

Observer reports from squid-jigging vessels off the New Zealand coast 1999

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1. Introduction

Scientific observers are placed on vessels by the Conservation Services Levy Programme in fisheries that interact with protected marine species to: obtain statistically reliable information on the number of protected species taken in a number of commercial fisheries; verify the accuracy of reporting by commercial fishers of protected species bycatch; identify possible means for mitigating the incidental take of protected species and collect other biological information on protected species.

In 1998/1999, 100 observer days were funded for the Squid Jig Fishery off the Otago Coast. Observer services were purchased from the Ministry of Fisheries (MFish) Observer Programme. The objective of these observer days was to determine the impact of the squid-jigging fishery on protected species. Observers recorded, in diaries, general descriptions of animal/vessel interactions and animal behaviour with comments on fishing practices relating to bycatch issues. This paper reports on qualitative information related to interactions with protected species obtained during the debriefing of those observers (including information from MFish Trip Reports and field diaries).

2. Observer coverage

The Conservation Services Levy Programme, under project CSL 98 1A, briefed two MFish scientific observers to record interactions of seabirds and marine mammals with squid-jigging vessels from the Chinese and Japanese fleets fishing for squid quota in Fisheries Management Area (FMA) 5. It was anticipated that a third observer would be briefed for the latter part of the squid season, to observe on a vessel from the Taiwanese fleet, but this did not occur, as the fleet moved to northern waters.

3. Non-fish bycatch injuries or mortalities

No seabirds or marine mammals were seen by observers to be injured or killed as a result of fishing operations. A potential risk of accidental seal capture or damage from squid-baited shark hooks on hand lines was identified and discouraged by one observer. On that same trip a penguin was captured with a scoop net by a "curious" crew member, the observer requested its immediate release as a protected species, and the bird was returned to the water alive and apparently unharmed.

4. Inter-species interactions

The observers reported that an apparent "food chain hierarchy" developed within the area of the vessels' lights. Small bait species (samples of krill/prawn and juvenile scampi were collected for identification and analysis by the National Institute of Water and Atmospheric Research Ltd. (NIWA)) attracted predators such as squid, mullet/herring, barracouta, fur seals, and bluenose sharks. The effects of submerged coloured lights could not be determined, from the echo sounding traces, as contributing a further attraction to any of the underwater species seen.

No jig-line entanglements were seen as a result of marine mammals feeding from the squid catch or other attendant species. Most line entanglements are believed to be caused by sharks. One observer recorded a hooked 2-metre bluenose shark which tangled two lines before eventually bending off the jig hook. Later, several shark/gear events which tangled three jig lines were observed. The crew repaired some of the damaged hooks.

5. Seabirds

At night most seabirds adopted peripheral locations at the extreme range of a vessel's lights, thus reducing identification to "large or small seabirds" rather than to species level. It was thought, however, that the same species were present during daytime fishing.

Birds were not seen to approach squid rising on the jigs either above or below the water by night or day. Observers experienced with longline fisheries felt that the deployment of the jig lines may present a torii streamer-like effect to the birds. It was also felt that the intensity of the lights (e.g. 140 bulbs each @ 2000 watts on one vessel) may deter the birds' approach at night.

Off Banks Peninsular and south of the Convergence Zone, approximately 100 to 150 sooty shearwaters were seen feeding on scampi. In rough seas shearwaters congregated in many rafts of about 500 birds, but otherwise they dispersed in thousands around the fleet's lights. Generally, more seabirds and more species were seen offshore (vessel B) between the Otago and Banks Peninsulas.

Lower numbers of birds were observed (5 to 50 cape pigeons, but less than ten albatross, mollymawks, shags or terns) on the vessel that fished closer inshore (vessel A), from the Otago peninsular towards Stewart Island. An exception occurred when large numbers of birds were seen associated with a separate vessel's gill net operations. Cape pigeons were seen to take pieces of squid tentacle washed overboard from the scuppers. Black-backed gulls were regularly seen scavenging on galley scraps in daytime.

A checklist of seabirds recorded by observers is attached as Appendix 1.

