Ling Longline Situation Report

Prepared for the 2019 MSC Surveillance Audit

deepwater group

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Purpose of this report

This report is one of three prepared for the New Zealand 2019 combined MSC reassessments for hake, hoki, ling and southern blue whiting. It provides an update on five ling longline Units of Certification (UoC) (LIN 3, 4, 5, 6 & 7), and builds on the information previously provided for the 2017 reassessment.

It is Deepwater Group Limited's (DWG) submission that these five fisheries continue to conform with the MSC Fisheries Standard (FCR V1.3) as evidenced in the following updated information and references.

All cited references are available here: https://deepwatergroup.org/certification/ling-longline-fishery-surveillance-audit-2019/

Overview of fishery status and information

Ling longline certification details

Certification date	Initial Certification: September 2014 Recertification: September 2018 (synchronised with Hoki)
Stock areas	UoC 6: LIN 3 UoC 7: LIN 4 UoC 8: LIN 5 UoC 9: LIN 6 UoC 10: LIN 7
Species	*Genypterus blacodes*
Method/gear	Longline

Stock status, TACC & catches

UoC 6 – LIN 3

Update on stock status (Holmes, 2019)	For Chatham Rise (LIN 3 & 4), B_{2019} was estimated to be about 57% B_0; Very Likely (> 90%) to be above the management target of 40% B_0 (base case run).
TACC 2017-18 TACC 2016-17 TACC 2015-16	2,060 t 2,060 t 2,060 t
UoA share of TACC and total LIN catch	100% of TACC and 34% of total LIN catch (based on average estimated longline catch over the last two years)

UoC share of TACC and total LIN catch	93% of TACC and 32% of total LIN catch (based on average estimated longline catch over the last two years)
LIN 3 catch 2017-18	2,171 t (Total reported catch) 621 t (Estimated catch trawl)[1] 676 t (Estimated catch bottom longline) 764 t (Estimated catch other methods)
LIN 3 catch 2016-17	1,808 t (Total reported catch) 708 t (Estimated catch trawl) 672 t (Estimated catch bottom longline) 290 t (Estimated catch other methods)

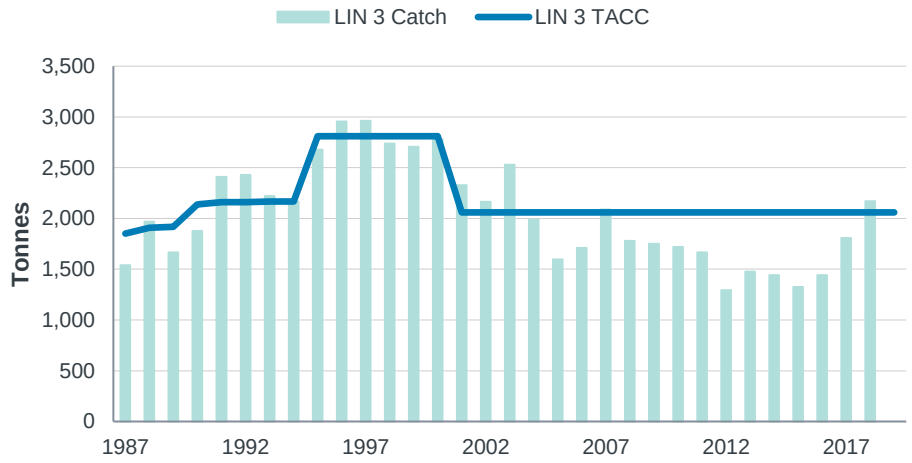

Figure 1: Total Allowable Commercial Catches and reported catches for LIN 3 (all gear types).

UoC 7 – LIN 4

Update on stock status (Holmes, 2019)	For the Chatham Rise stock (LIN 3 & 4), B_{2019} was estimated to be about 57% B_0; Very Likely (> 90%) to be above the management target (base case run).
TACC 2017-18	4,200 t
TACC 2016-17	4,200 t
TACC 2015-16	4,200 t

[1] There are typically differences between estimated and reported catches. “Estimated catch” is an at-sea estimate of the top 5-8 species per fishing event, whereas “reported catch” is the landings as reported against the TACC and balanced with ACE.

