

A photograph of several albatrosses swimming in the ocean. The birds have white heads and necks with dark brown wings and backs. They are scattered across the frame, with one in the center foreground showing its wings spread. The water is dark blue with white foam from the birds' movements.

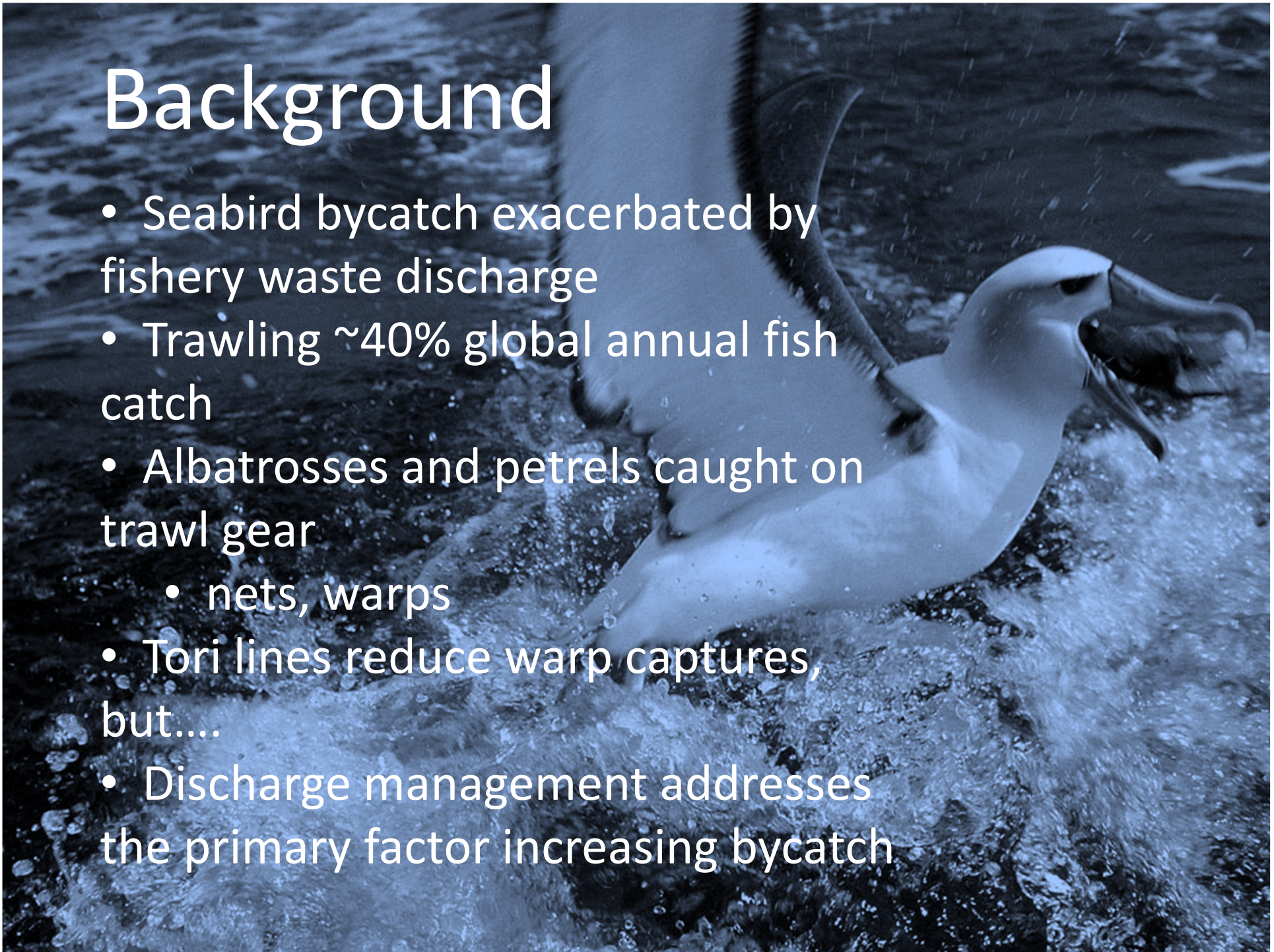
Reducing seabird bycatch through improving management of fisheries waste

