2014

LING

THE SUSTAINABLE MANAGEMENT OF NEW ZEALAND LING

DEEPWATER GROUP LTD
PUBLICATION SERIES 2014/02

deepwater group

DEEPWATER GROUP LTD

A non-profit organisation delivering the vision of New Zealand's deepwater quota owners to be recognised as having the best managed deepwater fisheries in the world, working closely with scientists and in partnership with the Ministry for Primary Industries.

ACKNOWLEDGEMENTS

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DISCLAIMER

DWG has made all reasonable efforts to ensure that information in this publication is accurate and correct. However, DWG does not accept any liability for any errors or omissions of content or fact.

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Introduction

OUR VISION: To be recognised as the best managed deepwater fisheries in the world.

New Zealand seafood products have a strong reputation for consistent high quality and for being harvested using environmentally sustainable practices. Consumers wanting a safe and sustainable food source need look no further than the New Zealand deepwater species ling.

Ling is a primeval looking fish harvested by trawl and longline by both the inshore (from New Zealand's coastline out to 12 NM) and deepwater (from 12 NM to 200 NM) fleet – mainly from New Zealand's southern and sub-Antarctic waters. Ling is both targeted and caught as bycatch in the hoki fisheries.

The ling fisheries overlap with the hoki and hake fisheries. As such, they are often considered and managed as a 'complex' due to the influence they have on each other and the additive effects that may result.

New Zealand's seafood industry, including quota owners in the ling fisheries, is committed to ensuring sustainable utilisation. This is delivered through the business ethos that sound environmental practices make good business sense.

Our role is to supply consumers with safe, nutritious, appetising and affordable seafood. The combined pressures of human population growth, increasing energy costs and the need to ensure sustainable production mean we need to find ways to produce more seafood, with more certainty, while minimising any adverse environmental effects. By 2030 the world demand for food will double, which will need to be met while still maintaining the environmental integrity that supports this production sustainably.[i]

Our commitment to sustainable utilisation includes the use of independent third party assessments to verify that our management practices reflect international best practice. In 2014 New Zealand's ling fisheries were certified sustainable against the very high standards required by the Marine Stewardship Council (MSC) programme for sustainable seafood.

Deepwater Group Ltd (DWG) is an alliance of quota owners in New Zealand's deepwater fisheries. DWG represents the interests of shareholders who collectively own 87% of the New Zealand ling quota.

This report highlights how the ling fisheries are performing in terms of:

- Stock sustainability
- Environmental effects
- Fisheries management.

WHITE FRONTED TERN AND CHICK.[XXVIII]

Profile

Ling is a primeval looking fish harvested by trawl and longline by both the inshore and deepwater fleet.

Common Name

Ling

Scientific Name

Genypterus blacodes

Ministry Code

LIN

Fishing Method

Bottom trawl, mid-water trawl and longline.

Distribution

Widely distributed throughout New Zealand waters, particularly south of 40 °S, from depths of 200 m to 800 m.

Quick Facts

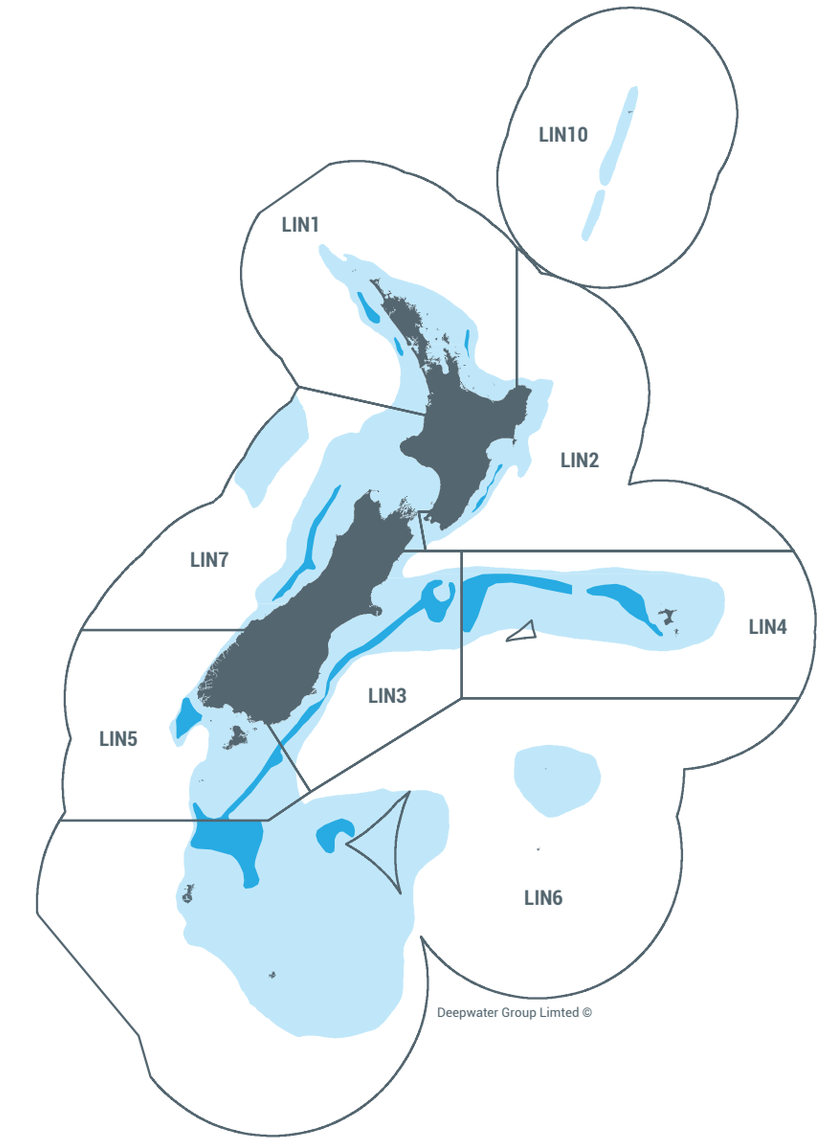
Ling have firm flesh that can be cooked in cubes or used for sashimi.

Ling start breeding at different ages in different parts of New Zealand and live to around 30 years.

Ling live and feed on the seabed eating crustaceans, like scampi, as well as fish.

The New Zealand ling fisheries are certified sustainable against the internationally-recognised Marine Stewardship Council standards for sustainable seafood.

FIGURE 1
LING KNOWN DISTRIBUTION RANGE AND MAIN FISHING GROUNDS[1]



1. 'Known distribution range' provides an indication of where ling are likely to be found based on all known records of ling collected from research and commercial activities. They may be found elsewhere. 'Main fishing grounds' is based on the trawl footprint for the last ten years, only a fraction of this is trawled annually (see Habitats and Ecosystems).

Performance Summary

In 2014 New Zealand ling were certified sustainable against the Marine Stewardship Council standard.

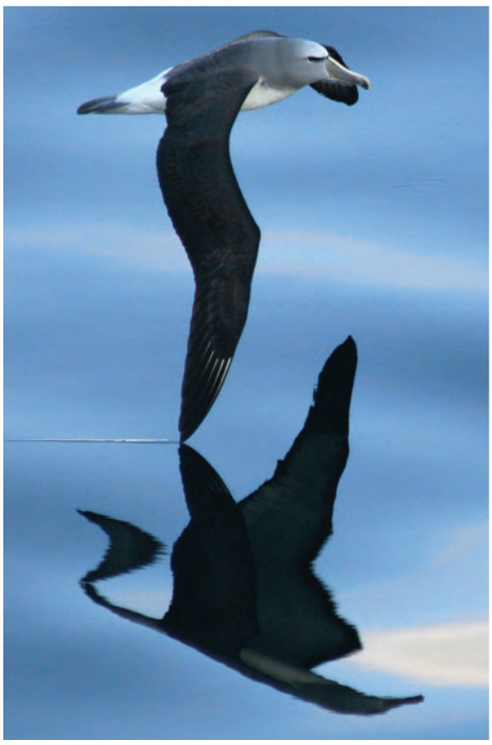
STOCK SUSTAINABILITY

Stock assessments for two ling stocks (LIN7WC, west coast South Island; LIN2/7CK, Cook Strait) were updated in 2013, although the LIN2/7CK assessment was rejected.

Assessments for other stocks were updated in 2006 (LIN6B, Bounty Plateau) or 2011 (LIN3&4, Chatham Rise; LIN5&6, Sub-Antarctic).

All stocks are healthy and are above the management target of 40%B_0.

Stocks LIN3&4 (Chatham Rise) and LIN5&6 (Sub-Antarctic) are scheduled for reassessment in 2015.



EFFECTIVE MANAGEMENT

Ling was introduced into the Quota Management System in 1986.

A formal partnership exists between the Ministry for Primary Industries and DWG to aid ongoing collaboration and cooperation.

Regular stock assessment models lead to regular catch limit reviews based on the best available science.

Over 90% of deepwater vessels undertook environmental training in 2013.

Government observers independently audited 10% and 17% of ling longline and trawl effort respectively in 2012.

A new National Plan of Action for Seabirds was published in 2013 and a new National Plan of Action for Sharks was published in 2014, these set out approaches to reduce seabird and shark interactions over the next five years.

THIRD-PARTY CERTIFICATION

The New Zealand ling fisheries are certified sustainable against the internationally-recognised Marine Stewardship Council (MSC) standards for sustainable seafood.

Three conditions (or areas requiring improvement) have been imposed by the assessment body, Intertek Fisheries Certification (IFC) requiring the provision of more information with respect to seabird interactions with ling longline fisheries

MANAGING ENVIRONMENTAL EFFECTS

All marine mammals and seabirds, four coral groups, and many shark species are protected by law in New Zealand waters.

It is illegal to intentionally harm or kill any protected species, and all accidental captures must be reported to the Department of Conservation and Ministry for Primary Industries.

The main environmental interactions are with seabirds and fur seals.

To reduce interactions we use mitigation devices to deter animals, provide operational procedures which include special training for crew on the risks, and monitor, report and audit each vessels' performance.

These management measures have proven successful with reduced fur seal interactions in the trawl fisheries and only one observed capture since 2003 in the longline fisheries.

Seabird interactions have proven more challenging and work is ongoing to minimise these interactions.

The ling fisheries are not known to interact with any other marine mammals, including sea lions, dolphins or whales.

Stock Sustainability

Ling stocks are healthy and productive with each of these well above management targets that have been set by the government.

Stock Structure

Research indicates there are five biologically distinct ling populations in New Zealand, known as 'stocks'. These are Chatham Rise (LIN3 and 4), Sub-Antarctic (LIN5 and part of LIN6), Bounty Plateau (part of LIN6), west coast South Island (part of LIN7), and Cook Strait (parts of both LIN2 and LIN7). We manage the fisheries according to these stocks and their status.

