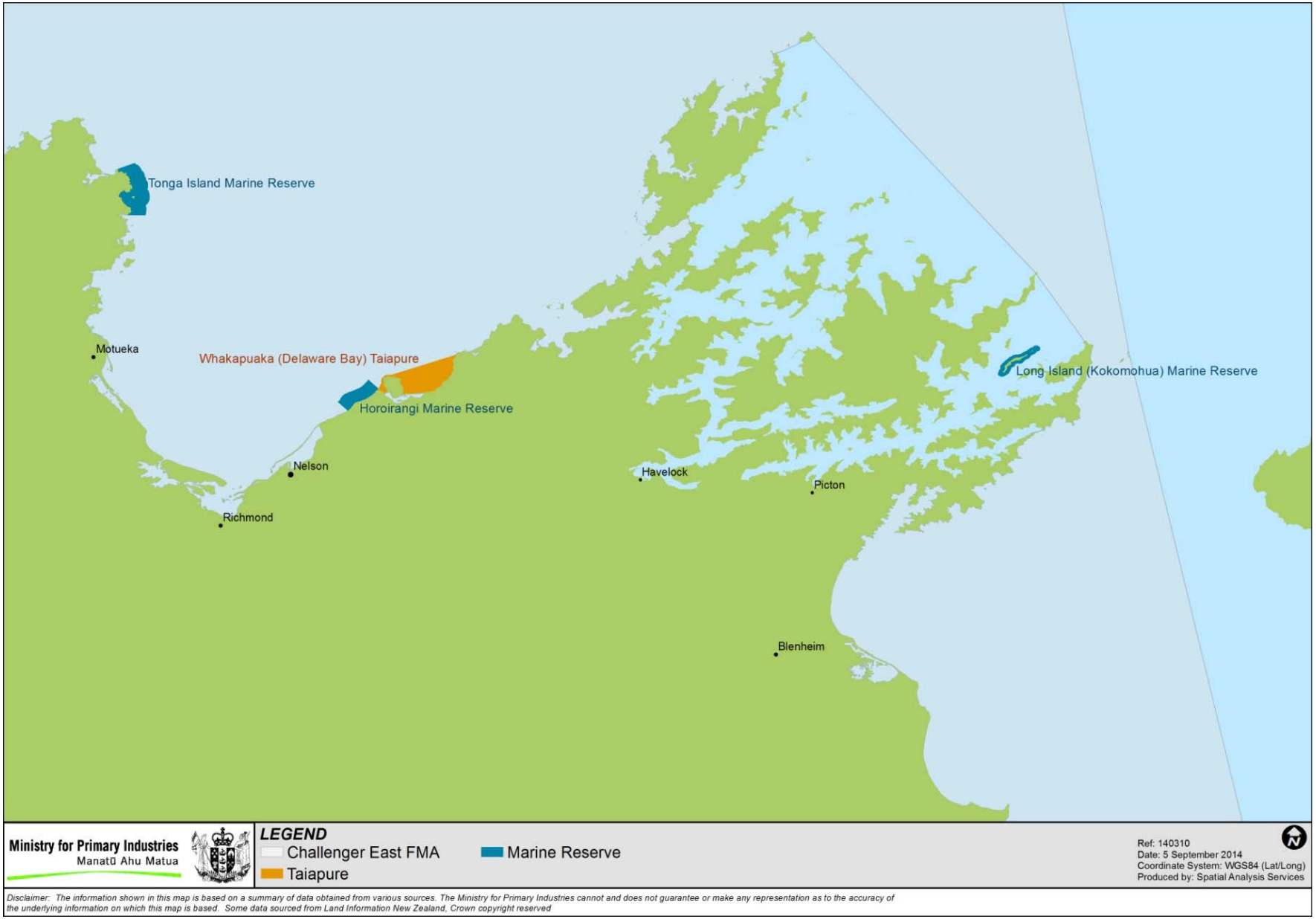


Figure 19: Taiāpure and marine reserves in Challenger (East) and the Marlborough Sounds Areas.

OTHER IMPACTS

Blue cod populations may be impacted by more than just targeted fishing pressure. Sedimentation, pollution, invasive species, marine farms, and other fishing activities can all impact the coastal and marine environment throughout the Challenger (East) area.