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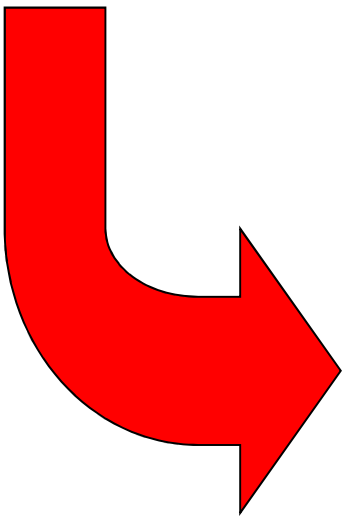
E Abraham, Y Richard – Dragonfly Science
J Cleal – FVMS Ltd; D Middleton – SeaFIC Ltd

Background

- Seabird bycatch exacerbated by fishery waste discharge
- Trawling ~40% global annual fish catch
- Albatrosses and petrels caught on trawl gear
 - nets, warps
- Tori lines reduce warp captures, but....
- Discharge management addresses the primary factor increasing bycatch



Warp strikes



Photos: DOC, MPI

A photograph of several albatrosses swimming in the ocean. The water is dark blue with white foam from the birds' movements. The albatrosses have white heads and necks with dark wings and backs. One albatross in the center is in the middle of a stroke, with its wings spread wide. Other albatrosses are visible in the background, some swimming and others partially submerged.

Objective

- To investigate a variety of fishery waste management regimes to reduce the risk of seabird bycatch on trawl gear
- 7-year research programme
- Vessel-based experiments
- Investigated effects of:
 - different durations of holding periods
 - different forms of fish waste discharge
- Identified management approaches relevant to operational capabilities

A photograph of several albatrosses swimming in the ocean. The birds are white with dark wings and heads. They are scattered across the frame, some swimming towards the camera and others away. The water is dark blue with white foam from the birds' movements.

Overview: Methods

- New Zealand trawl fisheries
 - range of target species
 - different fishing areas
 - trawl vessels ≥ 28 m in length
- 5 experiments 4 – 6 weeks in duration
- 3 – 4 treatments per experiment
- Randomised block design
 - 24-hour treatments changed at midnight
 - Pre-specified order of treatments
- Dedicated government observers

A photograph of several albatrosses swimming in the ocean. The birds are white with dark wings and heads. They are scattered across the frame, with some in the foreground and others further back. The water is dark blue with white foam from the birds' movements.

Overview: Methods

- Response: Seabird abundance in two areas astern
 - before and after discharge events
 - albatrosses + giant petrels
 - cape petrels
 - other petrels + shearwaters
- 10-m radius semicircle (incl. trawl warps)
- 40-m radius semicircle
- Counted using repeated sweeps through two areas over 60 minutes

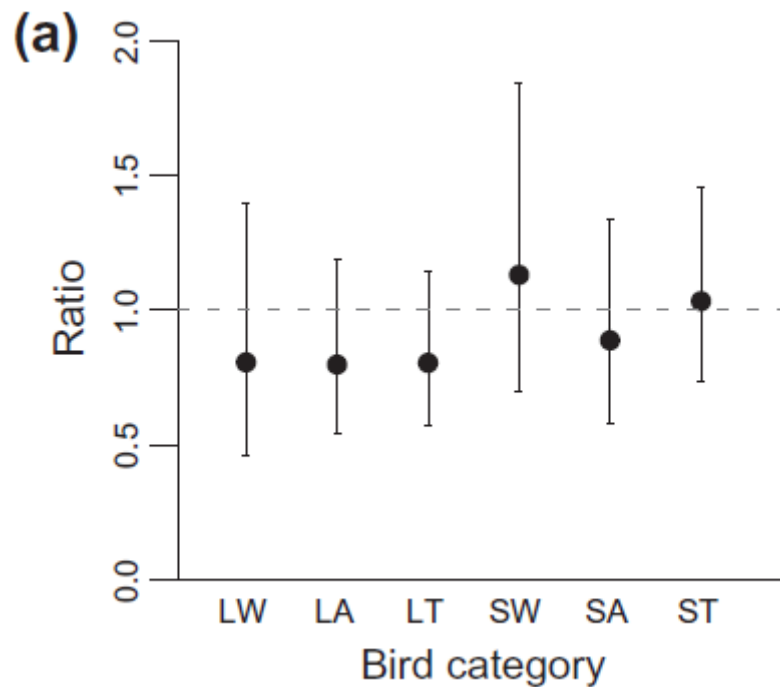
A photograph of several albatrosses swimming in the ocean. The water is dark blue with white foam from the birds' movements. The albatrosses have white heads and necks with dark wings and backs. One albatross is in the foreground, slightly to the left, with its head turned towards the camera. Another is in the center, with its wings spread. A third is on the right, and several others are visible in the background.

