Understanding and mitigating seabird and turtle bycatch during the pelagic longline soak period MIT2023-02

D. Goad
Prepared by Vita Maris for
Conservation Services Programme Technical Working Group
June 2024

Introduction

Seabirds

Focus has been on parts of operation where hooks are known to be accessible to birds.

Setting – Tori lines, night setting, weighted gear, Hookpods, dyed bait.

Hauling – Bait retention, offal control, hauling mitigation 'droppers'.

Residual level of captures – likely attributable to soak period.

This project aims to better understand the risk during the soak, and ways to mitigate it.

Turtles

Recent increase in captures.

Likely all during the soak.

Influenced by gear depth (and bait type, hook type, etc.).

Project objectives / approach

Characterise surface longline hook depth profiles throughout the fishing period via the deployment of Time Depth Recorders (TDRs).

Targeted trips, TDR deployments, manipulating gear (e.g. basket size, weight)

Also fisher-collected data with repurposed Wet Tags (4 vessels).

Assess risk of captures during the soak period by identifying incidents of exposed hooks at the surface during the 'soak period'.

Based on TDR / Wet Tag profiles

Compare depth profiles of sets with and without protected species captures and identify any apparent patterns.

Review international research and consider the effectiveness of existing mitigation practices on hook exposure during the soak period.

Separate contract

Timeline

Initial plan was to target trips overlapping with leatherback turtles first (summer ECNI), then focus on birds (either SCSI or WCSI depending on timing).

But bluefin fishery off east coast of South Island reported several captures of seabirds when using Hookpods (= birds very likely caught during the soak).

Decision taken to prioritise responding to capture events.

Undertook a trip in March starting on the following full moon.

Further (turtle) trip planned early 2025 off east coast of North Island

This presentation reports on the first trip to sea

Methods

Gear setup: 13 m branchlines, 300 mm hard floats separating baskets, 10 m float ropes, no moneymakers, no brake, 5.6 – 6.5 knots, 14 seconds.
Hookpod and 40 or 60 g sliding weight at 1.6 -1.8 m from hook.

Tested: Longer float ropes (13 m vs 10 m)

