

# Mitigating seabird captures on hauling in small-vessel longline fisheries

CSP Project MIT2015-02

Johanna Pierre



**JPEC** Ltd



# Introduction

- Seabird bycatch mitigation efforts often focuses on line-setting
  - e.g. tori lines, night-setting, line-weighting
- Haul captures can be a significant proportion of total captures
- Mitigation measures for use during longline hauling not well developed
- Factors influencing haul capture rates are not well understood
- Growing interest in haul captures amongst bycatch practitioners
  - Reflected in ACAP research priorities for pelagic longline fisheries





- Review approaches to mitigating haul captures in pelagic and demersal longline fisheries
- Explore information available on haul captures occurring on longline gear deployed by New Zealand vessels  $\leq 34$  m LOA
- Provide recommendations for future work to characterise and mitigate haul captures in New Zealand's smaller-vessel longline fisheries



# Methods: Review

- Past published and unpublished mitigation reviews
- Online search of published, grey and conference literature
- Targeted searches:
  - Regional Fisheries Management Organisations
  - Commission for the Conservation of Antarctic Marine Living Resources
  - Agreement on the Conservation of Albatrosses and Petrels
- Searches using names of haul mitigation measures
- Contacted mitigation practitioners re work in progress or not yet reported





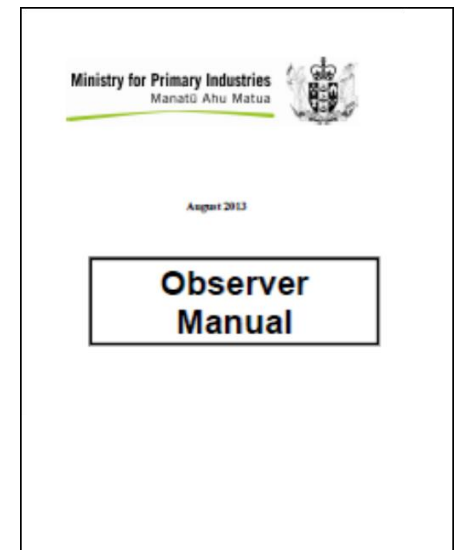


# Methods: Observer reports

Explored information available on haul captures, and mitigation measures in use, on smaller-vessel longliners in New Zealand:

$\leq 34$  m LOA

- Observer-reported seabird capture information collected 1 Oct 2009 onwards
- Assume live captures are most likely to be haul captures
- Observer trip information for trips starting April 2012
  - Observer diaries
  - Photographic logs
  - Observer information collected for the seabird liaison programme





# Methods: Recommendations

- So what?
  - Unanswered questions
  - Improvements to data collection relevant to haul captures
  - Approaches to reduce captures on hauling
  - What next?





# Results: Mitigation approaches

- 3 broad categories
  - Physical barriers impeding access
  - Reduced attractiveness of haul area
  - Deterrents







# Physical barriers

## Bird exclusion device:

- AKA bird curtain, Brickle curtain, bird baffler
- A range of designs trialled and in use
- Operational definition developed by CCAMLR.

### Device must:

- effectively deter seabirds from flying into the area where the line is being hauled
- prevent seabirds that are sitting on the surface from swimming into the hauling bay area
- Research has shown efficacy and habituation
- May require management to avoid tangling





# Physical barriers

## Tori line:

- May be shorter than a tori line used on setting
- May have streamers
- Has a terminal buoy or string of buoys
- Efficacy confirmed in research trials

## Towed buoy(s):

- Involves a single terminal buoy or series of buoys
- Effective but less so than tori line
- Requires management to avoid tangling



A large seabird, possibly a booby, is shown in flight over a blue ocean. The bird's wings are spread wide, and it is positioned centrally in the upper half of the frame. The text "Reducing attraction" is overlaid in white on the bird's body.

