

An underwater scene with several lingcods swimming in a dark, brownish water. Sunlight rays stream down from the top, creating a dramatic, high-contrast environment. The fish are shown in profile, with their characteristic long, pointed snouts and mottled patterns on their bodies.

Bait use by New Zealand Ling Longline Fisheries

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Background

A Recommendation in the ling longline PCR requires information to be provided annually on the species, quantities and origin of bait used by the MSC certified ling longline fisheries (LIN 3-7), as follows:

“PI 2.1.3, Sla. A recommendation is set that information is collected annually to determine the quantities and sources of bait species used in the fishery. This information should be retained and reported routinely at annual surveillance audits of the fishery.”

This report provides a breakdown of bait use by ling longline vessels representing over 91% of the effort during the 2019-20 fishing year and an evaluation of the status of bait ‘bycatch’ species in relation to the overall catch composition.

Method

DWG’s Environmental Liaison Officer identified 33 longline vessels engaged in ling longline fishing. Many of these vessels are involved in bottom longline fisheries other than ling (e.g. bluenose, hapuku, snapper, ribaldo, school shark and also surface longlining for tuna species). This analysis of bait use focuses on vessels with effort directed primarily at ling, of which 19 vessels were identified and which represented over 91% of the fishing effort based on the number of hooks deployed during the 2019-20 fishing year. Seven of these were autoliners and 13 were hand-baiters.

Bait usage templates were forwarded to companies and/or owners for completion via email. In two cases, data were sourced via telephone call. The information requested included:

- Average duration and number of ling-targeted trips undertaken per year?
- Average quantity of bait used, by species, during ling-targeted fishing trips?
- Origin of the bait used (NZ trawl-caught, NZ purse seine-caught, imported)?
- State of bait used (e.g. whole or fillets)?

Jack mackerel is one of the main baits used and the three species caught in New Zealand are all required to be reported against the generic code, JMA. The information on where the JMA bait was sourced from provided a reasonably good basis for identifying it as either *T. novaezelandiae* if it was sourced from purse seine operators, or as *T. declivis/T. murphyi* if it was sourced from trawl fishing operators. *Trachurus declivis* and *T. murphyi* are taken mainly by trawl gear in waters deeper than 150 m in the JMA 3 and JMA 7 management areas, while *T. novaezelandiae* is the dominant jack mackerel species taken by a purse seine fishery off the east coast of North Island in management area JMA 1 in waters shallower than 150 m (FNZ, 2020).

Results

Characterisation of bait used

Feedback received from companies and vessel owners covered a total of 19 ling-targeting longline vessels, which accounted for ~91% of the effort in FMAs LIN 3-7. Four bait types are used:

- Jack mackerel (JMA): Used by autoline vessels. Most sourced from New Zealand and a small quantity from Chile. All New Zealand JMA categorised as trawl-caught was assumed to be either *T. declivis* or *T. murphyi*, while if purse seine-caught was assumed to be *T. novaezelandiae*.
- Barracouta (BAR): Used by one of the smaller autoliners and by all of the hand-baiting vessels (skin-on fillets, purchased frozen in 10-20 kg boxes, trawl-caught).

- Atlantic/English mackerel (EMA): Imported, used by one vessel as part of its bait complement.
- Squid (SQU): Used by two vessels, both autoliners (whole or dressed form). Most sourced from New Zealand trawl fishery and a small quantity from Chile.

A breakdown of average annual bait use by species and capture method illustrates that jack mackerel species, squid, barracouta and Atlantic mackerel comprise around 54%, 21%, 23% and 2% respectively, with around 90% being sourced locally (Table 1).

Table 1: Local and imported bait species and the estimated annual quantity used by ling longline vessels during the 2019-20 fishing year.

Bait Species	Capture Method	Origin	Quantity (t)	Proportion (%)
Jack mackerel	Trawl	New Zealand	506	45.1%
Jack mackerel	Purse seine	New Zealand	18	1.6%
Jack mackerel	Trawl?	Imported	80	7.1%
Atlantic mackerel	Trawl?	Imported	25	2.2%
Squid	Trawl	New Zealand	215	19.1%
Squid	Jig?	Imported	21	1.9%
Barracouta	Trawl	New Zealand	258	23.0%
Total - all			1,123	100.0%
Total - NZ			997	88.8%

Assessment of bait bycatch status

An estimate of the total targeted ling longline catch from LIN 3-7, of 5,113 t for the 2019-20 fishing year, was sourced from FNZ (G. Lydon, pers. comm.). The most recent information on bycatch composition for the ling longline fishery (Finucci *et al.*, 2020) provides estimates of the top 100 fish species based on observer data for the period 2002-03 to 2017-18. The process applied for the present analysis was as follows:

- The observed catch estimates for the top 40 species, for the period 2002-03 to 2017-18, were divided by 16 to provide an average annual catch estimate by species
- The average annual catch estimates were raised by a factor of 7.14 so that the LIN catch approximated that taken in 2019-20. This produced an estimate of catch composition for the top 40 species
- The bait usage estimates for the 2019-20 fishing year were then added to the catch composition and their contributions calculated as a percentage of the overall estimated ling longline catch (i.e. the bait species were treated as 'bycatch' in the LIN longline fishery). Bait sourced from countries other than New Zealand, which amounted to around 11.2% of the bait used, was excluded.