6. Marine mammals

Pods of up to 50 dolphins were seen at a distance (from 50 to 1000 metres), when the vessels were steaming to different fishing grounds. One Master noted that dolphins only played in ones and twos around the vessel, but left when the vessel stopped to fish. There was no apparent risk to dolphins from jig fishing.

New Zealand fur seals seen around the vessels seemed to favour the areas shadowed by the inboard lights, i.e. directly beneath the vessel, under the flair of the bows, and in the area aft where light is occluded by the v-shaped mizzen sail. Some fur seals appeared to wait for food scraps when the vessel was drifting with the starboard aft quarter (cook's galley chute) in the lee. One Master commented that seals have not been a problem in New Zealand but that Peru has sea lions that take squid from hooks. Filipino crewmen said that seals take squid fallen from lures. Despite anecdotal reports of firearms being used to scare off seals, the only witnessed use of gunpowder was in fireworks discharged in celebration of the Chinese New Year. Fishing was suspended at this time.

6.1 FUR SEAL BEHAVIOUR OBSERVATIONS

The structured CSL briefing required on-the-hour counts of marine mammals sighted within the range of the lights in each vessel quarter (to port or starboard and fore or aft of amidships) to be recorded on data forms provided. However, the 24-hour fishing day and variable frequency of jigger servicing required a supplementary time/sighting log to be kept. In addition, conditions for making marine mammal observations were restricted by each vessel's layout and deployment of equipment. A walkway between the bulwarks and deck housings gave access to viewpoints between the delivery chutes of adjacent twin-jig machines. Caution was required gaining lateral vision of the shaded areas along the hull from these stations. Comprehensive diary notes provided the main record for the following behavioural observations.

Relatively few large fur seals were seen, 95% appeared to be "middle" sized, and no small or juvenile animals were seen. Middle sized animals yielded the "preferred" lee side to the larger animals when they were present. Groups of two to four animals were thought to exhibit a degree of territoriality to either the port or starboard illuminated waters. It could not be determined if the submerged lights (white, red, green, lowered from 55 to 90 metres deep) directly attracted seals when deployed by day or night.

General activities (singly or in small groups) observed at night included:

- no interest in vessel (seals just passing);
- relaxing (seals spending several hours in one vessel quarter);
- slipstreaming in vessel's lee (seals singly, or in twos, "exercising" back and forth with an occasional roll);
- curiosity (seals interacting with birds chasing scraps);
- playing (seals performing rolls, dives, chasing);
- "crazy exuberance" (fast "rocket-like" darting with dynamic turns).

A very noticeable difference in seal behaviour was observed with the sun up and vessel deck fishing lights turned off. The animals lolled in close proximity to one another with no indication of feeding or hunting interest, all tension and hyperactivity was absent.

6.2 DESCRIPTIONS OF FUR SEAL FEEDING

Fur seals were seen to feed on squid, barracouta, red cod, mullet or herring, and appeared to be feeding on scampi and prawn. Usually only solitary animals were observed feeding. Fur seals were observed chasing squid among lures. They were never observed removing squid or fish from lures. The most common method of capturing squid was to come up from below and catch the targeted prey on the way up. Another hunting position was when the seal was on its side, nothing out of the water, seemingly lifeless. From this position the seal disappeared straight down, no surface splash, no breath. Once, a seal was seen to attack outwards from the shade into the lit area around the vessel. At times the target was apparent, a shoal of squid or a single squid fallen from, or following, a lure. When hunting/feeding they did not flap flippers on surface, rub their muzzle, do cartwheels or exhibit other "play" or grooming behaviours. Nor did they show any catlike fidgety movements, flicking of body parts or little false starts. Feeding thus appeared to be a deliberate and focused activity.