# Reducing attraction

- Retaining used bait, fish discards, processing waste
- Effective in reducing seabird captures, and attacks on returning baits in most (but not all) cases
- Provision reinforces food – vessel connection
- Minimum operational standard
  - Retain for batch discharge away from hauling station





# Deterrents

- Water spray
- Deck hose
- Acoustic cannon
- Banging a gaff on the hull
- Shouting
- Lasers
- Fish oil





# In use on NZ vessels $\leq$ 34 m

- Information on seabird interactions with gear during hauling identified in reporting from 133 observed trips
  - 73 BLL
  - 60 SLL
- Shows a range of measures in use
- Most measures are operational, not “devices”
- Variation in practices between trips on a vessel
- Information recorded qualitatively
  - Not highly standardised
  - Sometimes difficult to interpret definitively



# In use on NZ BLL vessels $\leq 34$ m

- Tori line (1 vessel):
  - 25 m long tori line, no streamers, terminal buoy
- Bird “baffler” (1 vessel)
- Deck hose slotted into scupper grill (1 vessel)
- Swinging a long-handled net (1 vessel)
- Keeping hooks below the surface during breaks in hauling (3 skippers)
- Moving the line constantly to reduce birds’ ability to grab returning bait/fish (1 vessel)
- Manoeuvring vessel so haul station is immediately above incoming line, reducing seabird access (2 trips)
- Making a lot of noise (2 trips)







In use on NZ BLL vessels  $\leq$  34 m

- Differences in how returned baits, offal and discards were managed
- Returned baits (trip reports):
  - Retained some or all of the time during hauling (20)
  - Never retained (9)
  - Discharged at hauling station (9) compared to away (4)
  - Discharged until birds arrive, then retained (2)
  - “Flicked” away from the mainline (2)

A large seabird, possibly a booby, is shown in flight over the ocean. The bird's wings are spread wide, and its body is dark. The water below is a deep blue with some whitecaps. The text "In use on NZ BLL vessels ≤ 34 m" is overlaid on the image in white font.

In use on NZ BLL vessels  $\leq$  34 m

Offal (trip reports):

- Always or sometimes retained onboard until after hauling, or batch discharged during hauling (22)
- Never retained during hauling (4)
- Discharged at the hauling station (5)
- Discharged away from the hauling station (9)
- Timing of discharge influenced by when processing occurred
  - Often processing took place after the haul was complete



In use on NZ BLL vessels  $\leq$  34 m

Discards (trip reports):

- Always or sometimes retained and discarded after hauling (5)
- Never retained (4)
- Dead fish are “popped” before discarding (1)
- Space constraints led to discarding, e.g. a high number of SPD caught (1)







# In use on NZ SLL vessels $\leq$ 34 m

- Float deployed beside the vessel (1 vessel)
- Float suspended from a tuna pole swinging out over the haul area (1 vessel)
- Deck hose (2 vessels)
- Water curtain (2 vessels)
- Hauling as quickly as possible (1 vessel)
- Jerking the snood constantly to reduce birds' ability to grab returning bait/fish (1 vessel)
- Steep line angle at hauling to reduce seabird access (1 vessel)
- Deck lighting minimised at haul (1 vessel)



In use on NZ SLL vessels  $\leq$  34 m

- Differences in how returned baits, offal and discards were managed
- Returned baits (trip reports):
  - Retained some or all of the time during hauling (21)
  - Never retained (2)
  - Discharged at hauling station (2) compared to away (3)
- Offal (trip reports)
  - Retained some or all of the time during hauling (9)
  - Never retained (4)
  - Discharged away from the hauling station (7)

# Capture characteristics

## Fisher reports

|     | #   | Injured | Uninjured |
|-----|-----|---------|-----------|
| BLL | 172 | 8 %     | 92 %      |
| SLL | 136 | 35 %    | 65 %      |

## Observer reports

|     | #  | Injured | Uninjured |
|-----|----|---------|-----------|
| BLL | 78 | 58 %    | 42 %      |
| SLL | 44 | 82 %    | 18 %      |