It is important to note that the biological stocks do not align with the Quota Management Areas (QMAs, i.e. the administrative boundaries as seen in Figure 2).

Scientific research and assessments are carried out regularly based on the biological stock, and commercial catches are managed within a Total Allowable Commercial Catch (TACC)[2] for each QMA. TACCs are set by the Minister for Primary Industries based on the best available scientific information.

Stock Status

The current stock sizes for all of the ling stocks are estimated to be above 50% B_0[3] , demonstrating that they are being maintained at or above the management target (Table 1).[ii]

Stock Management

When recruitment levels decline, stock sizes decline. The management response to this is to reduce catch levels.

There are a number of management measures available to ensure stock sizes remain healthy and productive these are outlined below.

Harvest Strategy

All fish populations, even those that aren't fished, naturally fluctuate in size. These fluctuations may be driven by variations in recruitment levels (i.e. the number of young fish entering the fishery each year) which are caused by changing environmental factors, such as the availability of plankton as food during the larval stage.

When these populations or 'stocks' decline in size, the management response is to reduce catch levels or what are known as TACCs. Conversely, when stock sizes increase TACCs are increased.

In New Zealand, this management framework is underpinned by the Fisheries Act 1996 which requires stocks managed under the Quota Management System (QMS) to be

"maintained at or above the biomass that can produce the Maximum Sustainable Yield (MSY)"

(i.e. B_{MSY}[5]). MSY is the largest average long-term annual catch that can be taken from a stock under prevailing ecological and environmental conditions.

In 2008, this management framework was further defined through the introduction of the Harvest Strategy Standard for New Zealand Fisheries (HSS).[iii] The HSS is a

TABLE 1
CURRENT STOCK SIZE AND STATUS[ii]

STOCK	YEAR OF ASSESSMENT	HARD LIMIT (%B_0)	SOFT LIMIT (%B_0)	TARGET (%B_0)	VIRGIN BIOMASS (B_0) (t)	CURRENT BIOMASS (%B_0)
Chatham Rise (LIN3&4)	2011	10	20	40	127,400	55
Sub-Antarctic (LIN5&6, excl Bounty Plateau)	2011	10	20	40	395,660	89.2
Bounty Plateau (LIN6B)	2006	10	20	40	13,570	61
West Coast South Is. (LIN7WC)	2013	10	20	40	99,200	71
Cook Strait (LIN2&7CK)	2010[4]	10	20	40	8,070	54

2. The TACC is the amount of fish commercial fishermen are allowed to catch of a particular stock in a given year which has been set by the Minister.
3. B_0 is the estimated biomass that would exist in the absence of fishing, also known as virgin biomass.
4. Note: The 2010 stock assessment for Cook Strait (LIN2&7CK) was rejected by the Deepwater Fisheries Assessment Working Group.
5. B_{MSY} is the estimated biomass that will support the Maximum Sustainable Yield (MSY).

government policy that establishes best practice in relation to the setting of targets and limits for QMS fish stocks.

The HSS provides a technical elaboration of the MSY-related requirements of the Act. It also adds the concepts of two minimum biomass levels: a soft limit below which a formal time constrained rebuilding plan is required, and a hard limit, below which fisheries should be considered for closure.

Management Reference Points

Management reference points have been established for the ling fisheries according to the HSS (Table 2).[iv] Managers use these to respond to different stock statuses and to ensure stocks are maintained at optimum sustainable levels.

Stock Assessments

Stock assessments for ling fisheries are completed based on biological stock, rather than QMA. They are undertaken regularly for each stock to estimate how they are performing against the management reference points.

Stock assessment models use a combination of biological data (e.g. growth rates and recruitment levels), biomass estimates (from research surveys), and fisheries data (from commercial catches and observer records) to estimate current stock size. Not only do the models look at the current stock size, but they also look at what might happen to stock size in the future under different catch regimes.

Assessment results are presented to the Ministry for Primary Industries' (MPI) open scientific forum, the Deepwater Fisheries Assessment Working Group (DWFAWG), for peer review. The DWFAWG is attended by MPI scientists, research providers, independent scientists, fisheries managers, and representatives from

FIGURE 2
LING BIOLOGICAL STOCKS AND QUOTA MANAGEMENT AREAS

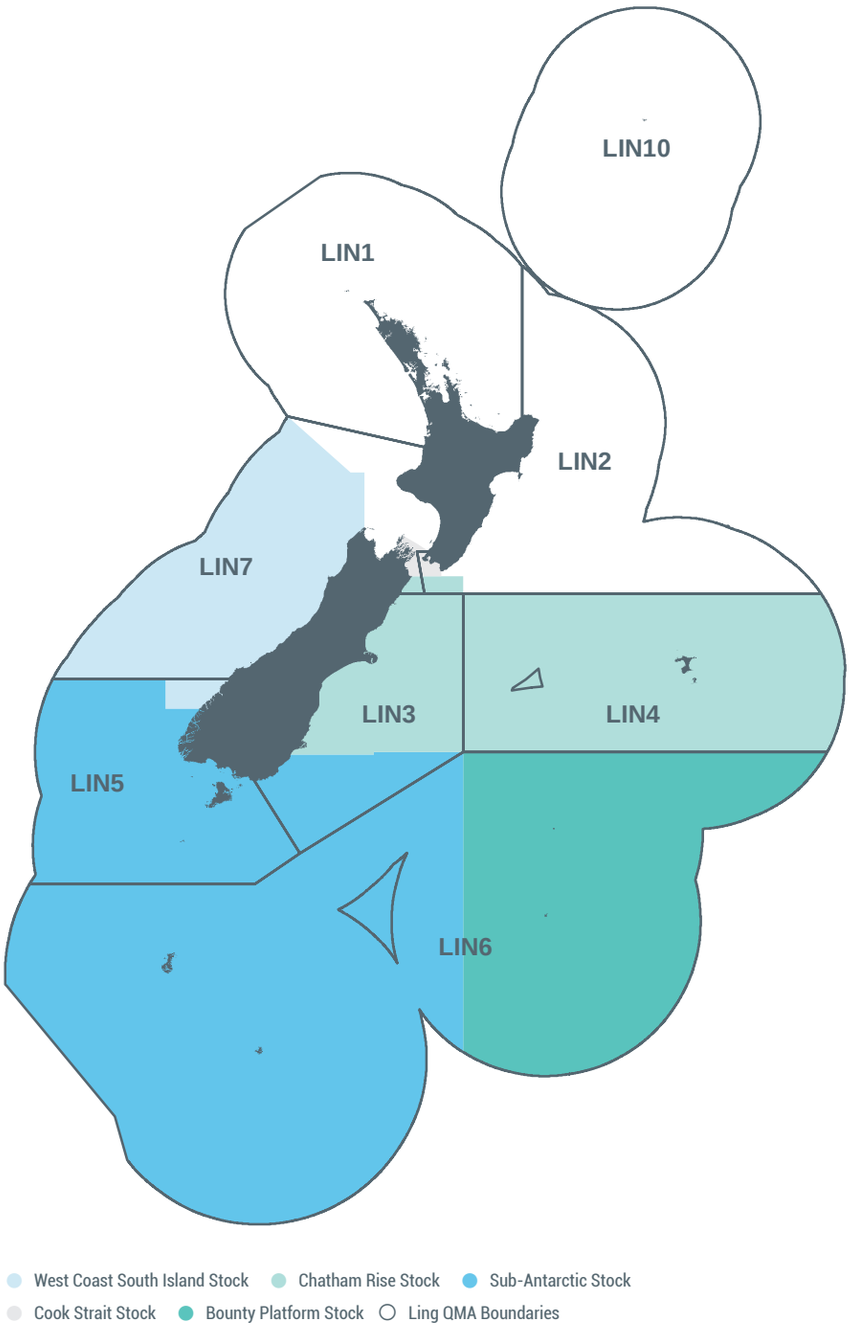


TABLE 2
LING FISHERIES HARVEST STRATEGY[iv]

REFERENCE POINT	MANAGEMENT RESPONSE
Management Target of 40% B_0	Stocks should fluctuate around this target. TACC changes and agreed catch limits for each of the stocks are used to move stocks toward or above this target.
Soft Limit of 20% B_0	If the size of any stock is below this limit, a formal time-constrained rebuilding plan will be implemented to increase the stock size back toward the management target.
Hard Limit of 10% B_0	If the size of any stock is below this limit, fisheries on this stock will be considered for closure.
Rebuild Strategy	The rebuild strategy requires a catch limit to be set to enable the stock to rebuild in size to the target range in not more than twice the time period it would take in the absence of fishing.
Harvest Control Rules	Management actions are determined after consideration of the current stock assessment, along with the results of five-year forecasts of stock sizes under a range of catch assumptions, and guided by the management reference points.

industry and environmental NGOs. High standards are held and any research information must meet (or exceed) MPI's Research and Science Information Standard for New Zealand Fisheries prior to being accepted as being of sufficient quality to inform management decisions.[v]

Once accepted by the DWFAWG, stock assessments are further peer reviewed through a scientific plenary process and are reported in the annual Fisheries Assessment Plenary Report[ii] (publically available on MPI's website).[vi] Stock assessments have been accepted for all five biological stocks in recent years, as summarised in Table 1. Specific details on the methodology and results from each of these assessments can be found in the Plenary report.[ii]

Assessment results are used by management to inform decisions – such as increasing or decreasing the TACC.

A History of the Fisheries' Management

New Zealand's ling fisheries have been managed under the QMS since its introduction in 1986 and TACCs for each QMA have been in place since that time.

Since 2000, there has been a declining trend in catches taken by longline vessels in most areas. This has been offset to some extent by an increase in trawl landings.

In 2011-12, landings from LIN2, LIN3, LIN4 and LIN6 were significantly undercaught relative to their TACCs by 49%, 37%, 45% and 76%, respectively. LIN5 and LIN7 were slightly overcaught (by 2% and 10%, respectively).

In 2000 the TACCs for LIN3 and LIN4 were reduced to 2,060 t and 4,200 t, respectively. In 2004 the TACCs for LIN5 and LIN6 were increased by about 20% to 3,595 t and 8,505 t, respectively. In 2009, the TACC for LIN7 was increased to 2,474 t. All other TACC increases since 1986 are the result of quota appeals.

With the exception of the Bounty Platform fishery, ling fisheries overlap both spatially and temporally with the hoki fisheries and many vessels that are engaged in the hoki fisheries take ling as bycatch. This has meant that management measures implemented in the hoki fisheries have also impacted on the ling fisheries. During the hoki quota reductions from 2001 to 2004, ling catches declined proportionately as less fishing for hoki took place. Ling was not sufficiently profitable to replace hoki as a major target species or in some areas was not able to be caught without significant hoki bycatch.