UoA share of TACC and total LIN catch	100% of TACC and 60% of total LIN catch (based on average estimated longline catch over the last two years)
UoC share of TACC and total LIN catch	94% of TACC and 57% of total LIN catch (based on average estimated longline catch over the last two years)
LIN 4 catch 2017-18	2,636 t (Total reported catch) 698 t (Estimated catch for all target trawl) 1,603 t (Estimated catch for bottom longline) 73 t (Estimated catch other methods).
LIN 4 catch 2016-17	2,565 t (Total reported catch) 666 t (Estimated catch for all target trawl) 1,542 t (Estimated catch for bottom longline) 2 t (Estimated catch other methods).

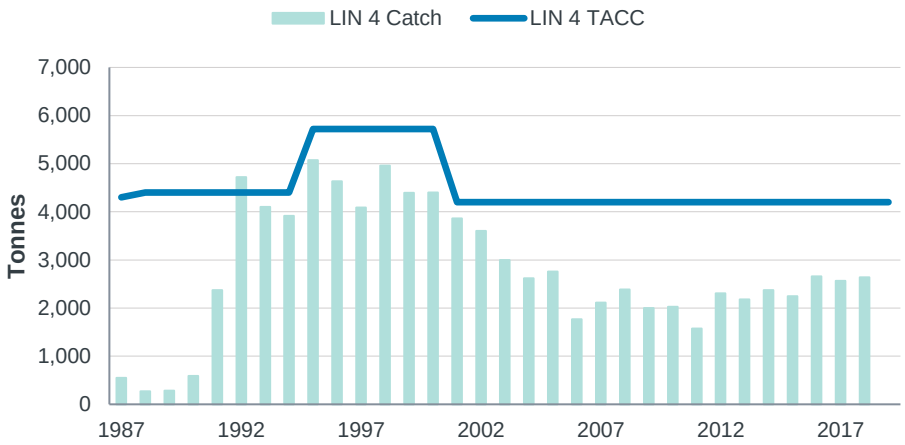

Figure 2: Total Allowable Commercial Catches and reported catches for LIN 4 (all gear types)

UoC 8 – LIN 5

Update on stock status (Masi, 2019)	LIN 5&6 (Sub-Antarctic excl. Bounty Plateau): B_{2018} was estimate be between 75% and 101% B_0; Virtually Certain (>99%) to be a above the target (40% B_0).
TACC 2017-18	3,955 t
TACC 2016-17	3,955 t
TACC 2015-16	3,955 t

UoA share of TACC and total LIN catch UoC share of TACC and total LIN catch	100% of TACC and 13% of total LIN catch (based on average estimated longline catch over the last two years) 95% of TACC and 13% of total LIN catch (based on average estimated longline catch over the last two years)
LIN 5 catch 2017-18 LIN 5 catch 2016-17	4,034 t (Total reported catch) 3,421 t (Estimated catch for all target trawl) 502 t (Estimated catch for bottom longline) 21 t (Estimated catch for other methods) 4,051 t (Total reported catch) 3,391 t (Estimated catch trawl) 575 t (Estimated catch bottom longline) 2 t (Estimated catch other methods)

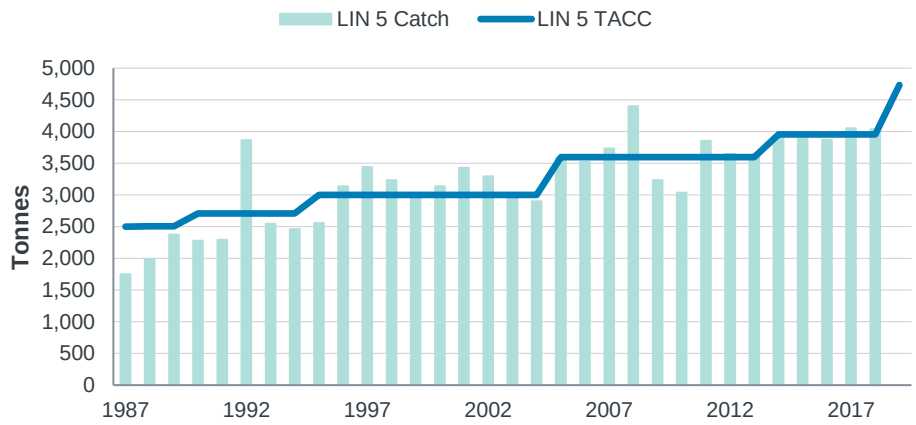

Figure 3: Total Allowable Commercial Catches and reported catches for LIN 5 (all gear types)