# Fisher-reported captures: Key BLL target sp.

| FMA            | Target   | Live and dead captures | % of total reported captures in FMA | % of fishing effort in FMA | % of captures live | % live captures that were albatross | Seabirds caught alive   |
|----------------|----------|------------------------|-------------------------------------|----------------------------|--------------------|-------------------------------------|---|
| <b>1</b>       | BNS      | 58                     | 53.2                                | 7.8                        | 81.0               | 0                                   | XBP (38), XSH (9)   |
|                | SNA      | 365                    |                                     | 81.8                       | 28.2               | 0                                   | XBG (1), XBP (25), XBS (1), XCC (5), XFL (1), XFS (47), XLA (1), XSH (3), XSU (2), XXP (17) |
| <b>2</b>       | BNS      | 2                      | 1.6                                 | 44.3                       | 0                  |                                     |   |
|                | LIN      | 12                     |                                     | 40.7                       | 0                  |                                     |   |
| <b>3</b>       | HAP, HPB | 8                      | 5.6                                 | 7.6                        | 0                  |                                     |   |
|                | LIN      | 28                     |                                     | 80.2                       | 10.7               | 100                                 | XPB (1), XSA (2)  |
| <b>4</b>       | HPB      | 37                     | 24.2                                | 28.8                       | 2.7                |                                     | XXP (1)   |
|                | LIN      | 130                    |                                     | 53.0                       | 2.3                | 100                                 | XPB (2), XSA (1)  |
|                | SCH      | 12                     |                                     | 3                          | 0                  |                                     |   |
| <b>5</b>       | LIN      | 13                     |                                     | 78.8                       | 0                  |                                     |   |
| <b>6</b>       | LIN      | 8                      | 0.9                                 | 99.6                       | 0                  |                                     |   |
| <b>7</b>       | HAP, HPB | 9                      | 6.8                                 | 16.2                       | 0                  |                                     |   |
|                | LIN      | 46                     |                                     | 60.9                       | 4.3                | 100                                 | XRU (1), XWM (1)  |
|                | SCH      | 3                      |                                     | 17.5                       | 0                  |                                     |   |
| <b>8</b>       | BNS      | 8                      | 5.3                                 | 12.3                       | 0                  |                                     |   |
|                | GUR      | 18                     |                                     | 18.0                       | 11.1               | 0                                   | XNP (1), XWP (1)  |
|                | HPB      | 4                      |                                     | 18.3                       | 25                 | 100                                 | XPB (1)   |
|                | SCH      | 11                     |                                     | 37.9                       | 27.3               | 66.7                                | XSH (1), XWM (2)  |
| <b>9</b>       | BAS      | 1                      | 0.6                                 | 35.6                       | 0                  |                                     |   |
|                | BNS      | 3                      |                                     | 17.4                       | 0                  |                                     |   |
|                | SNA      | 1                      |                                     | 10.3                       | 0                  |                                     |   |
| <b>Unknown</b> | LIN      | 3                      | 0.3                                 | 7.0                        | 0                  |                                     |   |