Overview: Methods

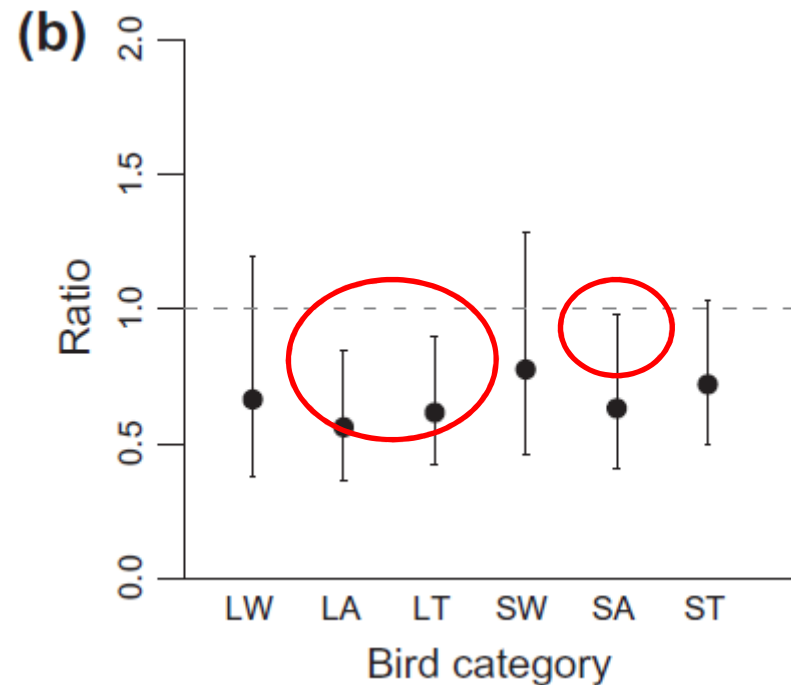
- Experimental discharge treatments
- Confirmed as discharge recorded when observed
 - type: offal, discards, mince, sump
 - rate: none, intermittent, continuous
- Covariates
 - location
 - weather + sea conditions
 - other vessels
- Bayesian models to fit count data