Fishing effort for ling also depends on export price, as indicated by a brief increase in target fishing for ling in 2007-08 when export prices rose.

The historical catches for ling are shown in relation to biological stock and by fishing method in Figures 3-7. TACC changes have been made in response to changes in stock biomass as seen in Figures 8-12.

FIGURE 3
CATCHES FOR CHATHAM RISE STOCK (LIN3&4)[II]

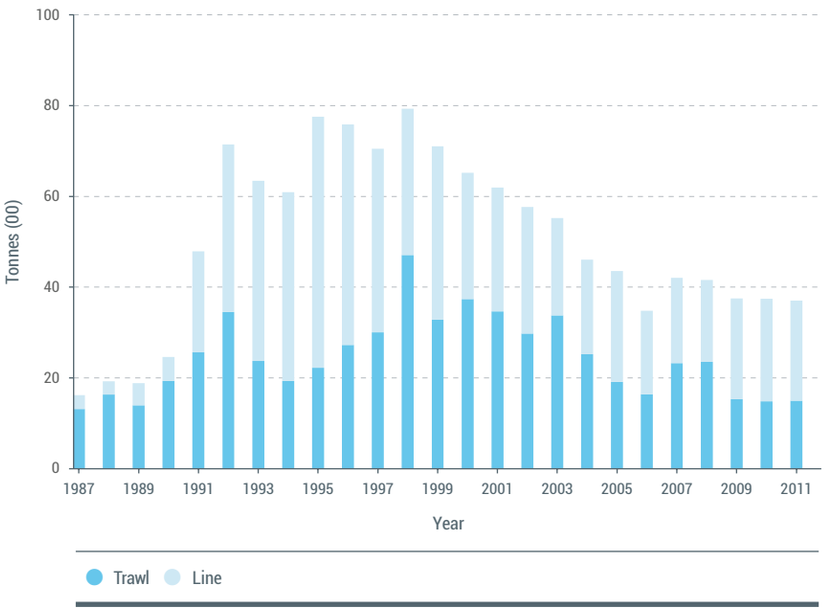


FIGURE 4
CATCHES FOR BOUNTY PLATEAU STOCK (LIN5&6)[II]

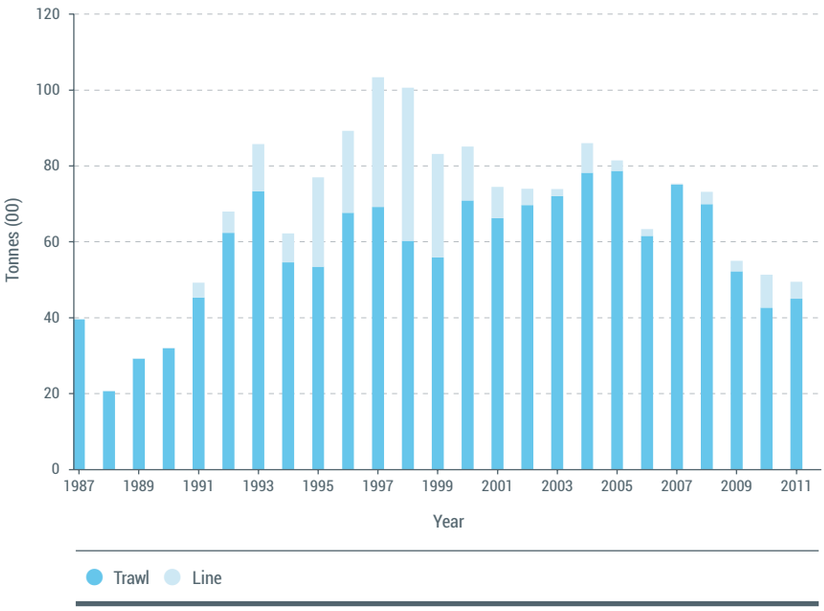


FIGURE 5
CATCHES FOR BOUNTY PLATFORM (LIN6B)[11]

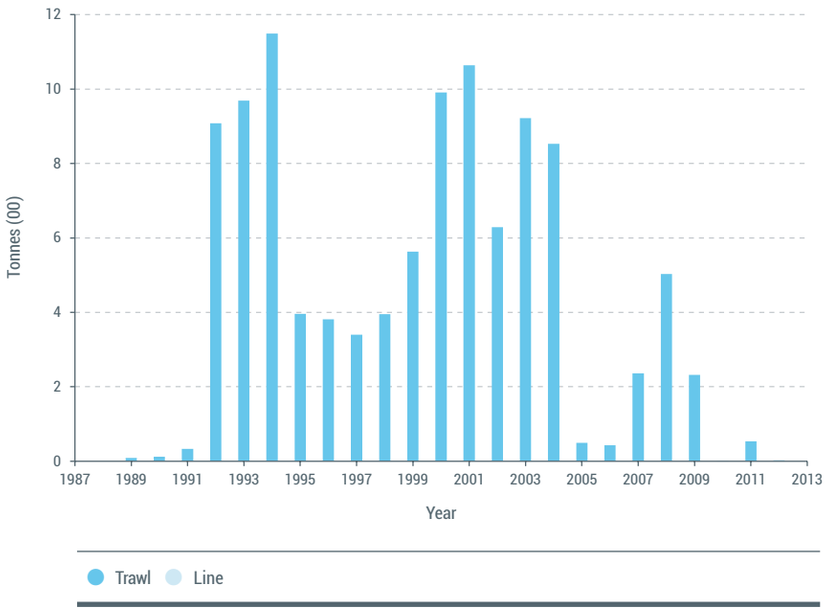


FIGURE 6
CATCHES FOR WEST COAST SOUTH IS. STOCK (LIN7WC)[11]

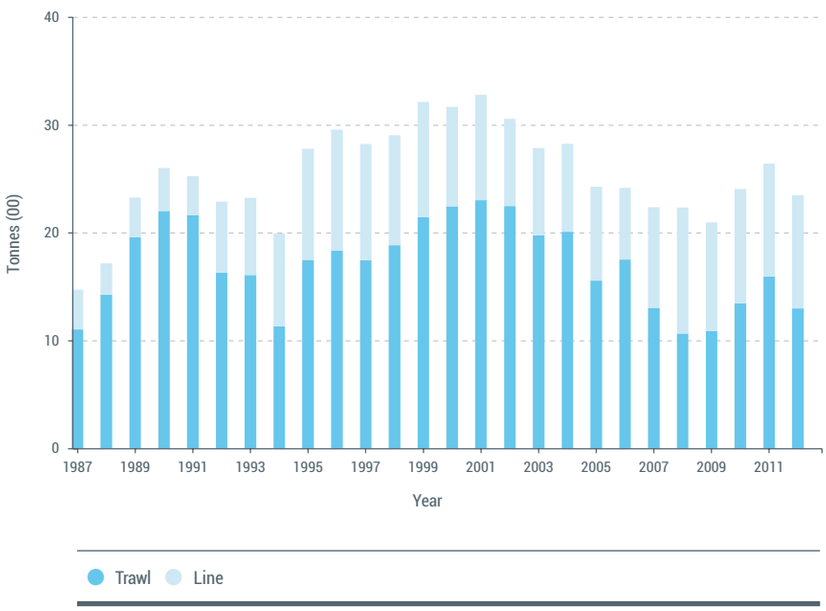


FIGURE 7
CATCHES FOR COOK STRAIT STOCK (LIN7CK)[II]

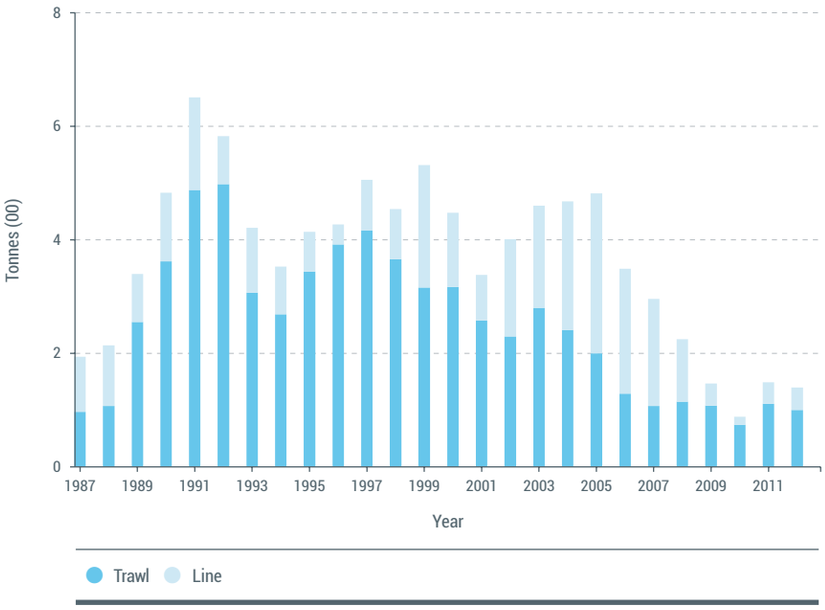


FIGURE 8
ESTIMATED BIOMASS CHATHAM RISE STOCK (LIN3&4)[II]

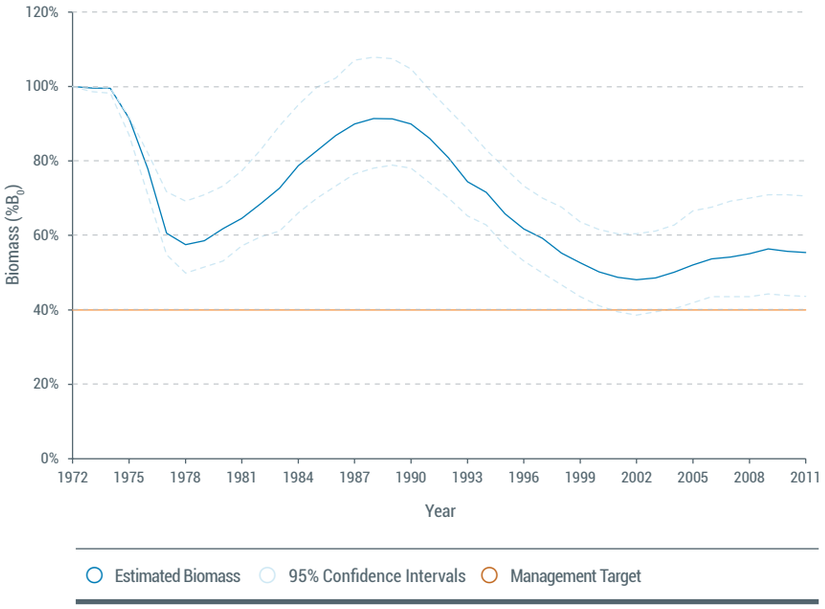


FIGURE 9
ESTIMATED BIOMASS FOR SUB-ANTARCTIC STOCK (LIN5&6)[II]