UoC 9 – LIN 6

Update on stock status LIN 5 & 6 (Masi, 2019) LIN 6B (Horn, 2007)	For the Sub-Antarctic stock (LIN 5 & 6, excluding the Bounty Plateau, LIN 6B), B_{2018} was estimated to be between 75% and 101% B_0; Virtually Certain (> 99%) to be above the management target. For the Bounty Plateau stock (LIN 6B part of LIN 6), B_{2006} was estimated to be 61% B_0; Very Likely (> 90%) to be at or above the management target of 40% B_0.
TACC 2017-18 TACC 2016-17	8,505 t 8,505 t

TACC 2015-16	8,505 t
UoA share of TACC and total LIN catch	100% of TACC and 25% of total LIN catch (based on average estimated longline catch over the last two years)
UoC share of TACC and total LIN catch	61% of TACC and 15% of total LIN catch (based on average estimated longline catch over the last two years)
LIN 6 catch 2017-18	4,845 t (Total reported catch) 3,656 t (Estimated catch trawl) 545 t (Estimated catch bottom longline) 2 t (Estimated catch other methods. 228 t (Estimated catch LIN 6B bottom longline)[2]
LIN 6 catch 2016-17	3,323 t (Total reported catch) 1,315 t (Estimated catch trawl) 351 t (Estimated catch bottom longline) 0 t (Estimated catch other methods) 932 t (Estimated catch for LIN 6B bottom longline)

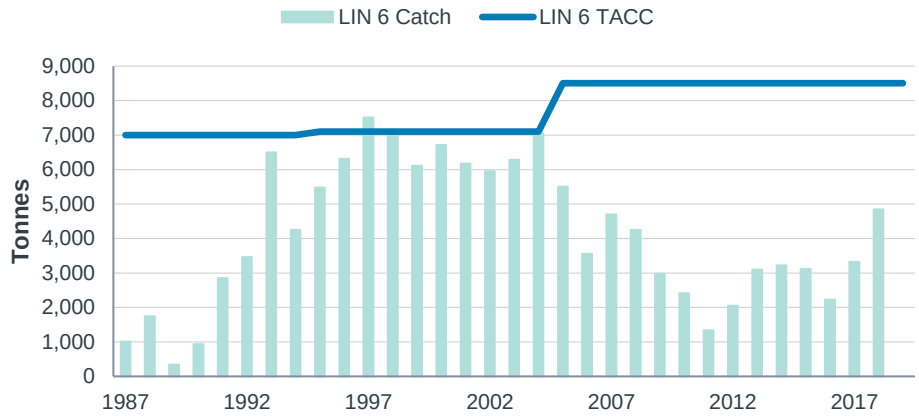

Figure 4: Total Allowable Commercial Catches and reported catches for LIN 6 (all gear types)

[2] LIN 6B catches are included in the above reported and estimated totals for LIN 6, but have also been separated out here for ease of assessing the LIN 6B fishery.

UoC 10 – LIN 7

Update on stock status (Dunn & Ballara, 2019)	Three alternative model runs were presented, with B_{2017} estimated to be 79%, 66% and 54% B_0, Very Likely (>90%) to be at or above the management target for all model runs.
TACC 2017-18 TACC 2016-17 TACC 2015-16	3,080 t 3,080 t 3,080 t
UoA share of TACC and total LIN catch UoC share of TACC and total LIN catch	100% of TACC and 23% of total LIN catch (based on average estimated longline catch over the last two years) 73% of TACC and 17% of total LIN catch (based on average estimated longline catch over the last two years)
LIN 7 catch 2017-18 LIN 7 catch 2016-17 	3,487 t (Total reported catch) 1,732 t (Estimated catch trawl) 822 t (Estimated catch bottom longline) 117 t (Estimated catch other methods) 3,428 t (Total reported catch) 1,891 t (Estimated catch trawl) 757 t (Estimated catch bottom longline) 26 t (Estimated catch other methods)

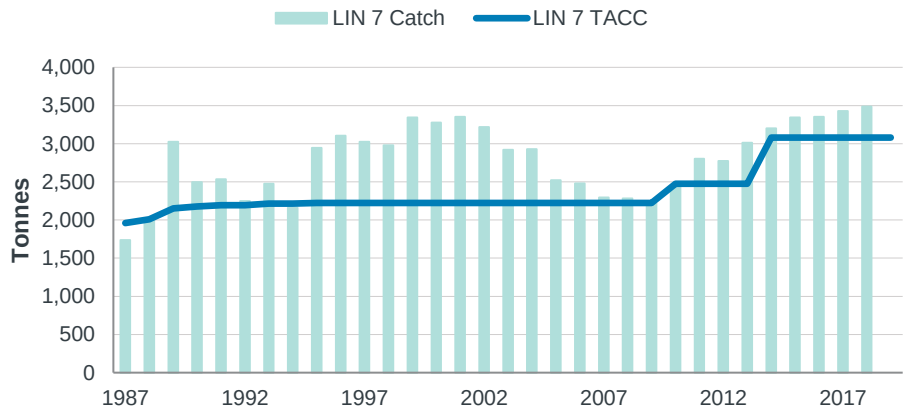

Figure 5: Total Allowable Commercial Catches and reported catches for LIN 7 (all gear types)