# Observer Data: BLL

| FMA      | Target species | Number of seabird captures (live and dead) | % of total observed captures occurring in FMA | % of fishing effort (hooks) on observed vessels | % of captures live | % live captures that were albatross | Seabirds caught alive                        |
|----------|----------------|--|---|---|--------------------|-------------------------------------|--|
| <b>1</b> | BAS            | 1  | 54.9  | 3.6   | 100                | 0                                   | XBP (1)                                      |
|          | BNS            | 43   |   | 2.0   | 93                 | 0                                   | XBP (40)                                     |
|          | KAH            | 1  |   | 5.4   | 100                | 0                                   | XFL (1)                                      |
|          | SNA            | 88   |   | 2.2   | 28                 | 0                                   | XBG (3), XBP (4), XFL (1), XFS (16), XNP (1) |
|          | TAR            | 2  |   | 1.2   | 100                | 0                                   | XFS (2)                                      |
| <b>2</b> | LIN            | 6  | 2.4   | 1.8   | 0                  |                                     |  |
| <b>3</b> | LIN            | 1  | 0.4   | 4.5   | 0                  |                                     |  |
| <b>4</b> | LIN            | 45   | 18.3  | 2.9   | 0                  |                                     |  |
| <b>5</b> | LIN            | 6  | 2.4   | 5.8   | 0                  |                                     |  |
| <b>7</b> | LIN            | 30   | 12.2  | 2.4   | 20                 | 100                                 | XBM (3), XRA (1), XWM (2)                    |
| <b>8</b> | GUR            | 10   | 8.9   | 26.8  | 20                 | 0                                   | XNP (1), XWP (1)                             |
|          | SNA            | 7  |   | 72.4  | 0                  |                                     |  |
|          | Unknown        | 5  |   | 0   |                    |                                     |  |
| <b>9</b> | SNA            | 1  | 0.4   | 3.8   | 100                | 0                                   | XBS (1)                                      |