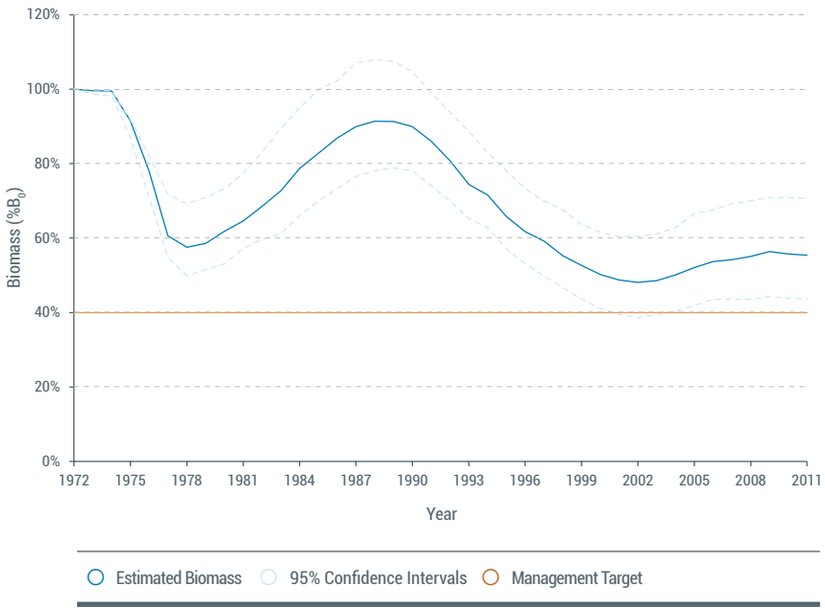


FIGURE 10
ESTIMATED BIOMASS FOR BOUNTY PLATFORM STOCK (LIN6B)[II]

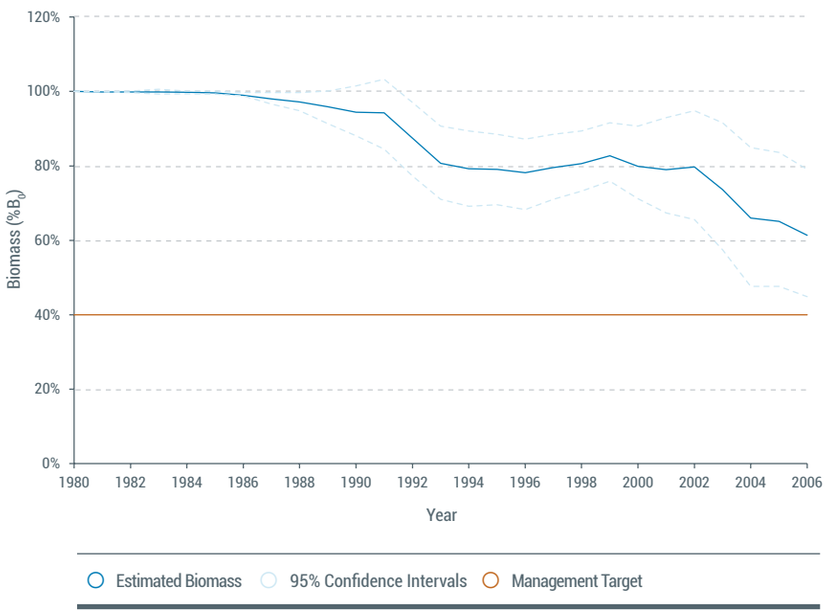


FIGURE 11
ESTIMATED BIOMASS FOR WEST COAST SOUTH IS. STOCK (LIN7WC)[II]

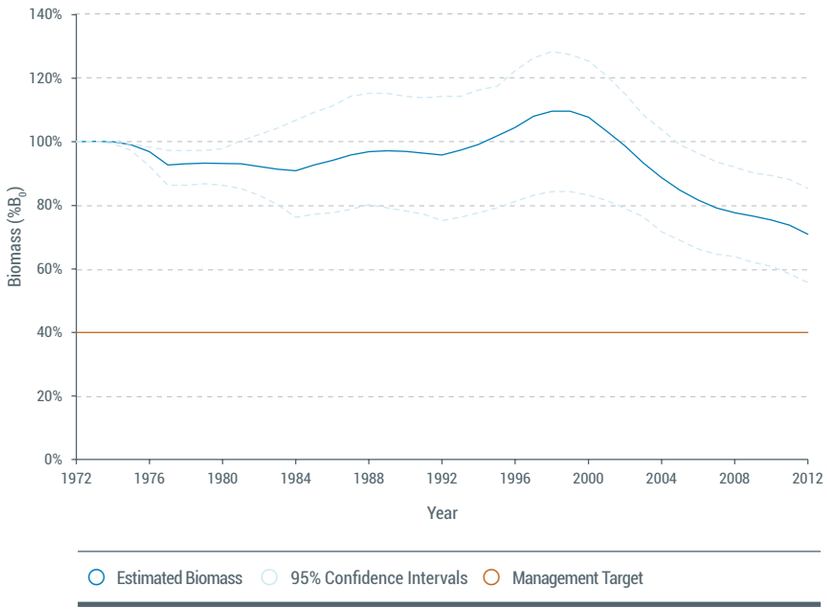
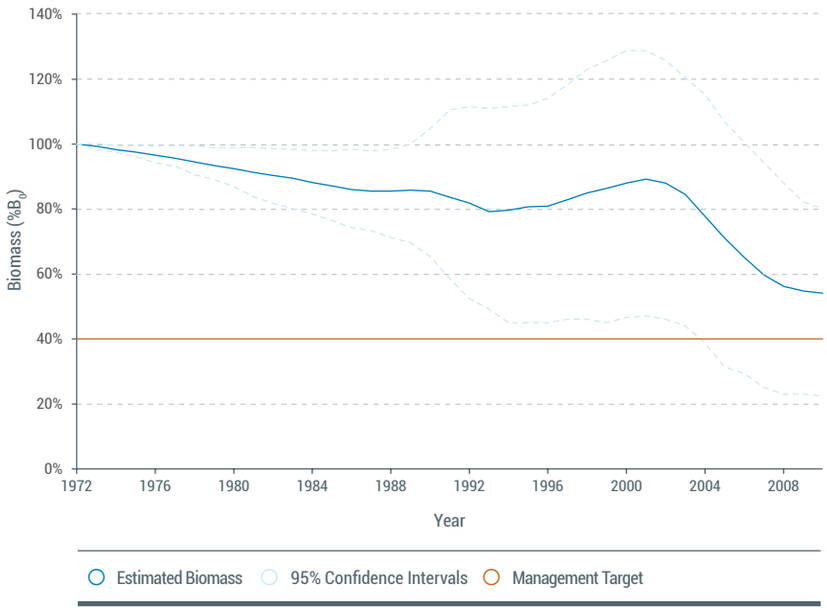


FIGURE 12
ESTIMATED BIOMASS FOR COOK STRAIT STOCK (LIN7CK)[II]



MARINE LIFE. SNARES ISLAND, NEW ZEALAND.[XXIX]

Managing Environmental Effects

All marine mammals and seabirds, four coral groups, and many shark species are protected by law in New Zealand waters.

White-Capped Mollymawk

Blue Shark

New Zealand Fur Seal[xxx]

Bycatch Species

New Zealand's ling fisheries generally take little non-commercial finfish bycatch. More than 90% of the catch by weight consists of ling and other retained commercial species sustainably managed under the QMS, such as hoki, hake and silver warehou. The key bycatch species in the ling fisheries are comparable to those in the related hoki and hake fisheries.

Detailed reporting and catch balancing procedures are required by law for QMS species taken within New Zealand's Exclusive Economic Zone (EEZ). All catches of quota species, whether taken as bycatch or as target catch, must be landed and reported against the appropriate catch limit and against Annual Catch Entitlements (ACE).

Due to the generally low catch volumes, species outside of the QMS are considered to be at low risk of being overfished. However, if a sustainability problem is identified for any non-QMS species, these may be introduced to the QMS under the provisions of the New Zealand Fisheries Act 1996 which requires such stocks, or species, be added to the QMS if the existing management is not ensuring sustainability or is not providing for utilisation.

The Fisheries Act defines *'ensuring sustainability'* as

> *"maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations"*

and

> *"avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment".*

'Utilisation' is defined as

> *"conserving, using, enhancing and developing fisheries resources to enable people to provide for their social, economic, and cultural wellbeing."*

Endangered, Protected & Threatened Species

MPI and DWG have active programmes in place to reduce incidental interactions, including developing and implementing mitigation methods.

Seabirds and marine mammals are at times attracted to fishing vessels as an opportunistic source of food. In seeking access to this easy source of food, they have demonstrated that they can modify their behaviours to overcome obstacles and may unwittingly put themselves at risk of harm. Patterns of 'at risk' behaviour are observed to vary seasonally and between species, and to be dependent on their eagerness to feed in close proximity to vessels and hooks. As such, interactions

TABLE 3
PROPORTION OF QMS SPECIES IN CATCH BY WEIGHT

	LIN2	LIN3	LIN4	LIN5	LIN6	LIN7
Trawl	90%	95%	90%	97%	97%	97%
Line	95%	93%	98%	99%	99%	99%

with fishing vessels are inherent and will continue to occasionally occur. In the same way that other industrial workplaces have hazard management plans in place to reduce accidents, MPI and DWG have active programmes in place to reduce these incidental interactions, including developing and implementing mitigation methods.

All of New Zealand's seabirds, four coral groups, and many shark species, are protected under the Wildlife Act 1953 (Table 4). All of New Zealand's marine mammals are protected under the Marine Mammal Protection Act 1978. It is an offence to harass, hunt, or kill any of these protected species without lawful authority. While the accidental or incidental capture of these species by commercial fishing activities is not unlawful, all incidents must be reported.

Observer coverage of New Zealand's ling fisheries is delivered through the MPI's Observer Programme, which provides independent monitoring of any interactions that occur between protected species and ling fishing (Figure 13-14). For the past five years, MPI observers independently audited on average 13% and 12% of ling longline and trawl effort respectively each year.

The long-term goal is to minimise interactions where possible, with zero interactions being the ultimate goal.