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Overview of environmental information

Observer Coverage

MPI's scientific observer programme (SOP) collects data from fisheries, including ETP incidental capture information. This ETP component, under New Zealand law, is administered and funded by the Department of Conservation (DoC) through levies recovered from relevant fisheries quota owners. All observer deployment is managed by the SOP.

The objective of the SOP is to collect data from fisheries for the following purposes:

- As an input to monitor key fisheries against harvest strategies
- As an input to monitor biomass trends for target and bycatch species
- To enable reliable estimations and the nature of ETP species interactions and captures
- To enable timely responses to sustainability and environmental impact issues
- To provide a high level of confidence in fishers' at sea compliance with regulatory and non-regulatory measures.

The level of observer coverage for the different fisheries/sectors is tailored to suit the data and information requirements, including for stock assessment, compliance monitoring and ETP species captures. FNZ considers that 30% coverage is sufficient for most fisheries/sectors but implements high (80-100%) coverage for fisheries where there may be what are deemed by management to be high risk ETP species

(e.g. squid and southern blue whiting trawl fisheries where operations overlap with sea lions).

Achievement of target observer coverage rates in the ling longline fleet is difficult given the small size of many vessels, leading to observer accommodation issues, and the short duration of fishing trips, which involves comparatively high observer deployment costs relative to trawl fisheries. Observer coverage over the recent 5-year period has ranged between 3% and 23% of hooks deployed and has shown a steady increase over the last three years (Table 1, Figure 6), (Dragonfly, 2019). In 2017-18, observer coverage on vessels less than 34 m covered 7% of hooks deployed, while on vessels greater than 34 m it covered 34% of hooks deployed (FNZ, 2019).

Table 1: Observer coverage in the ling longline fisheries (LIN 3, 4, 5, 6 & 7) as a percentage of hooks observed, 2013-14 to 2017-18.

	2013-14	2014-15	2015-16	2016-17	2017-18
Observer Coverage	9%	3%	9%	15%	23%

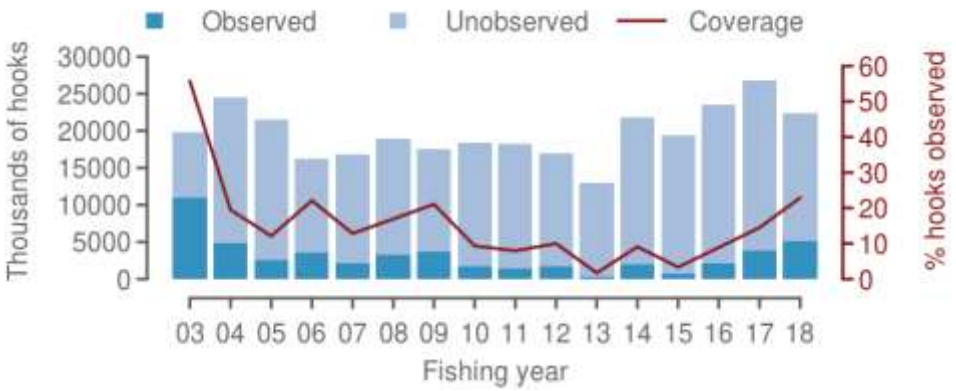

Figure 6: Numbers of hooks deployed and observed deployed in all ling longline fisheries, 2002-03 to 2017-18.

In 2019-20 a total of 400 days of observer time will be focused on monitoring and recording interactions with seabirds, including mitigation methods deployed, captures and seabird behaviour around vessels, for smaller vessels operating in LIN3 and LIN 4 on the Chatham Rise (DOC, 2019).