7. Marine environment hazard

Of considerable concern was the observed, and reported, dumping of fishing debris by one of the vessels. Worn monofilament jig line (4 mm, clear) was dumped overboard in tangled "nests"(approximately 38 to 40 metres, replaced at 2 to 3 day intervals, from each of the 80 reels). This poses a potential entanglement risk for marine mammals, seabirds, and other marine life. The other vessel often lost the 1 kg dropper weights from the lines but retained or repaired the jigs and incinerated the worn 1-metre line sections. However, small (5 to 8 cm) offcuts of new line were washed overboard. It was noted that care was taken to avoid these lengths being washed into the delivery

chute and subsequently packed with the squid product. The individual or cumulative effects on marine systems of this type of waste cannot be accurately determined. Rubber gloves, plastic containers, and uncut packing bands were also seen to be discarded overboard from that vessel, again creating a potential risk to marine life. Packing bands are known to be a serious threat to marine mammals, as they can become entangled around a pinniped's or cetacean's body. In the case of baleen whales, these materials may be ingested. Extrapolation of these quantities to some 22 vessels operating over three months would signal a serious risk to marine protected species.

Historical records at MFish refer to squid-jig detritus in FMA 8 (Central West, off the bights of Taranaki) and note that the overboard discarding of waste by vessels of many nationalities is regrettably frequent (Colin Sutton, pers. comm.). More recently, quantities of line and jigs have reportedly been raised in jack mackerel trawls in that Fisheries Management Area.

8. Summary

1. Vessels from the Chinese and the Japanese fishing fleets carried observers for a total of 65 days while fishing for squid quota in FMA 5 from January to March 1999.
2. No seabirds or marine mammals were seen by observers to be injured or killed as a result of fishing operations.
3. An apparent "food chain hierarchy" develops within the area of the vessels' lights, with larger predators attracted to smaller bait species. Observed jig-line entanglements were caused by sharks.
4. Seabirds did not have a strong interaction with the vessels. They were not seen to approach squid rising on the jigs by day or night. Lower numbers of seabirds were observed closer to shore.
5. Dolphins only interacted with the vessels under steam, not while fishing was occurring.
6. Fur seals favoured shaded areas around the vessels. Mostly middle-sized fur seals were observed around the vessels. Fur seals fed on squid and fish species in the vicinity of the vessel. They were not observed to remove either from the squid jigs.
7. The dumping of large quantities of non-biodegradable fishing debris was observed. This poses the potential risks, to marine mammals, seabirds, and other marine life, of entanglement and ingestion.

9. Acknowledgements

The CSL Programme greatly appreciates the commitment of the observers, who often work under difficult conditions. The observers wish us to acknowledge the consideration shown to them by the companies and the vessels' crews. Data access is by agreement with the Ministry of Fisheries to retrieve catch/effort/location information (relevant to incidental marine mammal and seabird bycatch) from the observers. The cooperation of the Observer Programme Manager and operational staff is gratefully acknowledged.

Appendix 1. Seabird species checklists for each observed squid-jig trip.

Species Codes are maintained by the National Institute for Water and Atmospheric Research (NIWA).

Species (common names)	Vessel A	Vessel B	Species Code*
Albatross (unidentified)	1 - 3	2	XAL
Antipodes Island			
wandering albatross		1 - 2	XAN
Black-browed			
albatross (unidentified)	2	2 - 4	XKM
Cape pigeon (unidentified)	5 - 50	4 - 100	XCP
Flesh-footed shearwater		2 - 6	XFS
Giant petrel (unidentified)	1 - 2		XTP
Grey petrel		4	XGP
Light-mantled sooty albatross		2	XLM
New Zealand white			
capped albatross		2 - 4	XWM
Northern giant petrel		1	XNP
Northern royal albatross	30		XNR
Petrel (unidentified)	100	2	XPE
Prion (unidentified)		1 - 8	XPN
Seabird large		2 - 10	XSL
Seabird small		3 - 20	XSS
Seagull (black-backed)	2 - 40	5 - 10	XSG
Sooty shearwater		2 - 500	XSH
Southern Buller's albatross	1		XBM
Southern royal albatross		1 - 2	XRA
Wandering albatross			
(unidentified)		1	XWA
Tern (unidentified)	1 - 5		
Shag (unidentified)	1 - 2		
Little blue penguin	1		