



Assessment of cryptic seabird mortality due to trawl warps and longlines

Final Report: INT2013-05

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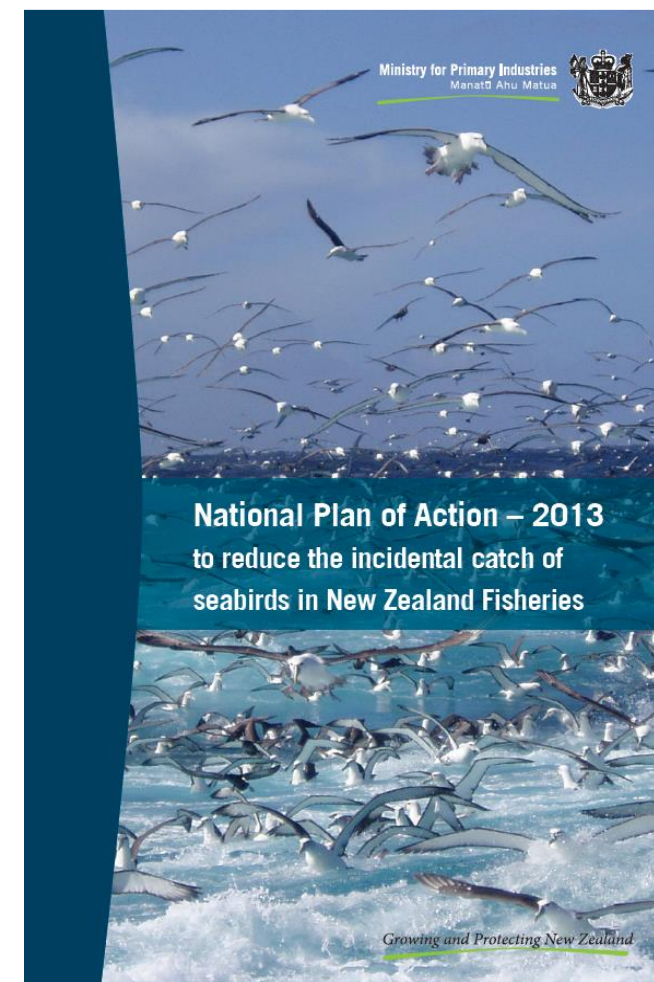
Yvan Richard

Edward Abraham



Introduction

- Understanding the extent of bycatch important for managing the impacts of fisheries
- NZ fisheries management frameworks incorporate cryptic mortality (CM): NPOA - Seabirds
- NZ: CM = Unobserved or unobservable mortalities
- Richard & Abraham (2013) risk assessment
 - Risk = ratio of estimated annual # of potential bycatch fatalities to the estimated # of seabirds that may be killed taking the PBR approach
 - R&A used multiplier approach to incorporate CM





Objectives

Overall objective:

- To estimate appropriate fishery- and species-group specific scalars to allow the robust quantification of total mortality from observed levels of seabird captures, in longline fisheries and on trawl warps

Specific objectives:

- Review available information from international literature and unpublished sources to characterise and inform estimation of CM and live releases for at-risk seabirds in New Zealand trawl and longline fisheries
- Identify those species and/or fishery groups for which current uncertainty regarding CM contributes most strongly to high risk scores for at-risk seabird species
- Recommend options to improve estimation of CM for those species/fishery group combinations



Methods: Priority fisheries/species

- R&A risk assessment
- Mean difference in risk ratios including and excluding CM
 - Larger mean differences -> CM more important contributor to estimated overall risk
 - Smaller mean differences -> CM less important
- Priority fisheries/species identified
- Then considered assumptions and uncertainties



Photo: J. Pierre

Methods: Information review

- New published and grey literature
- Expert input
 - Factors affecting CM
- Existing information sources, including databases, not currently publically available in usable form

Bird Survey and Interaction Monitoring for Falklands Islands Finfish Fishery



Falklands Islands Fisheries
Department



Methods: How to improve CM estimates

- Use of new and existing information
- Data collection
 - Use of existing government fisheries observer deployments
 - Experimental approaches



Photo: DOC/MPI



Results: Priority fisheries/species

- Mean differences in risk ratios incl. and excl. CM: 0 – 2.65
- Top fishery/species groups (0.5 – 2.65):
 - Black petrel – bluenose, snapper, small vessel BLL
 - Salvin's albatross – inshore trawl
 - Southern Buller's albatross – large meal trawl
 - White-capped albatross – small inshore trawl
 - Black petrel – small vessel tuna SLL