Retained & bycatch species

Ling accounts for around 66% of the total reported catch from ling-targeted longliners. The main non-target species, in decreasing order by weight, are QMS species spiny dogfish, ribaldo, rough skate, smooth skate, sea perch, pale ghost shark and red cod, followed by non-QMS species black cod and shovelnose dogfish (Finucci & Anderson, 2019). Eight of the top ten bycatch species are managed within the QMS and catches are therefore well monitored and with direct controls to limit their overall catch. The main discard species are spiny dogfish, black cod, conger eel and deep water dogfish.

While spiny dogfish is a QMS species, it has been listed as a Schedule 6 species under the Fisheries Act 1996 and can be legally returned to the sea (dead or alive) provided the catch is reported and balanced against ACE.

The trend in total bycatch has been relatively constant over the period 2002-03 to 2018-19, while for discards there has been a slight decrease (Finucci & Anderson, 2019).

ETP species

Information on incidental captures of ETP species, reported by vessels and by MPI observers, is summarised in the Aquatic Environment and Biodiversity Annual Review reports (e.g. FNZ 2019), and on the MPI website which is maintained under contract by Dragonfly Ltd (Dragonfly, 2019). The latter provides open access to multi-year records of ETP species captures by fishery sector and fishing method, based on MPI observer data, and is updated annually through the FNZ science working group process.

In addition to MPI's scientific observer programme, a range of management measures, including some industry-led, non-regulatory initiatives, are employed to monitor environmental interactions in deep water fisheries and to reduce the risk of any adverse effects on protected species populations. Measures relating to the monitoring and risk management of ETP species are described in DWG's Operational Procedures (DWG, 2019) and 10 Commandments for ling longline fisheries (DWG, 2019a).

Seabirds

Seabirds are subject to incidental capture by ling longline vessels during line setting and hauling when birds target baited hooks. The Ling Longline Operational Procedures prescribe a range of mitigation measures to be followed to mitigate seabird capture (e.g. use of tori lines, night-setting, line weighting, thawing of bait prior to deployment, dimmed deck lighting during setting, offal discharge restrictions), (DWG, 2019).

Measures relating to the capture-mitigation and monitoring of seabirds are described in DWG's Ling Longline Operational Procedures (DWG, 2019).

Between 2013-14 and 2017-18, there were between 16 and 89 observed, and between 496 and 857 estimated, incidental seabird captures per annum in ling longline fisheries (Table 2), (Dragonfly, 2019).

Table 2: Observed and estimated incidental seabird captures and capture rates in all ling longline fisheries, 2013-14 to 2017-18.

Fishing Year	% Observed Hooks	Observed Captures	Estimated Captures (Median)	Estimated Captures 95% CI	Observed Capture Rate/1000 Hooks
2013-14	9.09%	31	857	(532-1393)	0.016
2014-15	3.35%	16	664	(403-1126)	0.025
2015-16	8.90%	89	789	(523-1247)	0.042

2016-17	14.48%	35	743	(455-1280)	0.009
2017-18	22.89%	23	496	(315-786)	0.004

White-chinned petrel, the species captured most often, has comprised 81% of the incidental seabird catch over the 5-year period 2013-14 to 2017-18 (Fig. 7). These birds are capable of swimming down to considerable depths and are adept at accessing baited hooks during longline deployment.

