Reducing seabird bycatch through improving management of fisheries waste

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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
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
Overview: Methods

- New Zealand trawl fisheries
  - range of target species
  - different fishing areas
  - trawl vessels $\geq$ 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
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
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

• Fish waste cut into small chunks before discharge

Results: Minced discharge

• Birds feeding on minced waste discharge vs. offal discharge

Results: Minced discharge

Results: Minced discharge

(b) Large albatross, 40m

(d) Small albatross, 40m

(f) Cape petrel, 40m

(h) Other petrel, 40m

Conclusions:
Guidelines for managing fish waste to minimise bycatch risk

• Preferred: discharge when gear on deck
• 2\textsuperscript{nd}: rapidly discharge as much waste as possible as infrequently as possible
  • > 4 h holding periods preferred
  • 30 min holding period better than nothing
• 3\textsuperscript{rd}: mince waste to the smallest particle size possible
• worst: discharging as and when waste available
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
I'VE FOUND A WAY ROUND
YOU DUMPING OFFAL UNDER
THE WATER LINE, BUT DAVE...
YOU'VE GOT TO SET THE
MUFFIN MUNCHER TO
"COARSE"!

“Albert Times”: www.fishinfo.co.nz/albertross.htm
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• Reference:

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