TABLE 4
MARINE SPECIES FULLY PROTECTED UNDER THE WILDLIFE ACT 1953

PHYLUM	CLASS		
Cnidaria	Anthozoa *(corals and sea anemones)*	Black corals	All species in the order Antipartharia
		Gorgonian corals	All species in the order Gorgonacea
		Stony corals	All species in the order Scleractinia
	Hydrozoa (hydra-like animals)	Hydrocorals	All species in the order Stylasteridae
Chordata	Chondrichthyes *(cartilaginous fishes)*	Carcharhiniformes	Oceanic whitetip shark *(Carcharhinus longimanus)*
		Lamniformes *(mackerel sharks)*	Basking shark *(Cetorhinus maximus)*
			Deepwater nurse shark *(Odontapsis ferox)*
			White pointer shark *(Carcharodon carcharias)*
		Orectolobiformes *(carpet sharks)*	Whale shark *(Rhincodon typus)*
		Rajiformes *(skates and rays)*	Manta ray *(Manta birostris)*
			Spinetail devil ray *(Mobula japanica)*
	Osteichthyes *(bony fishes)*	Perciformes *(perch-like fishes)*	Giant grouper *(Epinephelus lanceolatus)*
			Spotted black grouper *(Epinephelus daemelii)*

FIGURE 13
EFFORT AND OBSERVED EFFORT IN LING LONGLINE FISHERIES[VII]

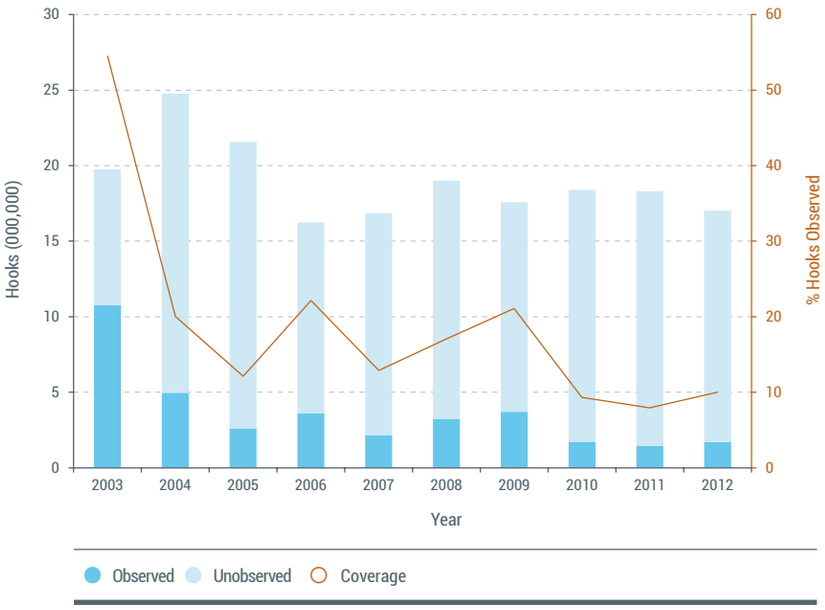


FIGURE 14
EFFORT AND OBSERVED EFFORT IN LING TRAWL FISHERIES[VII]

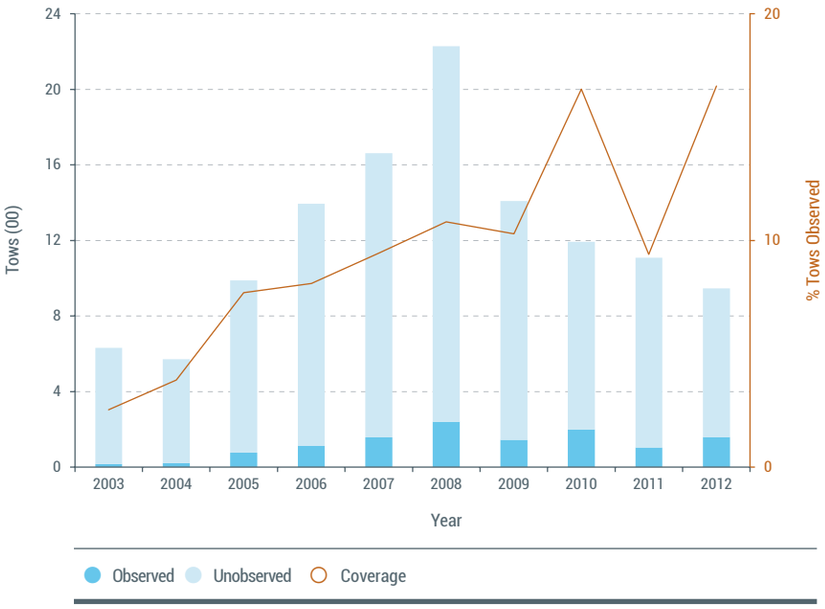


FIGURE 15
ESTIMATED SEABIRD CAPTURES IN THE LING TRAWL FISHERIES[VII]

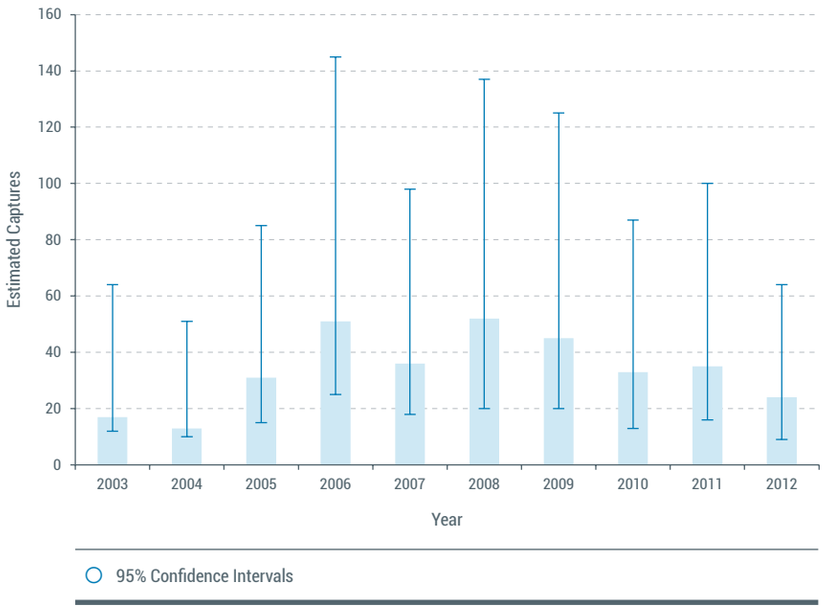


FIGURE 16
OBSERVED SEABIRD CAPTURES IN THE LING TRAWL FISHERIES[VII]

Seabirds

Ling trawl fisheries have been found to pose little risk to seabirds (i.e. seabird population growth can sustain the few fishing-related captures from ling fisheries).

MPI uses a risk-based approach to assess and to prioritise seabird species that might require management intervention. This approach is informed by the New Zealand Seabird Risk Assessment[viii], which has quantitatively estimated the potential levels of risk to seabird populations arising from incidental mortalities associated with New Zealand's commercial fisheries. Using this information, further research, education, and seabird mitigation measures can be determined and applied where these are most needed and where they will be most effective.

Ling trawl fisheries have been found to pose little risk to seabirds (i.e. seabird population growth is able to sustain the few fishing-related captures). With effective mitigation measures in place the risk scores for deepwater fisheries, including those for ling, have reduced over time.[ix]

Trawl vessels targeting ling all employ international best practices to mitigate the risk of interacting with seabirds. Management measures to mitigate interactions with seabirds and New Zealand's deepwater fisheries currently include:

- Mandatory use of seabird mitigation devices during fishing
- Mitigation research
- Education, training and outreach
- Vessel-specific offal management procedures
- Real-time incident reporting.

FIGURE 17
ESTIMATED SEABIRD CAPTURES IN THE LING LONGLINE FISHERIES[VII]

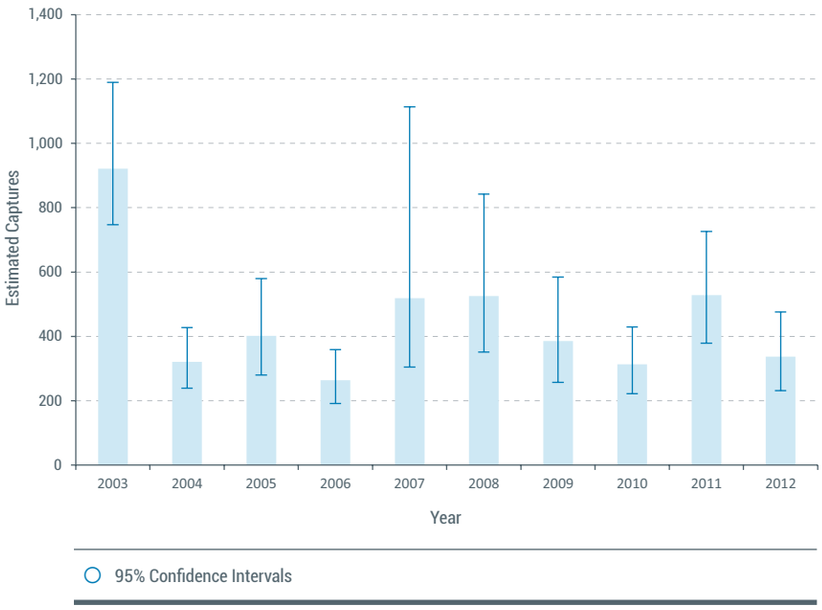
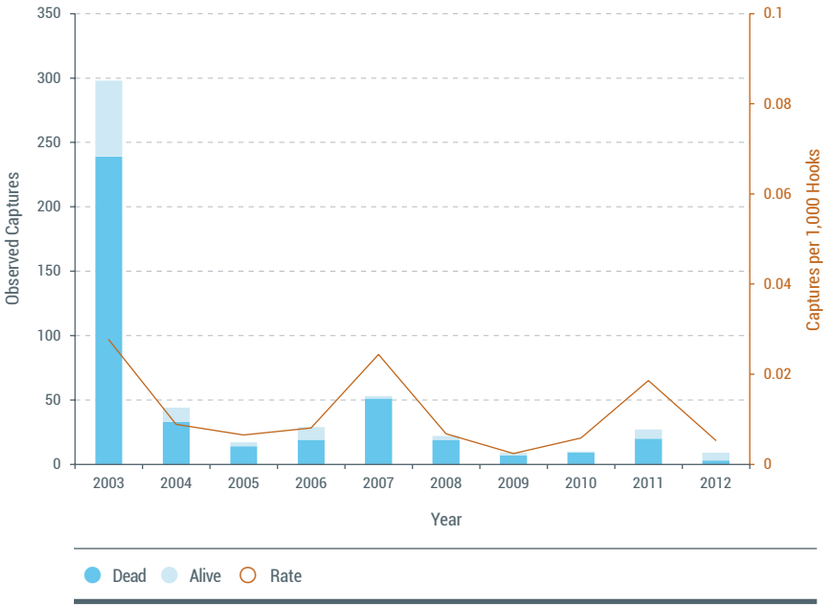


FIGURE 18
OBSERVED SEABIRD CAPTURES IN THE LING LONGLINE FISHERIES[VII]



Observer coverage in New Zealand's ling fisheries enables independent monitoring and reporting of seabird interactions with both government and industry risk mitigation requirements.