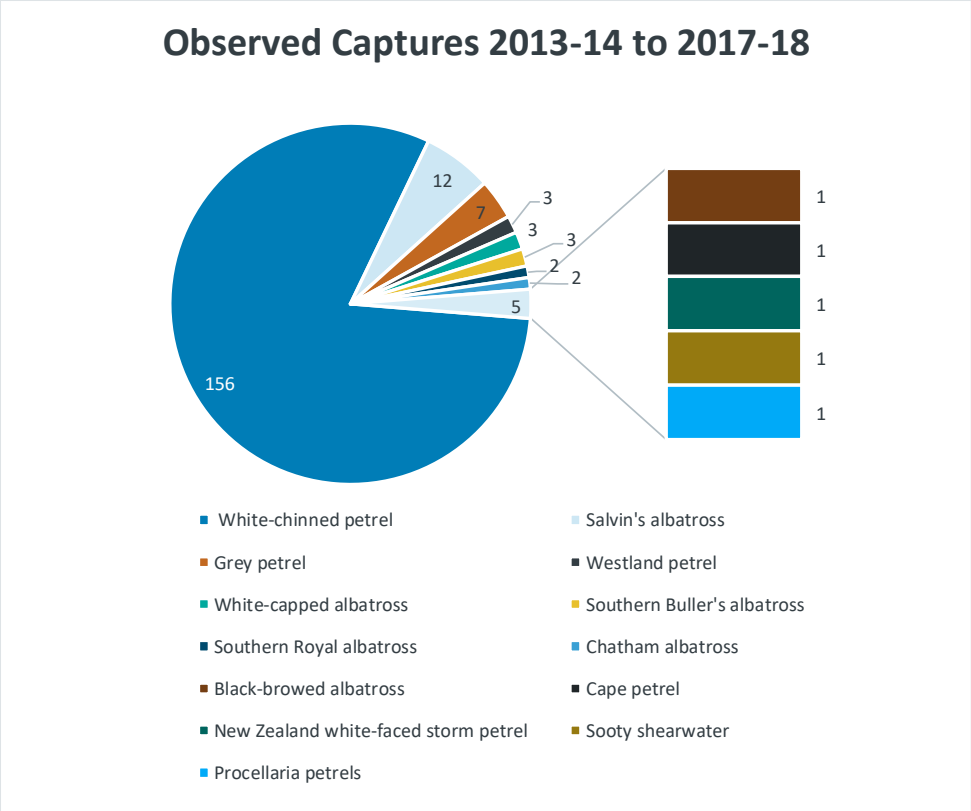

Figure 7: Observed seabird captures by all ling longliners 2013-14 to 2017-18.

The risk classifications from the Spatially Explicit Fisheries Risk Assessment Framework (SEFRA), (Richard et al., 2017), for the main species incidentally captured in the ling longline fishery are provided in Table 3 below. The Annual Potential Fatalities (APFs) for these species, for all New Zealand fisheries, are well below the estimated Population Sustainability Thresholds (PSTs).

Table 3: Threat and risk classifications, for all New Zealand fisheries combined, as applicable to the most prevalent incidental seabird captures by the ling longline fishery, noting the APFs are for all NZ commercial fisheries combined.

Species	SEFRA Risk Classification (all fisheries combined)	SEFRA Mean APF	SEFRA Mean PST
White-chinned petrel	Low	1,360	25,600
Salvin's albatross	High	2,780	3,600

Grey petrel	Low	203	5,530
Westland petrel	High	180	350
White-capped albatross	High	3,830	10,900
Southern Buller's albatross	High	528	1,370
Southern Royal albatross	Low	19	848
Chatham albatross	High	155	425

The two species incidentally caught by ling longliners that are at highest risk are Salvin's albatross and Westland petrel, which have total risk ratios near or above 50% of the PST threshold of 1 (Richard et al., 2017).

Censuses undertaken of Salvin's albatross at their breeding colonies on Bounty Islands show that the number of breeding pairs increased between 2010 and 2013 and that their raw numbers have steadily increased from around 43,000 in 2010 to around 60,000 in 2018 (Table 4), (Baker & Jensz, 2019). A further study is being undertaken at the Bounty Islands this year (in progress October 2019).

Table 4: Censuses of Salvin's albatross at Bounty Islands

Census Year	Breeding Pairs	Raw Counts	95% CI
2010	31,786	42,826	42,212-43,240
2013	39,995	53,893	53,429-54,357
2018	Not estimated	60,419	59,927-60,911

Estimated incidental captures of Salvin's albatross in ling longline fisheries over the 5-year period from 2013-14 to 2017-18 have ranged between 33 and 97, with an average of 58 birds per annum (Fig. 8), (Dragonfly, 2019).

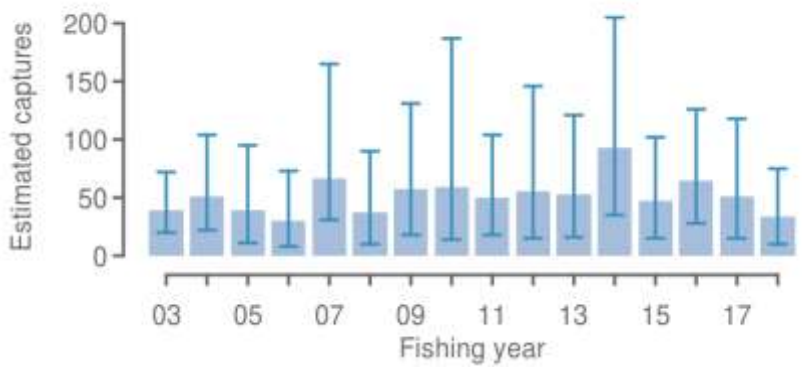

Figure 8: Estimated incidental captures of Salvin's albatross by ling longline fisheries 2002-03 to 2017-18.