Results: Batch discharge

- Waste held for a specified period, then dumped as quickly as possible

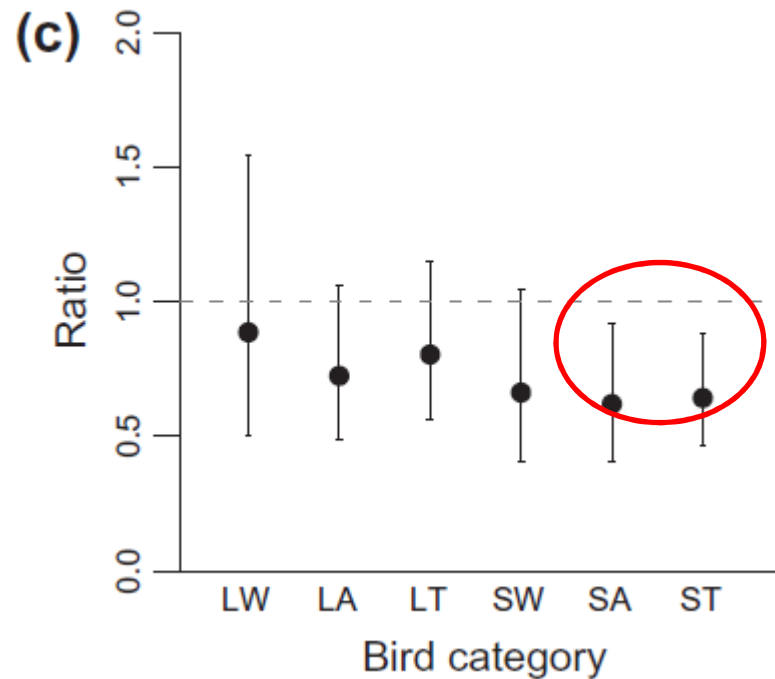


2 h vs. 30 min holding period



4 h vs. 30 min holding period

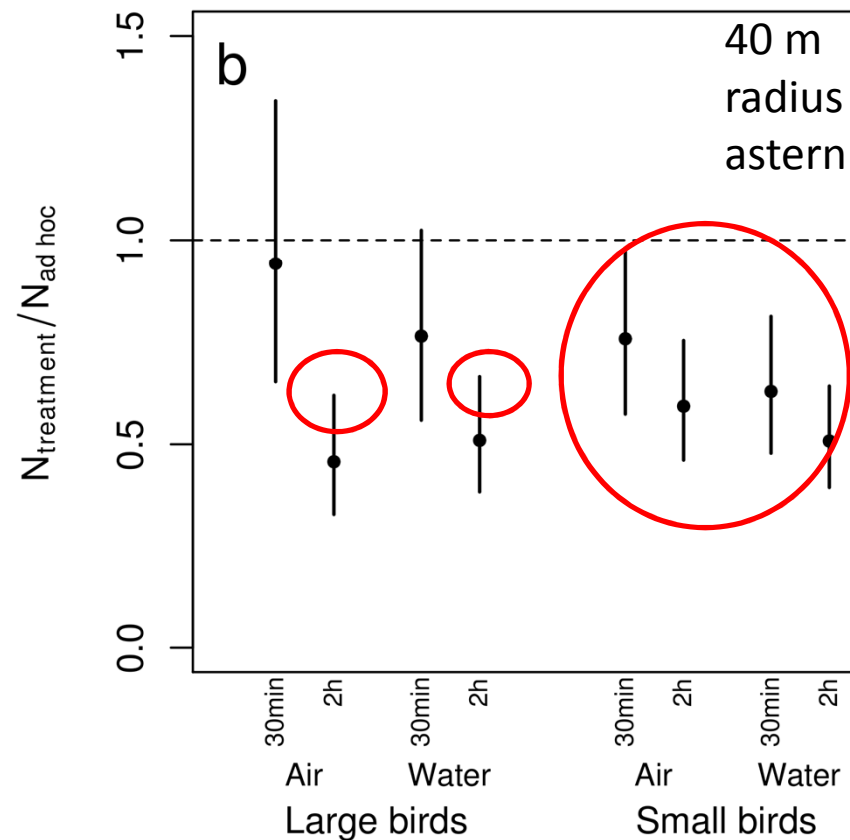
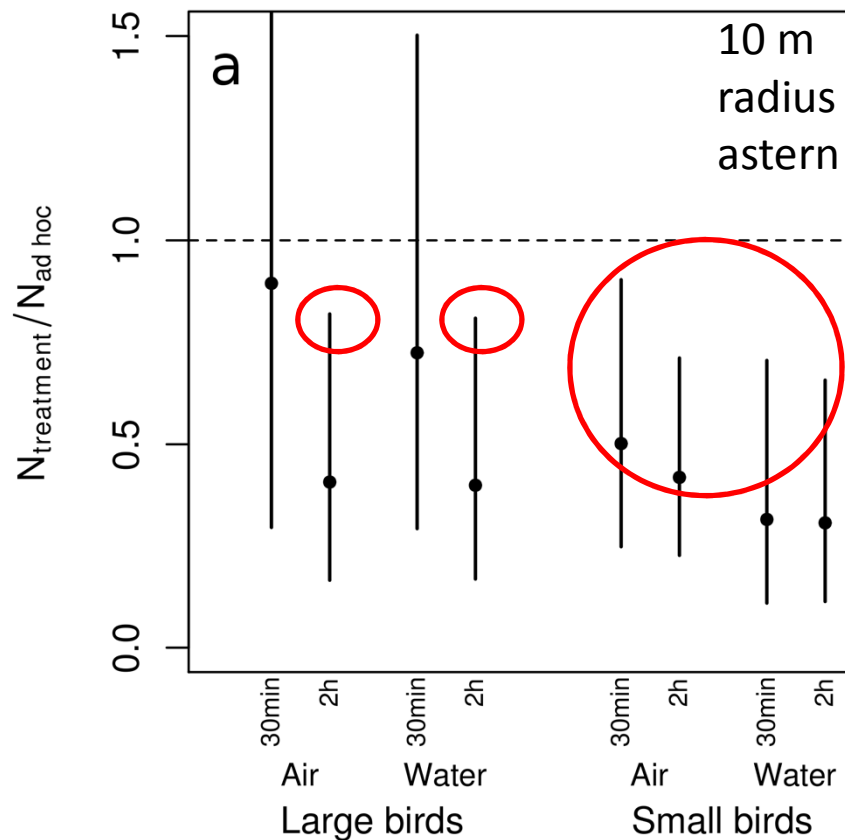
Results: Batch discharge