The ling longline catch composition, modified to include bait as 'bycatch', indicates that JMA trawl (two species), JMA purse seine, BAR and SQU respectively comprise 5.7%, 0.2%, 2.9% and 2.4% of the total estimated commercial catch (Table 2).

Table 2: Estimated ling longline catch composition for the 2019-20 fishing year by target, QMS bycatch, non-QMS bycatch and 'bait bycatch' species.

Category	Catch (t)	Proportion (%)
Targeted LIN catch	5,113	57.6%
QMS bycatch	2,220	25.0%
Non-QMS bycatch	542	6.1%
JMA trawl-caught bait	506	5.7%
JMA purse seine-caught bait	18	0.2%
BAR bait	258	2.9%
SQU bait	215	2.4%
Total	8,872	100.0%

A detailed breakdown of the estimated ling longline catch composition by species for 2019-20 is provided in Table 3.

Table 3: Estimated catch composition for the ling longline fishery for the 2019-20 fishing year. Ling targeted catch in orange, QMS species in blue, non-QMS species in black and the three bait species in red.

Species Code	Estimated Catch (t) 2019-20	Estimated Catch (%) 2019-20	Species Code	Estimated Catch (t) 2019-20	Estimated Catch (%) 2019-20
LIN	5,113	60.0%	CSQ	34	0.4%
SPD	1,168	13.7%	DWD	24	0.3%
JMA trawl	506	5.9%	CON	21	0.3%
RIB	259	3.0%	HPB	21	0.2%
SQU	215	2.5%	RAT	20	0.2%
RSK	212	2.5%	JMA purse	18	0.2%
BAR	180	2.1%	SCO	17	0.2%
BCD	132	1.5%	HAG	16	0.2%
SSK	116	1.4%	BNS	14	0.2%
SPE	114	1.3%	HAK	13	0.2%
GSP	99	1.2%	CAR	12	0.1%
RCO	94	1.1%	PLS	12	0.1%
SND	84	1.0%	HAP	11	0.1%

SCH	60	0.7%	NSD	10	0.1%
GSH	51	0.6%	SKA	8	0.1%
HCO	47	0.5%	ETB	7	0.1%
BSH	41	0.5%	CHI	6	0.1%
OSD	34	0.4%	ETL	4	0.1%
		Contd.	Totals	8,524	100.0%

An evaluation of the quantities of JMA, BAR and SQU used as bait by the ling longline fisheries, as against annual commercial catches of these species in the 2019-20 fishing year, shows that only a very minor component of each of these fisheries is used as bait (Table 4).

Table 4: JMA, BAR and SQU quantities used as bait by the ling longline fleet in relation to New Zealand commercial catches during 2019-20.

Species	Capture Method	Fishery Management Area	Catch 2019-20 (t)	Bait Use (t)	Bait Use (%)
JMA	Trawl	JMA 3 & 7	36,805	506	1.37%
JMA	Purse seine	JMA 1	6,478	18	0.28%
BAR	Trawl	BAR 1, 4, 5 & 7	22,792	258	1.13%
SQU	Trawl	SQU 1T & 6T	42,031	215	0.51%
		Totals	108,106	997	0.92%

Conclusion

Based on the defensible assumption that trawl-caught jack mackerel comprises two species, *T. declivis* & *T. murphyi*, and that purse seine-caught jack mackerel comprises *T. novaezelandiae*, none of the bycatch species is likely to exceed 5% of the total ling longline catch and none, therefore, is a 'main' species.

References

- Finucci, B., Anderson, O.F. and Edwards, C.T.T. (2020). Non-target fish and invertebrate catch and discards in New Zealand ling longline fisheries from 2002-03 to 2017-18. New Zealand Aquatic Environment and Biodiversity Report No. 241. 83 p. <https://www.mpi.govt.nz/dmsdocument/40757-AEBR-241-Non-target-fish-and-invertebrate-catch-and-discards-in-New-Zealand-ling-longline-fisheries-from-200203-to-201718>
- FNZ (2020). Fisheries Assessment Plenary May 2020. Stock Assessments and Stock Status Vol. 2: Jack Mackerels (JMA), Pp. 627 – 650. <https://www.mpi.govt.nz/dmsdocument/40784-Fisheries-Assessment-Plenary-May-2020-Volume-2-Hoki-to-Redbait>

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