SEDIMENTATION AND POLLUTION

Deforestation or land clearing, and the subsequent increase in sedimentation, can change the composition of the seabed and associated flora and fauna.[31] Morrison *et al*. argue that sedimentation is the most important land-based stressor in marine ecosystems around New Zealand.[32] Sedimentation can lead to the loss of habitat forming species that may provide a number of important services to finfish species such as foraging grounds, nursery grounds, and refuge.[32, 33] There is also evidence that sedimentation can have direct detrimental effects on some finfish species (specifically snapper).[32]

The effects of sedimentation on blue cod populations in and around the Marlborough Sounds are not clear. The area is known to have a strong history of forestry and related increased sedimentation into the marine environment[31] and it is possible that these factors impact on blue cod populations.

Pollution can also have a wide variety of impacts, depending on the pollutant entering the water. Impacts range from promoting plankton blooms to resulting in the direct mortality of marine organisms.

Heavy metals, herbicides, pesticides, pathogens, hydrocarbons, and other potentially dangerous substances can be taken up by filter feeders and transferred to higher levels of the food chain through predation, leading to accumulated toxin levels in the tissues of higher order predators. The concentration of heavy metals and organic chemicals is relatively low in most New Zealand aquatic environments[33]. While contaminants are detectable in tissues of

coastal fish around the country including blue cod,[34] MPI has no information regarding the effects of pollution on the abundance of blue cod in and around the Marlborough Sounds.

INVASIVE SPECIES

Invasive species have the potential to alter the make-up and distribution of marine communities and interfere with established food chains through various competition interactions, including predation and competition for food, space, or other resources. A number of invasive species are well established in the Marlborough Sounds Area, including cord grass, pacific oyster, Japanese kelp, club tunicates, and the ascidian *Didemnum vexillum*.[31] However, again it is not clear what impacts, if any, these species have on blue cod populations.

MARINE FARMS

A number of marine farms exist in Challenger (East) area (Figure 20). Marine farms can have a wide range of impacts. Mussels, pacific oyster, and salmon are all farmed in the Marlborough Sounds. Marine farms may alter the nearby seafloor environment, create anaerobic underlying sediments, alter benthic or planktonic community composition, and reduce water movement.[31] A large body of international literature suggests that increased sedimentation is likely to be the main impact from farming filter-feeding species such as mussels, and this is also the case in New Zealand (see Sedimentation and Pollution above)[36]

Marine farms may also affect seabird populations either negatively through increased mortality due to entanglement, collision, and ingestion of foreign objects, or positively by providing roost sites closer to foraging areas. These effects on seabirds may alter predation pressure on blue cod, although it is unclear if this would be positive or negative.[32]

Gibbs (2004) examined the impacts of mussel farming on blue cod in the Marlborough Sounds.[35] He found that the presence of mussel farms over soft-sediment habitat neither significantly attracted nor displaced blue cod over the summer months (study was not conducted during other seasons). Modelling suggested that, at the magnitude of farming present in 2004, the farms would add less than 10% additional mortality of blue cod eggs and larvae. The study concluded that this effect on recruitment was likely to be weak compared to the direct effect of harvesting adults.

Ten years have lapsed since this study was undertaken, and marine farms have expanded during this time from roughly 2447 hectares in 2004 to 4414 hectares in 2014 (according to MPI records). A literature review produced in 2013 by MPI examined the ecological effects of aquaculture.[36] While not specific to the Challenger (East) area, the overview of the literature review concludes that it is unlikely that the current level of mussel farming in New Zealand is having significant flow-on effects on the sustainability of wild fish populations.[37] However, the review also highlights that there are a number of information gaps that should be addressed through further research.

Other species, such as salmon and oyster, are also farmed in the Marlborough Sounds Area. The 2013 literature review highlights that the effects of these types of farms on blue cod populations are largely unknown, as are the cumulative impacts on blue cod from having multiple different marine farms in one area.[36] The potential effects on blue cod may be a mix of either positive or negative impacts, and further studies are required to determine the nature of any effects of marine farming in the Challenger (East) area.

OTHER FISHING IMPACTS

Anecdotal information suggests that changes in blue cod abundance may be related to changes in benthic habitats (those habitats that make up the seafloor) due to bottom impacting fishing gear.

Benthic habitats are known to provide shelter and refuge for juvenile fish and other animals, as well as a potential food source for a variety of animals. Bottom fishing methods can impact on benthic habitats in different ways, depending on the gear that is used. Methods include commercial bottom trawl or commercial and recreational dredging. Reported impacts in New Zealand include decreases in the density and diversity of benthic communities and, especially, the density of large, structure-forming epifauna and long-lived organisms along gradients of increasing fishing intensity.[33] Animals like sponges and corals that provide structure habitat for other animals are noted as being particularly susceptible to disturbance by mobile bottom fishing methods, especially on hard seabeds.[33] Effects have also been noted in the sandy or silty sedimentary systems usually considered to be most resistant to disturbance. Research into potential recovery time from such impacts is ongoing.[33] The direct effects of bottom fishing methods on blue cod populations in the Marlborough Sounds are unknown.