8 h vs. 30 min holding period

Results: Batch discharge

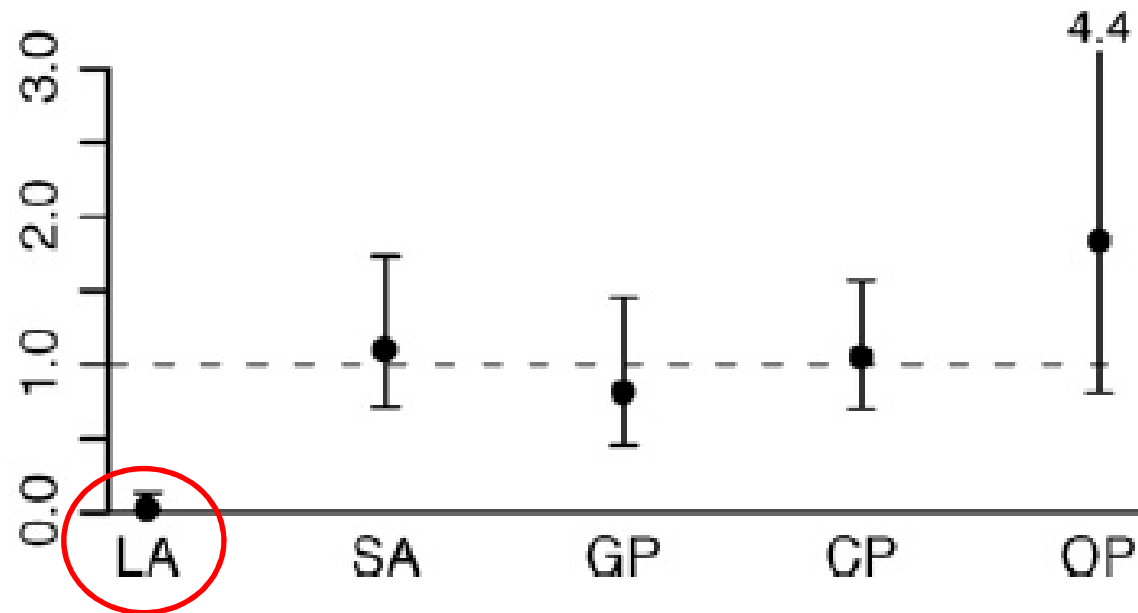
- Ad hoc discharge compared to waste held for a specified period, then dumped as quickly as possible





Results: Minced discharge

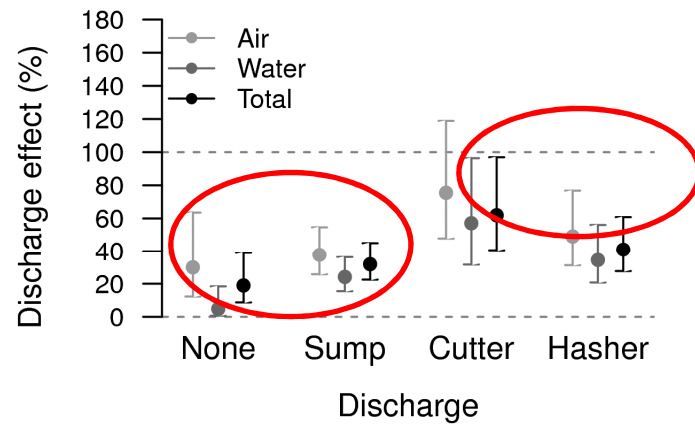
- Birds feeding on minced waste discharge vs. offal discharge