The Westland petrel population is considered to be stable at around 4,000 breeding pairs (Waugh & Bartle, 2013), and the population is estimated to be stable or slightly increasing, based on demographic studies at the largest colony (Waugh et al. 2015).

While modelled estimates of Westland petrel captures are not currently available, the low number of observed incidental captures per annum by ling longline fisheries, totalling three birds over the 5-year period 2013-14 to 2017-18 (Fig. 7), in combination with the increasing level of observer coverage (Table 2), suggest they do not pose a high risk to the Westland petrel population. Their median Annual Potential Fatality (APF) rate of 180 for all trawl and longline fisheries combined is well below their estimated Population Sustainability Threshold (PST) of 350 (Richard et al., 2017).

DoC has multiple seabird population assessments projects planned and/or underway, including for white-chinned petrel, Salvin's albatross, southern Buller's albatross, Gibson's albatross, white-capped albatross, northern giant petrel and flesh-footed shearwater (DoC, 2019).

DWG Liaison Programme for ETP Species Risk Management

DWG's Environmental Liaison Officer (ELO) visited 34 ling longline vessels[3] (11 autoline & 23 hand-baiting) in 2017-18 to:

- Deliver PowerPoint-assisted training courses to senior crew (and at times vessel managers) on the need for ETP species capture mitigation and on best practice mitigation methods
- Provide training material on best practice environmental operations and procedures and ensure updated versions of all OPs are on each vessel
- Check that VMP's are updated and appropriate for each vessel's fishing operations
- Physically check their seabird mitigation equipment is fit-for-purpose and functional and ensure officers and crew are aware of the need to maintain conformance with offal control and mitigation systems to reduce seabird interactions (DWG, 2019)
- On call 24/7 for any communications or calls for support from vessels, including for trigger capture events
- Compare information from observers to ensure the best information is available on the nature of significant capture events.

The ELO additionally visits any vessel that has reported trigger-point captures in order to assess the possible reasons for the captures, whether they could have been prevented, and to educate the skipper on how to reduce the risk of such events re-occurring (DWG, 2019b). Increased attention on ling longliners will be a key focus of the ELO programme during 2019-20.

In summary, the existing seabird mitigation strategies applied by DWG and FNZ for ling longline fisheries, in combination with FNZ's seabird risk assessment and management approach, serve to ensure that the UoAs do not hinder recovery of any seabird populations.

[3] Excluding smaller vessels landing less than 2 t of ling annually, of which there are approximately 10 - 15 boats (note most of these vessels are under other DOC CSP risk programme plans e.g. surface longline).

Marine mammals

There have been no reported incidental captures of New Zealand sea lions, New Zealand fur seals, whales or dolphins in the ling longline fisheries subsequent to the 2004-05 fishing year.

Benthic interactions

Bottom longline fishing has minimal interactions with the benthic habitat.

New Zealand's strategy to guard against adverse impacts on the benthic environment includes multiple area closures in the EEZ. A total of 17 Benthic Protection Areas (BPAs), representatively distributed around the EEZ, and 17 'seamount' closures, collectively close 30% of the EEZ to bottom fishing (Helson et al., 2010). The area closures protect:

- 28 percent of underwater topographic features (including seamounts)
- 52 percent of seamounts over 1000 metres in height
- 88 percent of known active hydrothermal vents.

Aquatic environment and biodiversity research initiatives related to the benthic effects of fishing are detailed in the Annual Operational Plan for Deepwater Fisheries (FNZ, 2018, pp. 29-31) and include undertaking a spatially explicit benthic impact assessment for deepwater fisheries.

Key P2 references

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Overview of management information

Legal & customary framework

New Zealand's fisheries management is centred on the Quota Management System (QMS), a system introduced in 1986 based on Individual Transferrable Quota (quota), Total Allowable Catch (TAC) limits and Total Allowable Commercial Catch (TACC) limits.

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."*

Quota is a tradable property right that entitles the owner to a share of the TACC. At the commencement of each fishing year, quota gives rise to Annual Catch Entitlements (ACE) which are tradable, expressed in weight, and entitle the holder to land catch against them. The QMS enables sustainable utilisation of fisheries resources through the direct control of harvest levels based on the best available science. The QMS is administered by MPI through the Fisheries Act 1996.

New Zealand has implemented one of the most extensive quota-based fisheries management systems 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.

At an operational level, the ling longline fisheries are managed in accordance with the National Fisheries Plan for Deepwater Fisheries (FNZ, 2019b). There is a species-specific chapter for ling within this plan (MPI, 2011).