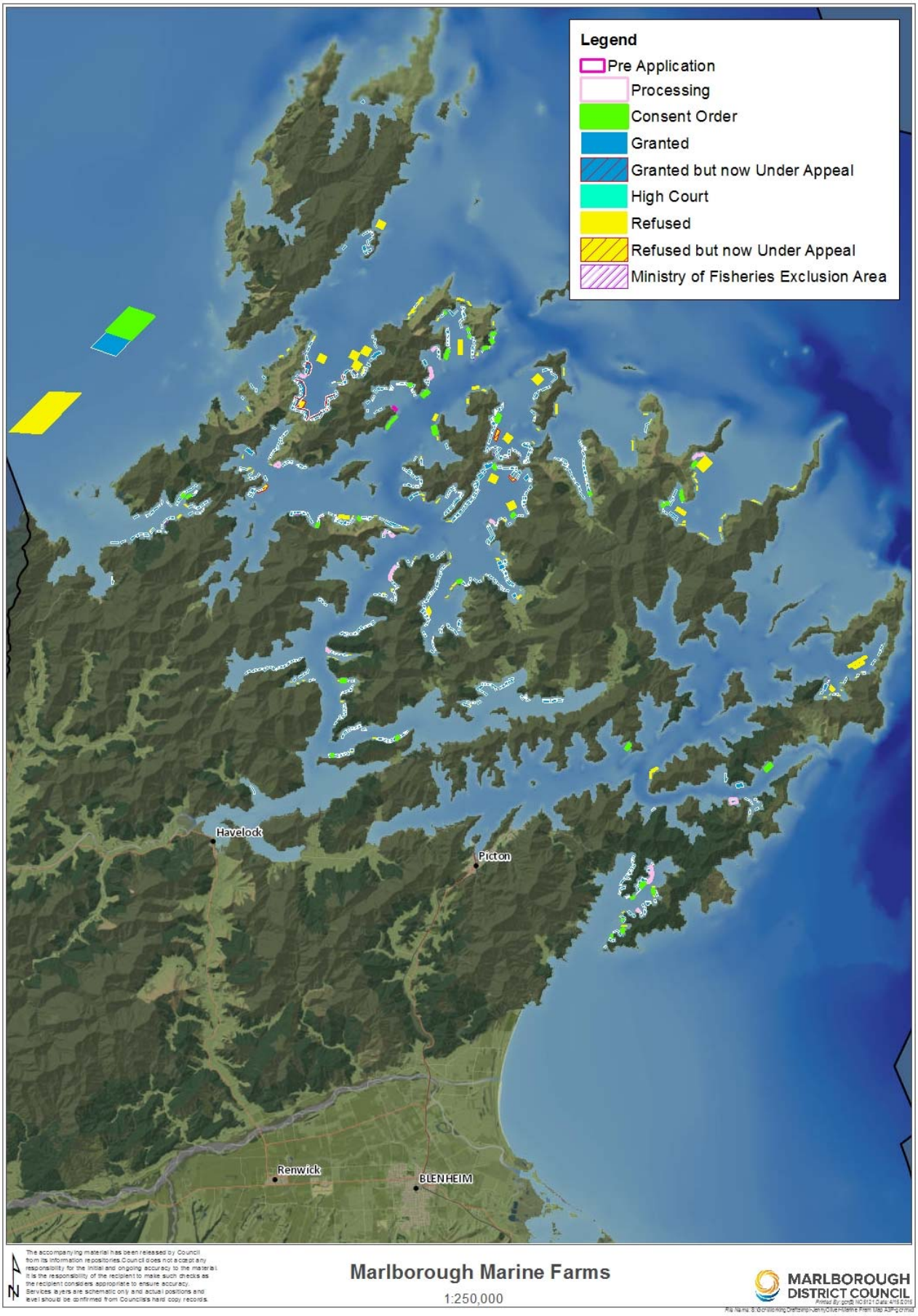
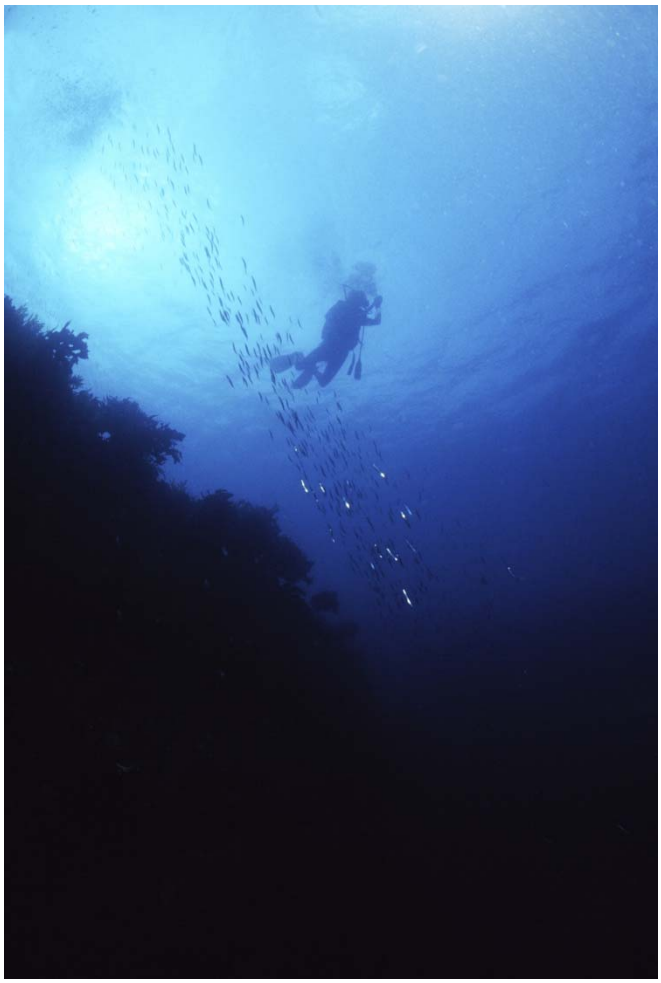