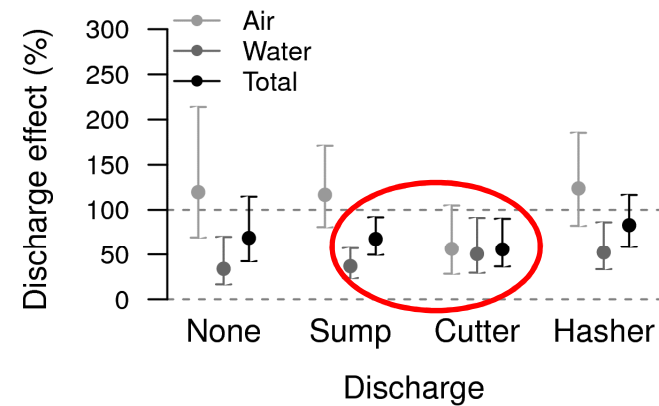
Abraham et al. 2009. Fisheries Research 95: 2010 – 219.

Results: Minced discharge

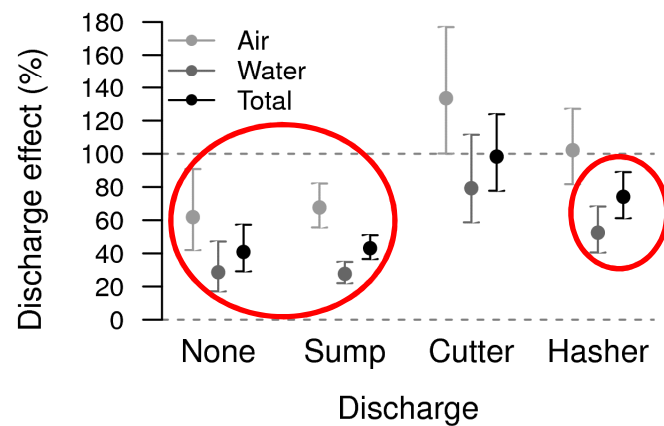
(b) Large albatross, 40m



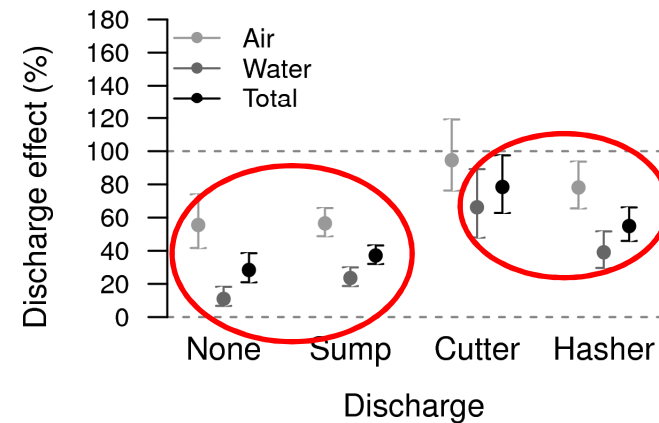
(f) Cape petrel, 40m



(d) Small albatross, 40m