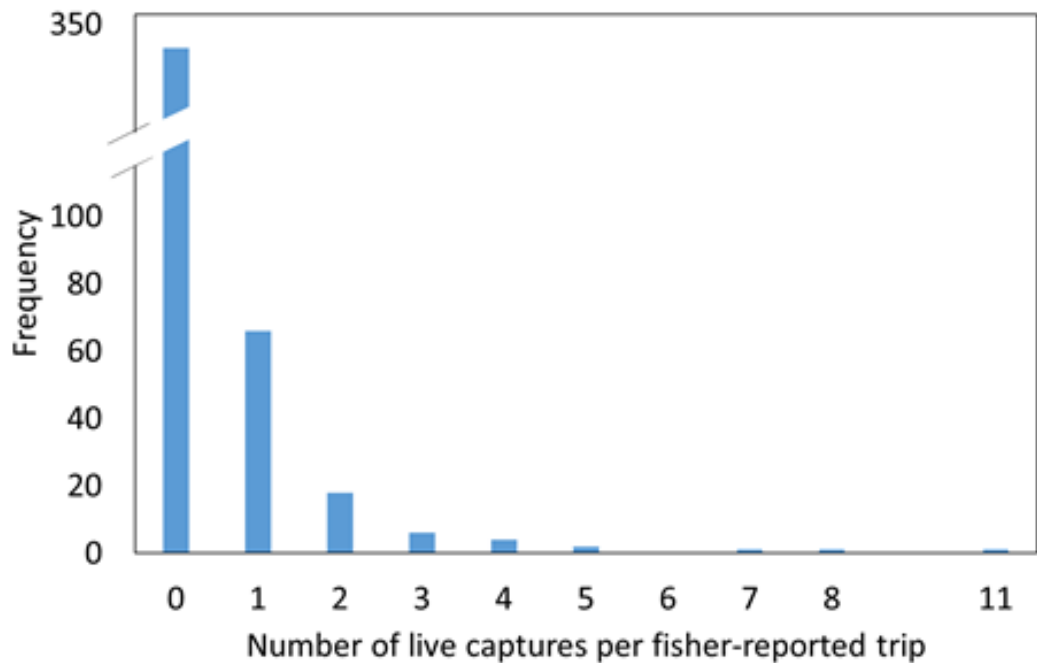
# Fisher-reported captures: SLL

| FMA      | Target species | Number of seabird captures (live and dead) | % of total reported captures occurring in FMA | % of fishing effort in FMA | % of captures live | % live captures that were albatross | Seabirds caught alive   |
|----------|----------------|--|---|----------------------------|--------------------|-------------------------------------|---|
| <b>1</b> | BIG            | 159  | 28.8  | 61.7                       | 8.8                | 71.4                                | XFS (3), XPE (1), XAL (3), XAS (1), XPB (1), XRA (3), XSY (1), XWA (1)  |
|          | STN            | 26   |   | 31.2                       | 7.7                | 100                                 | XAL (2)   |
|          | SWO            | 76   |   | 6.9                        | 17.1               | 92.3                                | XXP (1), XAL (5), XAS (1), XSY (5), XWA (1)   |
| <b>2</b> | BIG            | 52   | 17.1  | 35.0                       | 9.6                | 100                                 | XPB (1), XRA (3), XSA (1)   |
|          | BWS            | 2  |   | 0.08                       | 50                 | 50                                  | XSA (1)   |
|          | STN            | 89   |   | 55.7                       | 13.5               | 91.2                                | XCP (1), XAL (1), XAS (1), XBM (1), XPB (2), XSY (6)  |
|          | SWO            | 9  |   | 4.6                        | 0                  |                                     |   |
|          | TOR            | 3  |   | 3.2                        | 0                  |                                     |   |
| <b>5</b> | STN            | 29   | 3.2   | 100                        | 6.9                | 100                                 | XRA (1), XWM (1)  |
| <b>7</b> | STN            | 394  | 47.5  | 81.8                       | 19.0               | 67                                  | XBP (1), XDP (2), XFS (2), XSH (1), XWP (2), XAL (13), XAS (10), XBM (5), XPB (16), XSA (3), XSY (8), XWA (2), XWM (10) |
|          | SWO            | 37   |   | 18.0                       | 21.6               | 75                                  | XSH (1), XXP (1), XAL (3), XAS (1), XWM (2)   |
| <b>9</b> | BIG            | 14   | 3.4   | 50.1                       | 21.4               | 66.7                                | XXP (1), XAG (1), XAL (1)   |
|          | SWO            | 17   |   | 46.5                       | 5.9                | 100                                 | XSM (1)   |