In recent years the numbers of estimated captures from ling trawlers have declined, although the rate of interactions has shown an increase over the trawl fishery as a whole (Figures 15 and 16). Interactions with trawlers were primarily in LIN5 and LIN6. Compared to the ling trawl fishery, notable numbers of birds are estimated to interact with the ling longline fishery, although in 2011-12 only nine captures were observed (Figures 17 and 18). Interactions with longliners were primarily from LIN4 and LIN6. The situation will continue to be monitored through the observer programme and improvements sought.

When looking at New Zealand EEZ fisheries as a whole, captures of all bird types combined have decreased between 2002-03 and 2011-12.[ix] Although the numbers of captures have reduced overall, there are substantial differences in the trends between different species. One marked difference is in captures of large surface-feeding birds (e.g. albatrosses) compared to those of smaller diving birds (e.g. petrels and shearwaters).

Large surface-feeding birds tend to feed on offal near the stern of trawlers, where, in their competition for food, they may get distracted from the dangers around them and fly into or get caught by trawl warps (i.e. steel cables connecting the submerged trawl gear to the vessel). Smaller seabirds, particularly those that dive for food, tend to feed around the trawl nets when they are near to or on the surface, placing them at risk of getting caught or entangled in the net.

One of the most important factors influencing interactions between seabirds and trawl warps is the presence of offal in the water, which acts as an attractant for foraging seabirds. Middleton and Abraham[x] confirmed that discharge of offal was the main factor influencing warp strikes; almost no strikes were recorded when there was no discharge. This is also mostly the case in the ling bottom longline fisheries where the majority of seabird interactions involve petrels, Salvin's and Chatham mollymawks and sooty shearwaters.

Industry has developed and implemented Vessel-specific Management Plans (VMPs) which, through the management of offal discharges, have proved effective at mitigating these interactions. VMPs require all vessels to designate how they will reduce the presence of offal in the water when trawling. One method that has proven to be most effective is to release factory waste in intermittent batches (as opposed to a continuous discharge), reducing the time seabirds are attracted to the 'risk zone' at the stern of the vessel and ahead of the warps. This approach has been accepted as world's best practice by the Agreement on the Conservation of Albatrosses and Petrels, and underpins the VMPs.[xi] Other best practice includes mitigation methods such as tory or streamer lines, bird bafflers, and warp deflectors which have been mandatory since April 2006 (Figure 19).

Notably, during the four fishing years since 2006, when mitigation to reduce warp strikes was implemented, the average capture rates for Salvin's and white-capped albatross reduced significantly. In 2009-10 these rates were 0.20 and 0.21 birds per 100 tows, down from 0.61 and 0.26 birds per 100 tows during the three previous years.[ix]

Although warp captures have reduced significantly, reducing net captures of small diving birds is proving to be more challenging. MPI and industry are continually seeking better ways to deter birds from attending the net.

FIGURE 19
SEABIRD MITIGATION EXAMPLES (TORI LINES, BIRD BAFFLER, WARP DEFLECTOR)

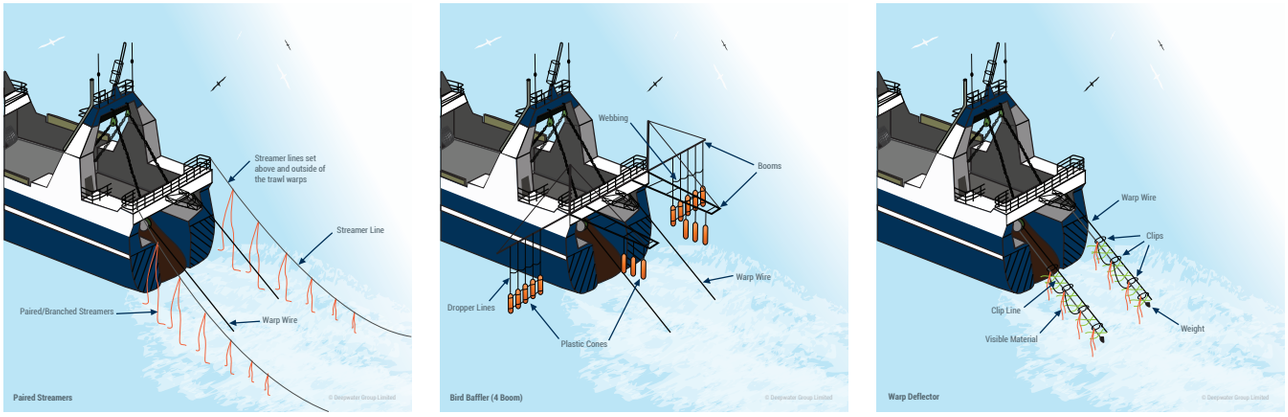


FIGURE 20
ESTIMATED NEW ZEALAND FUR SEAL CAPTURES IN LING TRAWL FISHERIES[VII]

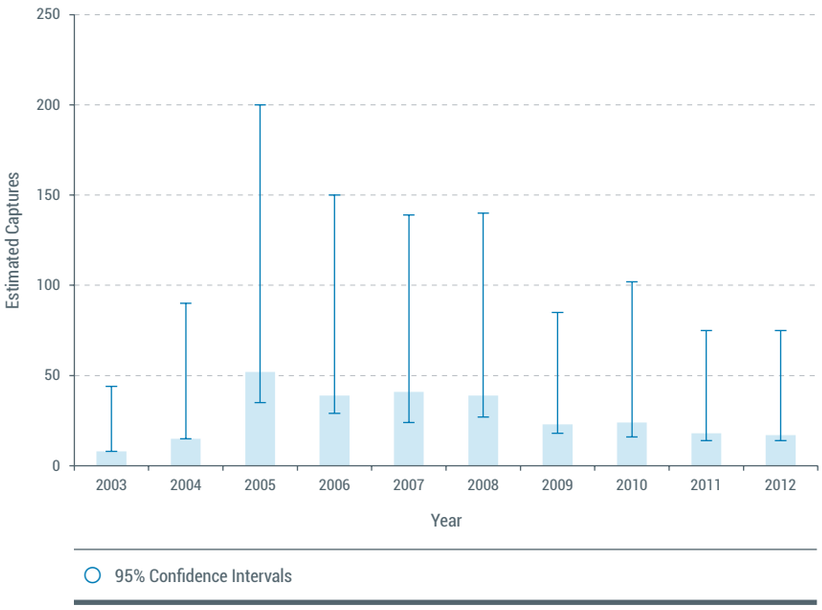
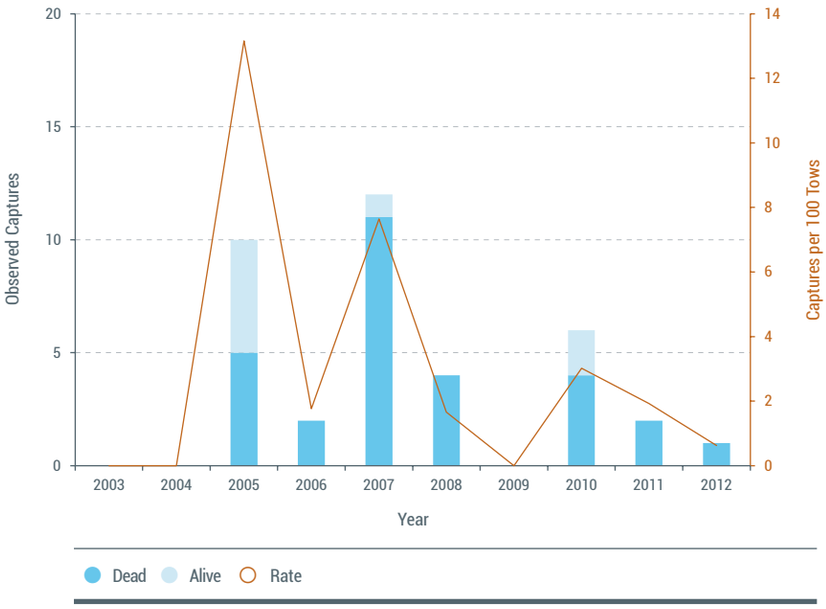


FIGURE 21
OBSERVED NEW ZEALAND FUR SEAL CAPTURES IN LING TRAWL FISHERIES[VII]



New Zealand Fur Seal

The ling fishery is not having any unsustainable impacts on the fur seal population.

The New Zealand fur seal was classified in 2008 as *'Least Concern'* by the International Union for the Conservation of Nature (IUCN) and in 2010 as *'Not Threatened'* under the New Zealand Threat Classification System.[xii] Fur seal populations are monitored, with the total population around New Zealand estimated to exceed 50,000 adults and thought to be increasing.[ix]

The number and rate of incidental fur seal captures in the ling trawl fishery has reduced over the past years (Figures 20 and 21).[vii] In the ling longline fishery only one capture has been observed since 2003 (Figure 22). These levels of interaction are not considered to pose a risk to fur seal populations.

During recent years, DWG and MPI have worked closely with scientists and eNGOs to develop and implement Marine Mammal Operational Procedures (MMOPs) to provide guidance and best practice and to reduce fur seal interactions to the lowest possible levels. All deepwater trawl vessel operators have agreed to follow the MMOPs and to submit each vessel's performance to an annual audit by MPI.[xiii]

In 2008 the Department of Conservation (DOC), MPI, and DWG combined resources to undertake the first census of the New Zealand fur seal population along the west coast of the South Island.[xiv] This area was identified to be of most potential concern because of the number of incidental interactions between vessels here and foraging fur seals. The fur seal population estimate from the census was then

used to estimate the level of 'Potential Biological Removals' (PBRs, i.e. the number of fur seals that could be removed without detriment to the population size) using internationally-accepted scientific methods. Captures of fur seals by ling fisheries have not been reported here.

No interactions have been reported with sea lions, dolphins or whales.[xv]

Protected Coral & Fish

MPI observers also record the levels of interactions with protected fish and coral species.

Among all of the bycatch species for ling fisheries no finfish or invertebrates are considered to be threatened.

Five species of sharks (basking, deepwater nurse, white pointer, oceanic whitetip, and whale sharks) are protected by law in New Zealand waters. There have been no observed interactions with these protected shark species and the ling fisheries.