Figure 20: Marine farms in the Marlborough Sounds Area.

INTRINSIC VALUE



There is value attached to the non-extractive use and non-use of the environment. Non-extractive use refers to activities such as diving, snorkelling, or photography that 'use' environmental resources without extracting them, and therefore rely on the preservation of environmental attributes. Non-use implies that there is intrinsic environmental value obtained from not using a resource in any way, leaving it to contribute undisturbed in its role within the ecosystem.

There is very little available information regarding the value of non-extractive use of blue cod. It is likely that blue cod is valued in the diving community through non-extractive use due to its presence in popular diving locations. In the Marlborough Sounds Area, blue cod are advertised as a fun contribution to the dive experience in the Long Island-Kokomohua Marine Reserve – "this reserve is well-known to divers for its large friendly blue cod, who may come up to you and nibble a finger". Ninedives dive shop in Marlborough advertises the opportunity for divers to "make some new underwater friends with the blue cod, a unique New Zealand species of fish". While there are no available studies estimating the economic non-extractive value of blue cod in the Challenger (East) area, these references suggest that users place value on this species.

The intrinsic environmental value of blue cod, or non-use value, refers generally to the value obtained from allowing blue cod to remain in their natural environment and continue in their role in the ecosystem. Blue cod are likely to contribute to the ecosystem as both a predator and prey. As outlined above in the "*Biology"* section, blue cod consume a fairly generalist diet that includes a variety of small crustaceans, molluscs (including octopus), fish (including pilchard and sprats), polychaetes, and echinoderms.[11, 12, 13] As a prey species, blue cod have been detected in the guts of seabirds (yellow-eyed penguins[38, 39] and shags[40]), marine mammals (fur seals[41], sea lions[42], and dolphins[43]), and fish (bream, groper, barracouta, and blue cod)[44].

Blue cod are also likely to contribute to ecosystem functioning through other competitive interactions, but there is a paucity of information regarding other potential functions. The effect on the ecosystem from fishing for blue cod is not clear, and no estimates of the non-use value of blue cod are available.

ANNEX ONE

Kaikoura-Motunau Recreational Survey – October 2012 to September 2013
A boat ramp survey was carried out to achieve comprehensive coverage of private vessel recreational fishing in the Kaikoura and Motunau area for key three species: blue cod, sea perch and rock lobster

During interviews, surveyors asked the following question: "You may be aware that the Blue Cod fishery in the Marlborough Sounds is closed to recreational fishing. Was your trip today:

1. One that would be here to [Kaikoura/Motunau] regardless of that,

2. One that would have been to Marlborough Sounds, if the blue cod fishery were open,

3. Would have gone to some other fishery today, but not Marlborough Sounds, e.g., due to weather or road closures

4. Would have gone to Marlborough Sounds despite blue cod closure but road conditions, boat, passengers, weather or other conditions prevented it"

1905 fishers confirmed option 1. Only 18 fishers responded with option 2, and four fishers responded with option 4.

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