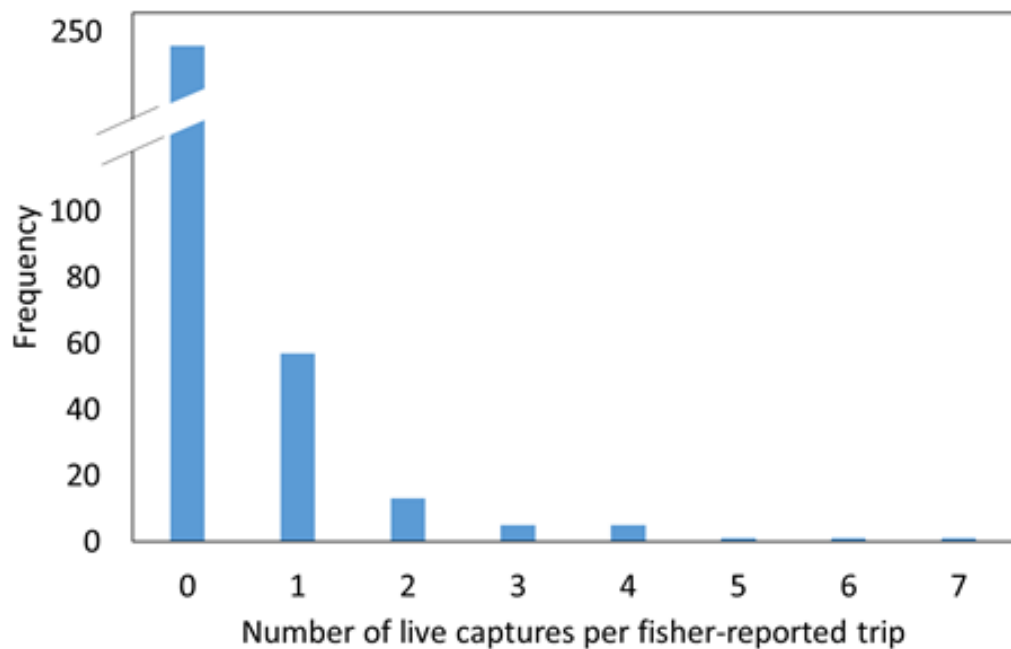
# Observer Data: SLL

| FMA | Target species | Number of seabird captures (live and dead) | % of total observed captures occurring in FMA | % of observed fishing effort (hooks) | % of captures live | % live captures that were albatross | Seabirds caught alive                        |
|-----|----------------|--|---|--------------------------------------|--------------------|-------------------------------------|--|
| 1   | BIG            | 68   | 22.3  | 5.7                                  | 5.9                | 75                                  | XBP (1), XAN (1), XBM (1), XWA (1)           |
|     | STN            | 12   |   | 11.4                                 | 8.3                | 100                                 | XKM (1)                                      |
|     | SWO            | 5  |   | 6.1                                  | 20                 | 100                                 | XWA (1)                                      |
| 2   | BIG            | 6  | 11.8  | 2.3                                  | 16.7               | 100                                 | XAL (1)                                      |
|     | STN            | 39   |   | 12.4                                 | 12.8               | 80                                  | XCP (1), XKM (1), XWA (1), XBM (1), XSY (1)  |
| 5   | STN            | 29   | 7.6   | 57.7                                 | 6.9                | 100                                 | XRA (1), XWM (1)                             |
| 7   | STN            | 199  | 55.5  | 11.5                                 | 12.1               | 91.7                                | XBM (7), XKM (2), XWA (2), XWM (11), XWP (2) |
|     | SWO            | 12   |   |                                      |                    |                                     |  |
| 9   | BIG            | 9  | 2.6   | 7.8                                  | 44.4               | 50                                  | XAN (1), XKM (1), XFS (2)                    |
|     | SWO            | 1  |   |                                      |                    |                                     |  |