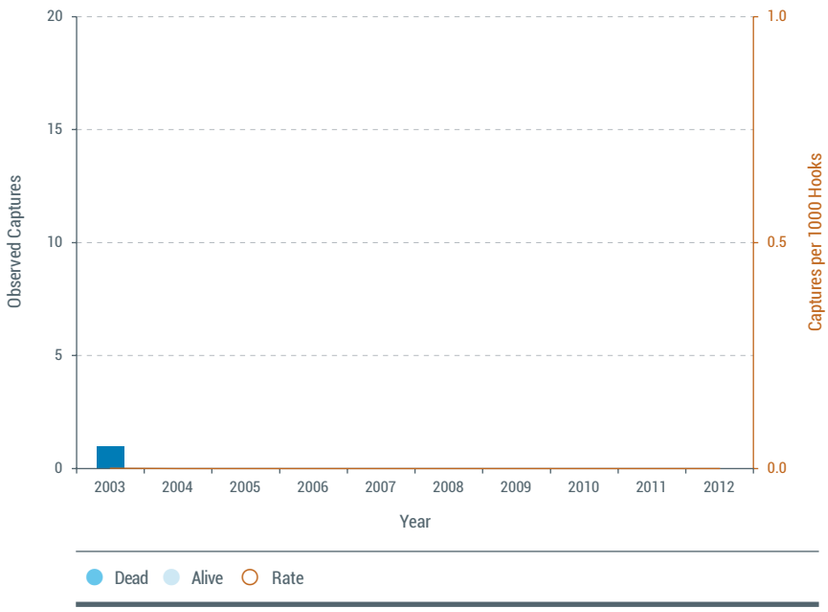
Few protected coral species are recorded as bycatch in the ling trawl fisheries[xvi], with only 1.5% of observed tows recording coral bycatch between 2007-08 and 2009-10.[xvii] The current best scientific information indicates that the ling fisheries (along with the New Zealand hoki and the New Zealand hake fisheries) have minimal overlap with where protected corals are distributed and, therefore, pose little risk to protected corals.

Habitats & Ecosystems

New Zealand's Benthic Protection Area network is over four times the area of New Zealand's landmass.

Ling are widely distributed throughout New Zealand waters, particularly south of 40 °S, from depths of 200 m to 800 m.

FIGURE 22
OBSERVED NEW ZEALAND FUR SEAL CAPTURES IN LING LONGLINE FISHERIES[VII]



A Patch of Stony Coral[xxxi]

Ling are taken by both bottom trawl and longline. Bottom trawling is known to impact fragile benthic (or seabed) invertebrate communities, the degree of such impacts is dependent upon sediment type. Longlining is considered to have minor impacts on the benthic habitat as the line and hooks are relatively static once they have settled on the seabed.

As part of MPI's 10-Year Research Programme, the footprint of all trawl fisheries, including ling, is mapped and audited annually. This allows the extent of trawl interactions with the seabed to be monitored, and provides a mechanism to identify if and where further management measures might be necessary. Research projects such as the Oceans Survey 20/20, which used both acoustic mapping and underwater cameras to map New Zealand's marine biodiversity and habitat types, continually increase our knowledge and understanding of the effects of fishing on the benthic environment and are critical to informing management decisions. Key fishing grounds such as the Chatham Rise are now well studied and understood in terms of habitat and biodiversity.

MPI and DWG have also developed and implemented a programme of spatial management (Table 5 and Figure 23), which includes:

- *Closed areas* – where fishing is excluded or subject to gear restrictions
- *Benthic Protection Areas (BPAs)* – where bottom trawling is prohibited[xviii]
- *'Seamount' Closures* – where fishing is prohibited.

BPAs are large, broadly representative areas closed to set aside and protect the full range of benthic marine biodiversity. Their selection was based on the best available scientific knowledge, the Marine Environment Classification (MEC), to encompass pristine areas that for the most part have not been impacted by trawling, to provide large and untouched refuges for benthic communities.[xix]

In total, 30% of New Zealand's EEZ is closed by law to bottom trawling. This New Zealand marine spatial management programme continues to constitute one of the largest bottom trawl closures within any EEZ in the world and when introduced comprised 24% of the total area under Marine Protection Areas (MPAs) in the world. To give an indication of their size, New Zealand's BPA network is over four times the area of New Zealand's landmass.

The requirement for the BPA design was to encompass not less than 10% of each oceanic class of the MEC and each oceanic class was to be represented in two or more BPAs. They were also spread by latitude and longitude throughout the New Zealand EEZ, which runs from sub-tropical waters to sub-Antarctic waters, and to protect benthic habitats over a range of depths. The designated BPAs are indicated to protect:

- 28% of Underwater Topographic Features (including seamounts)
- 52% of seamounts (underwater mountains over 1000 m in height)
- 88% of active hydrothermal vents.

Over 95% of the seabed within the ling known distribution range has either

TABLE 5
MARINE SPATIAL MANAGEMENT IN NEW ZEALAND'S EEZ

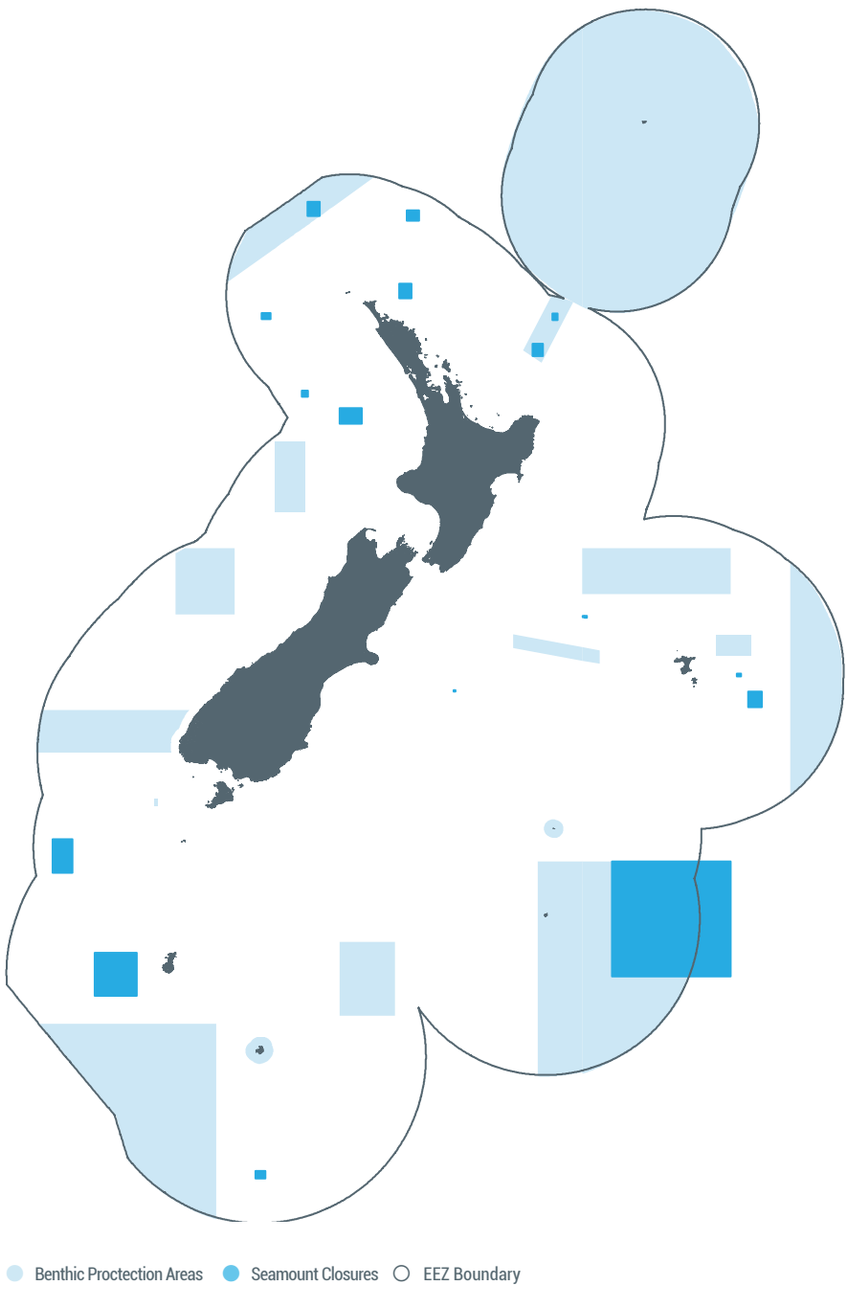
MANAGEMENT TOOL	LEGISLATION	RESTRICTIONS	AREA (KM^2)
Benthic Protection Areas (BPAs)	Fisheries Act 1996 Fisheries (Benthic Protection Areas) Regulations 2007	Prohibition on use of dredge and restrictions on use of trawl net within 100 m of the seabed	1,124,539
'Seamount' Closures	Fisheries Act 1996 Fisheries Regulations	Prohibition on trawling	78,466
Total Area Closed (km^2)[6]			1,200,741
Total Area as a Percentage of New Zealand's EEZ			30%

6. In some areas, BPAs and 'Seamount' Closures overlap. Therefore, this is based on the footprint area.

been closed to bottom trawling or has never been contacted by trawls targeting ling.[xx] Annually less than 1% of the known distribution range is contacted. Examinations of the trawl footprint by LIN region have also been undertaken.[xxii] Trawling occurs mainly at depths of 300-600 m for ling. Over the last five years, the trawl footprint recorded in the 300-600 m depth range has always been less than 3% of each Fisheries Management Area for ling, except in LIN5 where the footprint was 7.9%. By these measures, the extent of the ling bottom trawl grounds is only a very small part of the known distribution range and primary depth range for ling.

The ling fishing grounds have been progressively developed over the past two decades and there is now relatively little exploratory fishing over new grounds. Most ling catches are taken from the same fishing grounds each year, and the fisheries are now primarily supported by relatively small, localised areas which sustain high catch rates year on year.[xxii]

FIGURE 23
BENTHIC PROTECTION AREAS AND 'SEAMOUNT' CLOSURES



SEA SALT.[XXVIII]

Effective Fisheries Management

New Zealand was ranked first for managing marine resources among the 53 major fishing nations that were assessed.

New Zealand by Satellite[xxxii]

Governance & Policy

Legal & Customary Framework

New Zealand's fisheries management regime is centred on the Quota Management System (QMS), a system introduced in 1986 based on Individual Transferrable Quotas (ITQ, quota) and Total Allowable Commercial Catches (TACCs). The QMS ensures sustainable utilisation of fisheries resources through the direct control of harvest levels based on best available scientific assessments.

Within the QMS, ITQ have been allocated in perpetuity providing each quota owner with a proportional share of the TACC. At the commencement of each fishing year, ITQ generates Annual Catch Entitlements (ACE), the annual harvesting right expressed in kilogrammes. The QMS is administered by MPI through the Fisheries Act 1996.