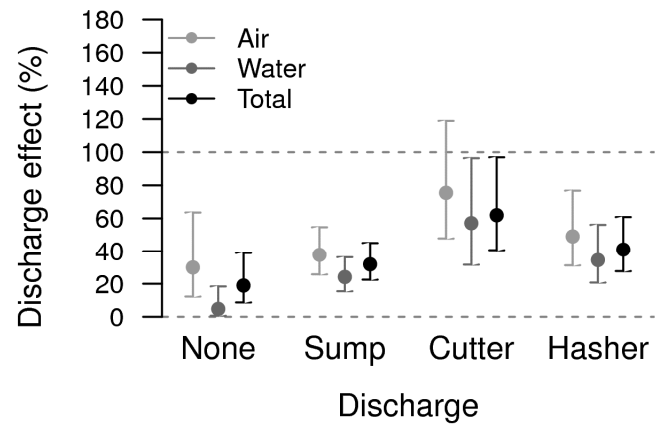


(h) Other petrel, 40m

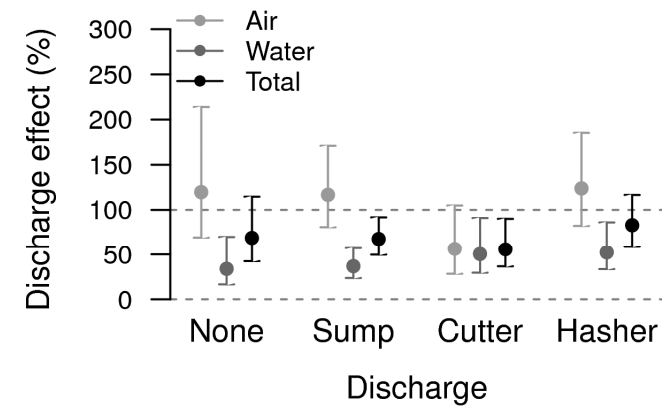


Results: Minced discharge

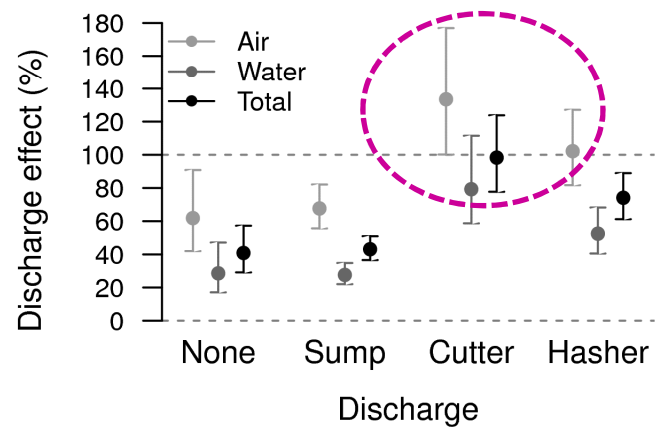
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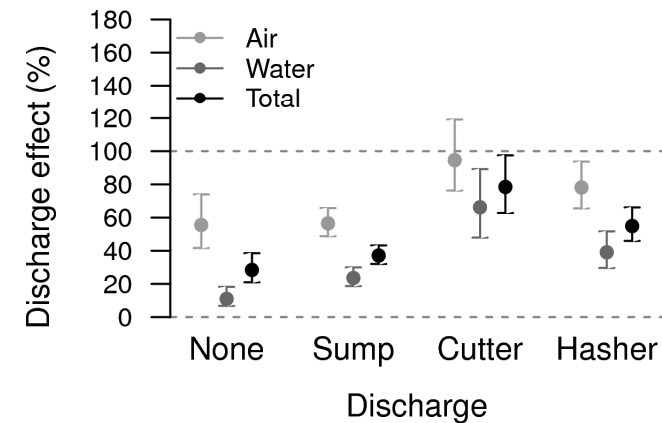
(f) Cape petrel, 40m