Surface longline

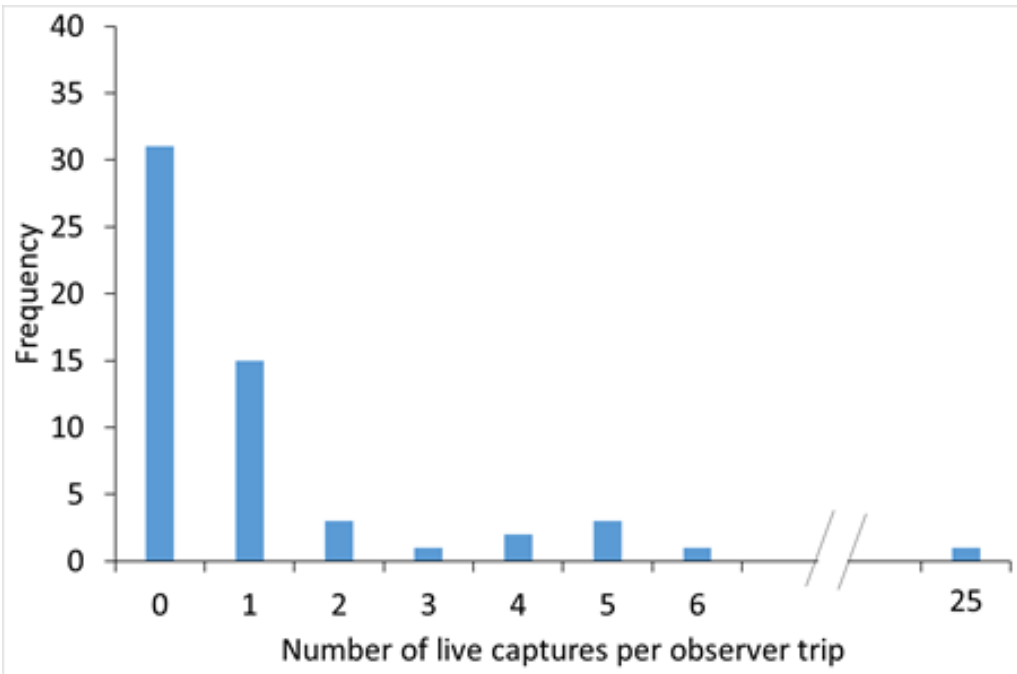
Bottom longline



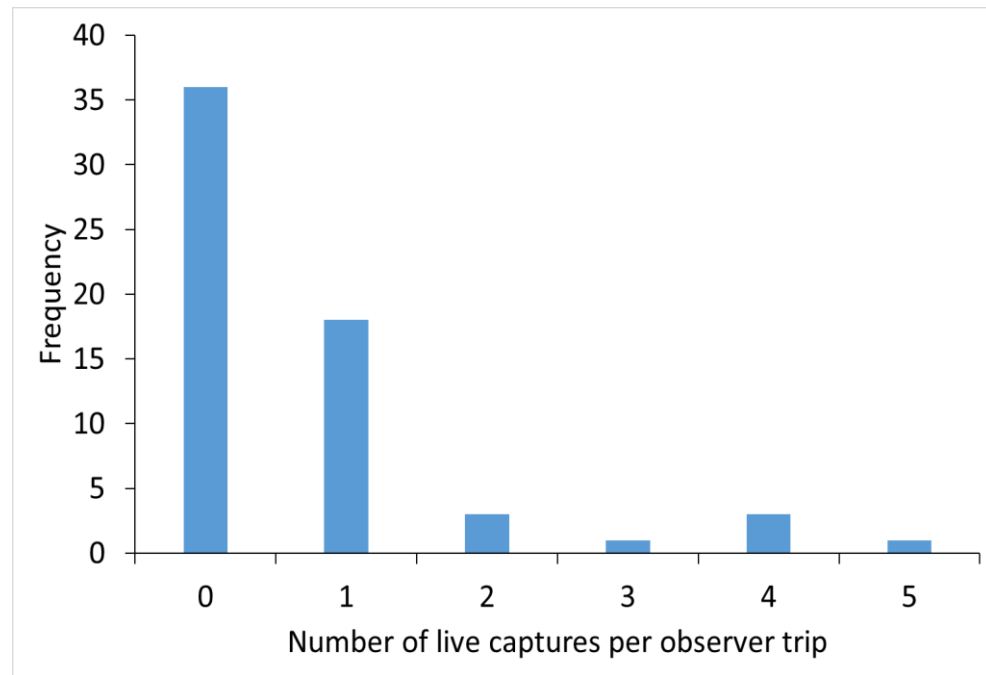
Number of live seabirds caught per  
observer trip:

1 Oct 2009 – onwards

Vessels  $\leq$  34 m LOA



Surface longline



Bottom longline





# So what?

- Still more set than haul captures overall
  - Assumption: haul-caught birds are alive on landing
- Live captures of both seabird groups occur in surface and bottom longline fisheries.

Very broadly:

- BLL – more of a petrel/shearwater problem, dominated by FMA 1 (albatross in other areas)
- SLL – more of an albatross problem, FMAs 7, 1 & 2
- Single live-captures per trip dominate fisher and observer reports





# Opportunities to:

## Reduce risk:

- Reduce attractiveness of hauling operations to seabirds
- Make bait retention a standard and consistent part of hauling practice
- Discharge away from the hauling station
- Same for offal, although this is a lesser issue

## Better understand risk and mitigation:

- More data especially in data-poor areas
- More standardised data collection on risk factors
- Detailed documentation of devices used on hauling
- Attempt to explore gear relationships with haul captures
  - Weighting, snood length





# Opportunities to:

## Develop mitigation approaches:

- BLL: Focus on areas that appear to have particularly a high incidence of haul captures
  - Based on available data
- SLL: HMS species and a smaller more mobile fleet
  - Fleet-wide approach
- Devices that keep birds away from the hauling station
  - Towed/dangled buoy devices

## Reduce captures:

- If most haul capture events are single birds, mitigation measures must be in place before a single capture occurs





# Acknowledgements

- CSP team
- MPI Research Data Management
- MPI Observer Services Unit
- Observers who collected the information
- Fishers who reported captures
- Bycatch practitioners who provided information



# Questions?