Results: Factors affecting CM

- All factors affecting bycatch affect CM
- A subset determines the proportion of captures that are cryptic
- Longline fisheries:
 - Time of line setting: scavenger access to carcasses
 - Gear configuration: escape opportunity, soak depth
 - Weighting
 - Hook type
 - Snood length
 - Where on body birds hooked/tangled
 - Gear remaining in/on captured birds released alive





Results: Factors affecting CM

- Trawl fisheries:
 - Mid-tow turns: carcass retention on sweeps, bridles, doors
 - Length of exposed warp: extent of warp strikes
 - Presence of warp sprags, grease: carcass retention
 - Tow depth: scavenger assemblage
 - Tow speed: carcass retention in net
 - Net mesh size: carcass retention

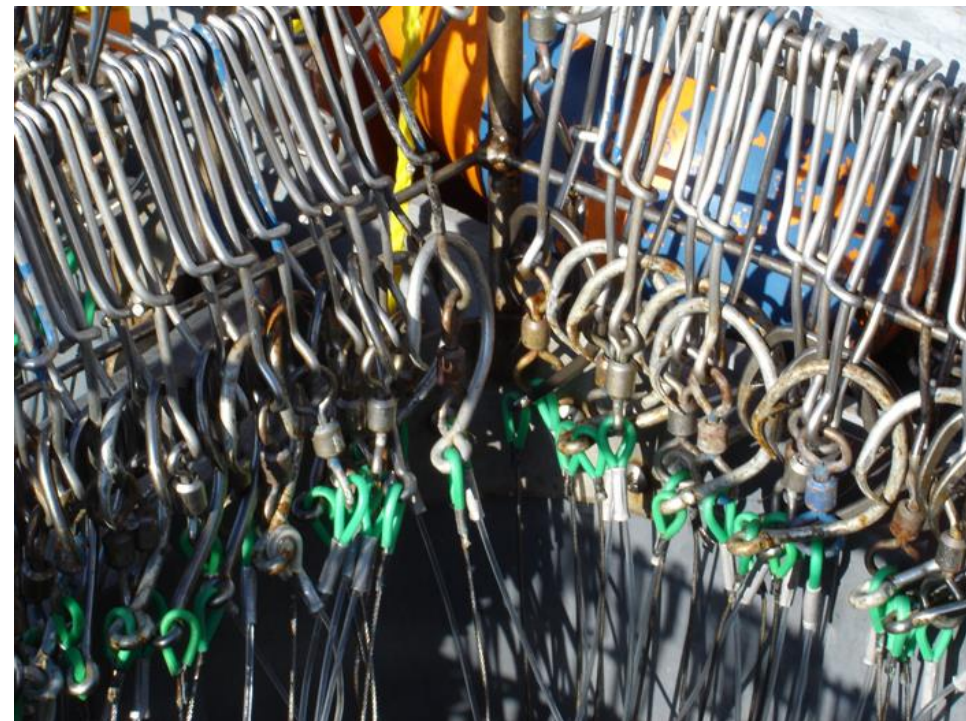


Photo: DOC/MPI



Results: Assumptions

- CM multiplier derived from overseas SLL fisheries
- Large and smaller vessels
- Four geographic regions, 15 years
- Applied to all NZ longline fisheries
- Assuming:
 - Findings from overseas appropriate to NZ
 - Extent of CM identical across all LL fisheries



Results: Assumptions

- CM multiplier based on NZ and South African information
- Mostly from large demersal trawlers
- Applied to all NZ trawl fisheries
- Assuming:
 - South African information appropriate to NZ
 - Extent of CM identical across trawl fisheries
 - Net-capture CM multipliers assumption-based
 - Aerial warp strikes assumed entirely cryptic
 - Species-based fatality rates assumed



Photo: J. Pierre

Results: Additional Information

- Broader definition of cryptic mortality (Gilman et al. 2013)
 - Pre-catch losses
 - Ghost-fishing
 - “collateral” mortalities
 - Post-release mortality
 - Cumulative effects of the fishing operation
- Some information available for NZ seabirds
 - Banding records
 - Colony-based records
 - Necropsy data from bycaught birds