The National Deepwater Plan consists of three parts:

- Fisheries management framework and objectives:
  - Part 1A - strategic direction for deep water fisheries
  - Part 1B - fishery-specific chapters and management objectives at the fishery level
- Annual Operational Plan (AOP) – detailing the management actions for delivery during the financial year (FNZ, 2018)
- Annual Review Report – reporting on progress towards meeting the five-year plan and on the annual performance of the deep water fisheries against the AOP (FNZ, 2019a).

Collaboration

In 2006, DWG and FNZ (then MPI), entered into a formal partnership to enable collaboration in the management of New Zealand's deepwater fisheries. This partnership was updated in 2008 and 2010 (MPI, 2010), and has directly facilitated improved management of the ling fisheries through:

- A close working relationship under a shared and agreed vision, objectives and collaborative work plans
- Real-time, open communication between DWG and FNZ on information relevant to management measures, particularly from the FNZ Observer Programme and commercial catching operations.

FNZ and DOC actively consult with interested parties to inform management decisions through their open scientific working groups and public consultation processes.

Compliance & enforcement

FNZ maintains a comprehensive compliance programme, which includes both encouraging compliance through support and creating effective deterrents. This strategy is underpinned by the VADE model, which focuses on all elements of the compliance spectrum as follows:

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 and recognises that some individuals may deliberately choose to break the law and require formal investigation and prosecution.

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 FNZ to monitor all deepwater vessel locations at all times. This system is now being replaced by Geospatial Position Reporting. FNZ still combines this functionality with at-sea and aerial surveillance, supported by the New Zealand Defence Force. This

independently provides surveillance of activities of deep water vessels through inspection and visual capability to ensure these vessels are fully monitored and verified to ensure compliance with both regulations and with industry-agreed Operational Procedures.

All commercial catches from QMS stocks must be reported and balanced against ACE at the end of the month. It is illegal to discard or not to report catches of QMS species. 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, main species caught for each tow, and total landed catch for each trip.

Introduced in January 2019, all New Zealand vessels are transitioning in a staged implementation programme to new Electronic Reporting and Geospatial Position Reporting (replaces VMS) regulations. All New Zealand vessels now report catch daily on an event-by-event basis. These reports are validated against positional data allowing for timely interventions and compliance oversight in near real time.

FNZ audits commercial vessel 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 correctly.

Commercial fishermen face prosecution and risk severe penalties, which include automatic forfeiture of vessel and quota upon conviction of breaches of the fisheries regulations (unless the court rules otherwise). Financial penalties are also imposed in the form of deemed values to discourage fishermen from over-catching their ACE holdings.

The extensive regulations governing these fisheries are complemented by additional industry-agreed non-regulatory measures, known as the New Zealand Deepwater Fisheries Operational Procedures. The Minister for Fisheries relies on the effectiveness of both regulatory and non-regulatory measures to ensure the sustainable management of these fisheries.

As part of DWG's Operational Procedures, DWG has an Environmental Liaison Officer whose role is to liaise with vessel operators, skippers and MPI to assist with the effective implementation of these Operational Procedures.

Fisheries plans

The National Fisheries Plan for Deepwater Fisheries (FNZ, 2019b), is a statutory document approved by the Minister of Fisheries. This Plan provides an enabling framework outlining agreed management objectives, timelines, performance criteria and review processes. There is a fisheries-specific chapter for the ling fisheries within this Plan (MPI, 2011).

The actual management measures and delivery outcomes in the Plan are specified in FNZ's Annual Operational Plan (AOP), (FNZ, 2019c), which is reviewed and updated annually. In addition, an Annual Review Report assesses performance against the AOP and is publicly available (FNZ, 2019a).

Research plans

Research needs for deep water fisheries are driven by the Objectives of the National Plan for Deepwater Fisheries and delivered through the research programme for deep water fisheries.

All research projects are reviewed by FNZ's Science Working Groups and assessed against FNZ's Research and Science Information Standard for New Zealand Fisheries (MFish, 2011).

Tables 8-11 and 16 FNZ's Annual Operational Plan 2019/20 provide lists of research projects to be undertaking that relate to deep water species (FNZ, 2019c) specify planned research for 2019-20.

FNZ's Medium-Term Research Plan for Deep Water Fisheries provides a five-year schedule of science and monitoring projects (e.g. biomass surveys and stock assessments) required to support the sustainable management of deepwater fisheries (MPI, 2017).

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