Quota is an asset that provides owners with incentives to increase returns from their property rights by reducing harvest costs and increasing product values. Improved economic efficiencies have also resulted in alignment between fishing capacities and the sustainable catches from QMS fish stocks, thereby avoiding over-capitalised fisheries (i.e. too many vessels competing for available fish stocks).

Quota provides a property right to access commercial fisheries and has been allocated to Maori as part of the Treaty of Waitangi Settlements that acknowledge the Treaty guaranteed Maori

> *"full exclusive and undisturbed possession of their...fisheries".*[xxiii]

Maori interests are now significant participants in the New Zealand Seafood Industry.

New Zealand has implemented the most extensive quota-based fisheries management system in the world, with over a 100 species or species-complexes of fish, shellfish and seaweed now being managed within this framework. Almost all commercially targeted fish species within New Zealand's waters are now managed within the QMS. The status of the stocks of each species within the QMS is determined using the best available scientific information and each stock is managed independently.

MPI employs fisheries managers to advise the Minister for Primary Industries on the appropriate level at which to set catch allowances and fisheries scientists to oversee the collection and analysis of scientific information to inform management advice. Fisheries managers and scientists work closely to ensure the management advice provided to the Minister is consistent with the best available scientific information. TACCs are set by the Minister based on advice provided by fisheries managers, in consultation with quota owners and other external stakeholders.

At an operational level, ling is managed in accordance with the National Fisheries Plan for Deepwater and Middle-depth Fisheries, there is a species-specific chapter for ling within this Plan.[iv]

New Zealand recently became one of only two fishing jurisdictions to achieve a top ranking in a review of fisheries management systems around the world.[xxiv] In a second study, New Zealand was ranked first for managing marine resources among the 53 major fishing nations that were assessed.[xxv]

Collaborative & Participatory Processes

In 2006, DWG and MPI entered into a formal partnership to enable collaboration in the management of New Zealand's deepwater fisheries, including the ling fisheries.[xxvi] This partnership has been updated in 2008 and 2010 and has directly facilitated improved management of the ling fishery in almost all respects through:

- A close working relationship under a shared and agreed vision, objectives and collaborative work plan
- Real-time open communication between DWG and MPI on information relevant to management measures, particularly from the MPI's Observer Programme and commercial catching operations
- Agreement on a strategic plan for the management of New Zealand's EEZ fisheries
- Development and implementation of clear and agreed management objectives for all New Zealand's deepwater fisheries, including ling, through fisheries plans.

Environmental organisations and other interested parties also actively participate and contribute to management processes.

Compliance & Enforcement

MPI maintains a comprehensive compliance programme, which includes both encouraging compliance through support and respect for the fisheries management regime, and creating effective deterrents.

This strategy is underpinned by the VADE compliance operating model, which focusses on all elements of the compliance spectrum. The VADE spectrum takes the following form:

1. ***Voluntary Compliance*** – outcomes are achieved through education, engagement and communicating expectations and obligations
2. ***Assisted Compliance*** – reinforces obligations and provides confidence that these are being achieved through monitoring, inspection, responsive actions and feedback loops
3. ***Directed Compliance*** – directs behavioural change and may include official sanctions and warnings
4. ***Enforced Compliance*** – uses the full extent of the law recognising that some individuals may deliberately choose to break the law and require formal investigation.

Within the VADE framework enforcement is but one of the tools utilised, however it is the intervention that sets the conditions and incentive for voluntary compliance.

Since 1994 all vessels over 28 m have been required by law to be part of the Vessel Monitoring System (VMS) which, through satellite telemetry, enables MPI to monitor all deepwater vessel locations at all times. In combination with at-sea and air surveillance, supported by the New Zealand joint military forces, the activities of deepwater vessels are fully monitored and verified to ensure compliance with regulations and with industry-agreed operating procedures.

All commercial catches from QMS stocks must be reported and balanced against ACE at the end of each month. Catches may only be landed at designated ports and sold to Licensed Fish Receivers (LFRs). Reporting requirements for deepwater trawl vessels include logging the location, depth and main species caught for each tow and the total landed catch for each trip undertaken.

MPI audits deepwater vessels' catch-effort and landing reports, reconciles these against multiple sources including VMS records, data collected by onboard MPI observers, and catch landing records from LFRs to ensure that all catches are reported and documented correctly. Around 10% of all tows and hooks targeting ling are observed each year and MPI has plans in place to increase this coverage further (Figures 13 and 14).[vii] Quayside inspections are also undertaken to verify reported landings.

Commercial fishermen face prosecution and risk severe penalties, including automatic vessel forfeiture, upon conviction of breaches to the fisheries regulations. Financial penalties are also imposed, in the form of deemed values, to discourage commercial fishermen from over-catching their ACE holdings. For every kilogram of catch above the available ACE held, MPI invoices the permit holders a deemed value charge. Deemed values are set at a level to remove the commercial value from sale of any catch above the level of ACE held. This provides the incentive for permit holders to acquire or maintain sufficient ACE to cover all their catch.

It is illegal to discard or to not report catches of QMS species. For some high value stocks, such as ling, differential deemed values apply such that the rate that is charged increases depending on the proportion by which catches exceed ACE holdings.

It is illegal to catch fish in one QMA and report it as caught in another. This practice, known as trucking is also subject to the severe penalties as described above.[iv]

The deepwater fishing industry works closely with the government to ensure

New Zealand Fur Seal[xxix]

compliance with all agreed management measures. A co-management approach to New Zealand's deepwater and middle-depth fisheries has been in place since 2006, encouraging open collaboration between quota holders and MPI.[xxvii]

This collaborative approach to management has enabled the development of shared reporting and monitoring processes that allow both parties to utilise their own operational expertise to ensure ongoing adherence to the agreed non-statutory management measures.

Fishery Management Plans

Fisheries Plan

MPI and DWG, in consultation with other interested parties, have developed a National Fisheries Plan for Deepwater and Middle-depth fisheries, including a specific chapter that focuses on ling fisheries.[iv] This Fisheries Plan (the Plan) is a statutory document, approved by the Minister of Fisheries in 2010. The Plan provides an enabling framework, outlining agreed management objectives, timelines, performance criteria and review processes, and has a life of five years between reviews.

The Plan specifies that the ling fisheries will be assessed against agreed reference points for the management of ling harvests. It specifies a range of objectives and measures for bycatch management and for the mitigation of incidental interactions with protected species (e.g. seabirds, marine mammals and certain sharks).

The actual management measures and delivery outcomes in the Plan are specified in MPI's Annual Operational Plan (AOP), which is reviewed and updated annually. In addition, an Annual Review Report (ARR) assesses performance against the AOP, and the Plan in general, and is available to all stakeholders and interested parties.

Non-Regulatory Management

"...regulations are complemented by additional industry-agreed non-regulatory measures."

Extensive regulations govern the ling fisheries; these regulations are complemented by additional industry-agreed non-regulatory measures, known as the New Zealand Deepwater Fisheries Operational Procedures (OPs). The Minister relies on the effectiveness of both regulatory and non-regulatory measures to ensure the sustainable management of these fisheries.

The OPs apply to all deepwater fisheries, including those for ling, and set out agreed industry best practice for minimising interactions with protected species such as seabirds, marine mammals and sharks.

As part of this, DWG has an Environmental Liaison Officer whose role is to liaise with vessel operators, vessel skippers, and MPI to assist with the effective implementation of these best practice guidelines.

Research Plan

"...programme to improve both the information to underpin management decisions and the efficiencies in science service provision."

In 2009 DWG proposed that the industry's science and research programme should be integrated with that being undertaken by MPI to form a single and integrated 10-Year Research Programme that would be:

- *Management Led* – to ensure we obtain adequate science-based information to underpin sustainable management decisions
- *Comprehensive* – increase the annual investment by MPI in deepwater science and information by 50% including more research surveys, more stock assessments, more stock characterisations, and greater observer coverage
- *Environmentally Sound* – including enhanced monitoring of interactions between the deepwater fleet and protected species, regular Ecological Risk Assessments to scientifically determine where fishing activities are causing risk of harm to the marine environment, and assessments of trophic interactions
- *Cost Efficient* – reduce service delivery costs through public tender and multi-year contracts.

In 2010 MPI implemented this 10-Year Research Programme to improve both the information to underpin management decisions and efficiencies in science service provision.

Fisheries research falls into several key areas, each of which has its own specific goal. These are:

- *Fisheries Resources* – to provide information on sustainable yields and stock status required for sustainable utilisation of New Zealand's fisheries resources
- *Harvest Levels* – to determine the nature and extent of commercial and recreational catch, Maori customary take, illegal catch, and fishery-induced mortality
- *Cultural, Economic, and Social Research* – to provide information on cultural, economic, and social factors that may need to be considered in the management decision-making process to enable people to provide for their social, economic and cultural well-being
- *Traditional and Customary Research* – to provide information on the traditional and customary factors that may need to be considered in the management decisionmaking process to enable the Minister to discharge his/her obligations to tangata whenua under the Deed of Settlement and the Treaty of Waitangi (Fisheries Claims) Settlement Act to enable Maori to provide for their traditional and customary well-being.

Research plans and reports are made publically available.

Certified Sustainable

The MSC is a global organisation working with fisheries, seafood companies, scientists, conservation groups and the public to promote the best environmental choices in seafood.

The Deepwater Group has embarked on an ambitious programme to have all its main fisheries assessed and certified as sustainable under the Marine Stewardship Council's (MSC) programme, the international 'gold standard' for sustainable fisheries performance.

The MSC is a global organisation working with fisheries, seafood companies, scientists, conservation groups and the public to promote the best environmental choices in seafood.

The MSC standards are based on three principles:

1. Are the fish stocks healthy?
2. Is the fishery damaging the marine ecosystem?
3. Is there ongoing effective management of that fishery?

Fisheries are assessed by third-party accredited auditors and their findings are peer-reviewed.

Currently New Zealand's ling fisheries are certified as meeting the MSC standards, with three conditions. The Conditions of Certification are based on the need for further information in the ling bottom long line fisheries in order to demonstrate low risks to seabird populations. DWG and MPI are confident that these Conditions of Certification for seabirds will be meet as required.

MSC certification provides independent validation of the seafood industry's commitment to continuous improvement and the collaborative partnership with MPI; a commitment that has seen DWG and MPI actively developing and applying new methods and strategies to reduce interactions with seabirds, marine animals, and the broader marine ecosystem. This partnership also aligns strategic and operational objectives, resulting in a long-term science and information plan and more investment in monitoring and research.

To track a fishery's certification progress go to: *www.msc.org/track-a-fishery/fisheries-in-the-program*

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