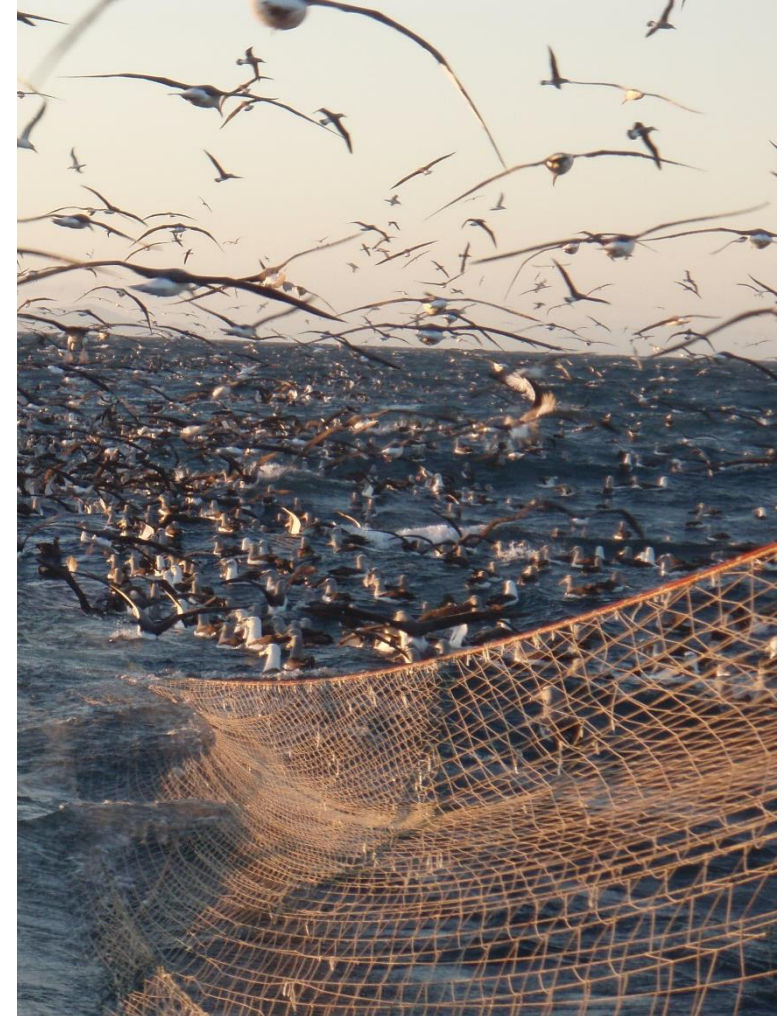


Photo: DOC/MPI



Results: Additional Information

- New information on the outcomes of trawl warp strikes
 - Demersal fisheries
 - Uruguay: larger vessels
 - Australia: smaller vessels
- One field study on cryptic mortality
 - Falkland Islands fishery
 - Demersal trawl vessel
- Existing, but not currently available, information
 - CCAMLR observer data

Assessing the effectiveness of seabird mitigation devices in the trawl sectors of the Southern and Eastern Scalefish and Shark Fishery in Australia



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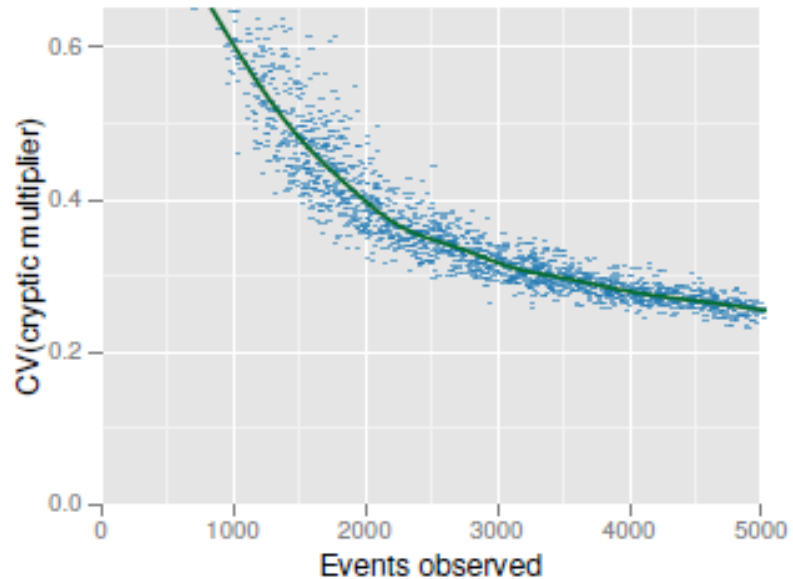
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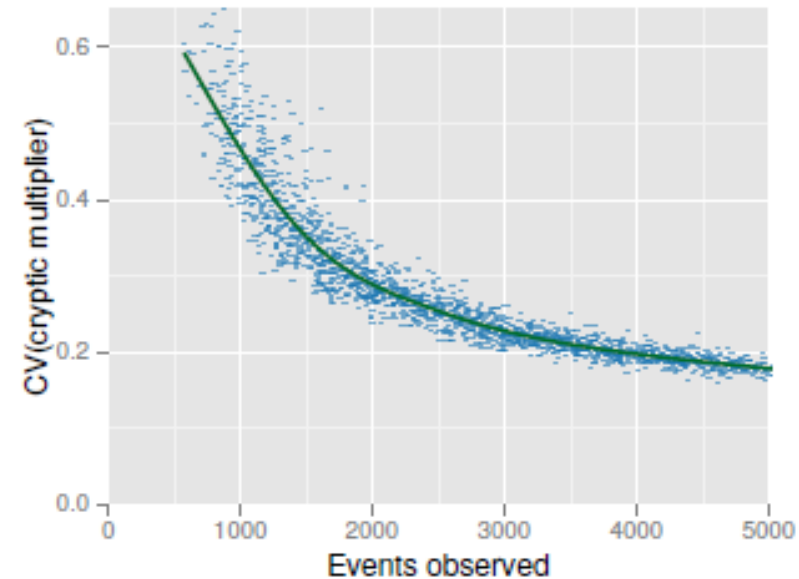
Conclusions: Improving CM Estimation