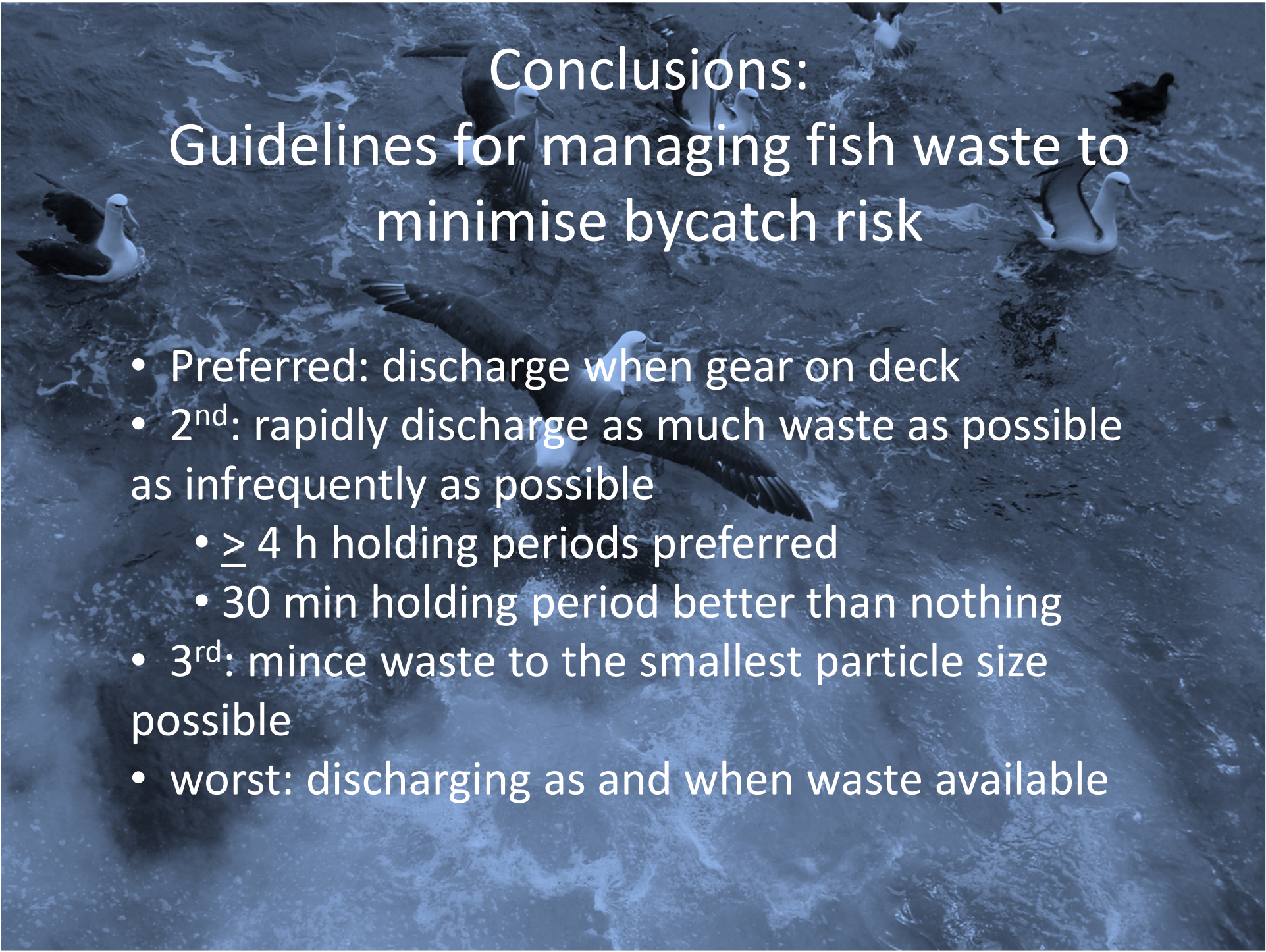


(d) Small albatross, 40m



(h) Other petrel, 40m





Conclusions: Guidelines for managing fish waste to minimise bycatch risk

- Preferred: discharge when gear on deck
- 2nd: rapidly discharge as much waste as possible as infrequently as possible
 - ≥ 4 h holding periods preferred
 - 30 min holding period better than nothing
- 3rd: mince waste to the smallest particle size possible
- worst: discharging as and when waste available

A photograph of several albatrosses swimming in the water. The birds are white with dark wings and heads. They are scattered across the frame, with some in the foreground and others further back. The water is dark and has some white foam or splashes. The overall tone of the image is blue and somewhat somber.

Issues

- Vessel storage capabilities
- Cost of retrofitting storage tanks, re-routing conveyors and piping
- Requires constant vigilance to keep factory floor clear of fish waste (sumps automated)
- Best practice:
 - robust waste management regime + deployment of effective mitigation device

Result!

Science-based management that reduces seabird bycatch risk



Photo: DOC, MPI



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Thanks to:

Sanford Ltd, Sealord Ltd, skippers, crews, onshore managers, Deepwater Group Ltd, Agreement on the Conservation of Albatrosses and Petrels, Department of Conservation, Ministry of Fisheries Observers

- Reference:

Pierre et al. 2012: Controlling trawler waste discharge to reduce seabird mortality. *Fisheries Research* 131 – 133: 30 – 38.

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