- To improve the confidence of CM multipliers, many fishing events must be observed

(a) Albatrosses, small trawl



(b) Albatrosses, large trawl





Conclusions: Improving CM Estimation

- Role of experimental approaches
 - May be expensive and methodologically challenging, but....
 - High quality data
 - Data collected in a shorter timeframe
- e.g., retention of longline carcasses on hooks, losses from trawl nets, monitoring live releases over time



Photo: © M. P. Pierre

Recommendations

- Confirm the definition of CM to be used in the NZ fisheries context
- Amend data collection protocols used by government fisheries observers to record potential incidents of CM
- Consider the role of experimental approaches in supporting improved estimates of CM and the development of multipliers

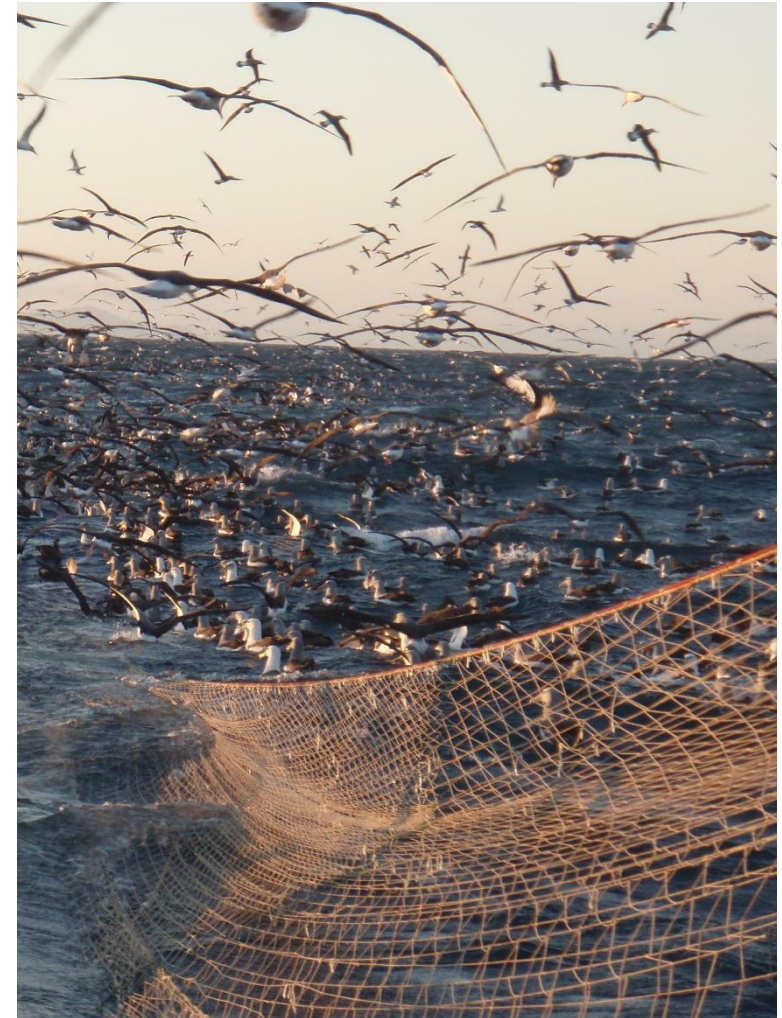


Photo: DOC/MPI



Recommendations

- Refine estimates of mortalities resulting from aerial warp strikes
- Develop method-specific scalars for bottom longline fisheries, especially vessels < 34 m
- Explore the development of scalars for trawl vessels < 28 m in overall length
- Refine CM scalars applied to small-vessel SLL fisheries





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Questions?