                 Weight at clip on float ropes

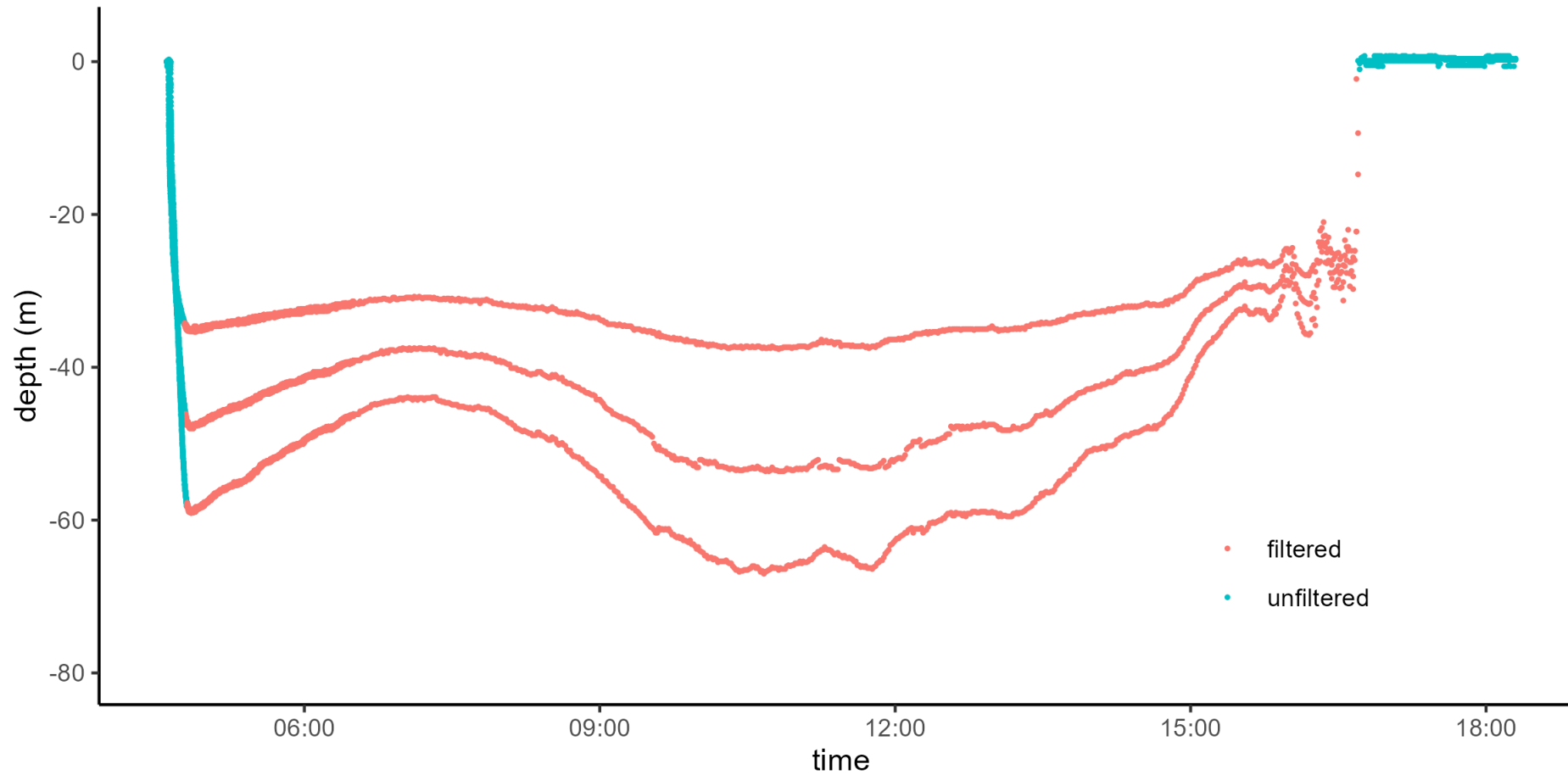   Increased basket size

TDRs were placed 0.5 m from the baited hook. Three per basket, beside the float (1), a quarter of the way into the basket (3), and half way into the basket (6 or 7).

Measured depth every minute during soak.

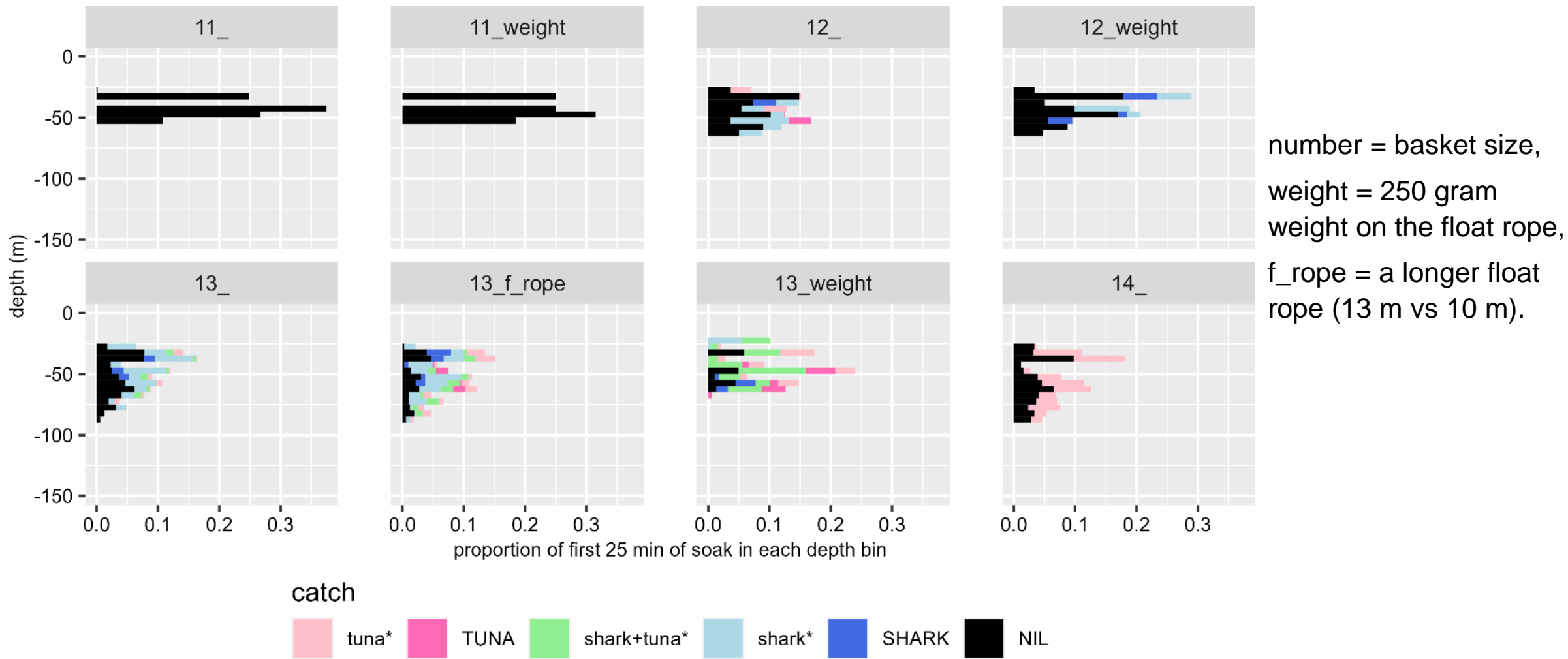Discarded records for first five minutes and depths less than 1.5 m at haul.

Produced histograms of the proportion of time spent in each five-metre depth bin
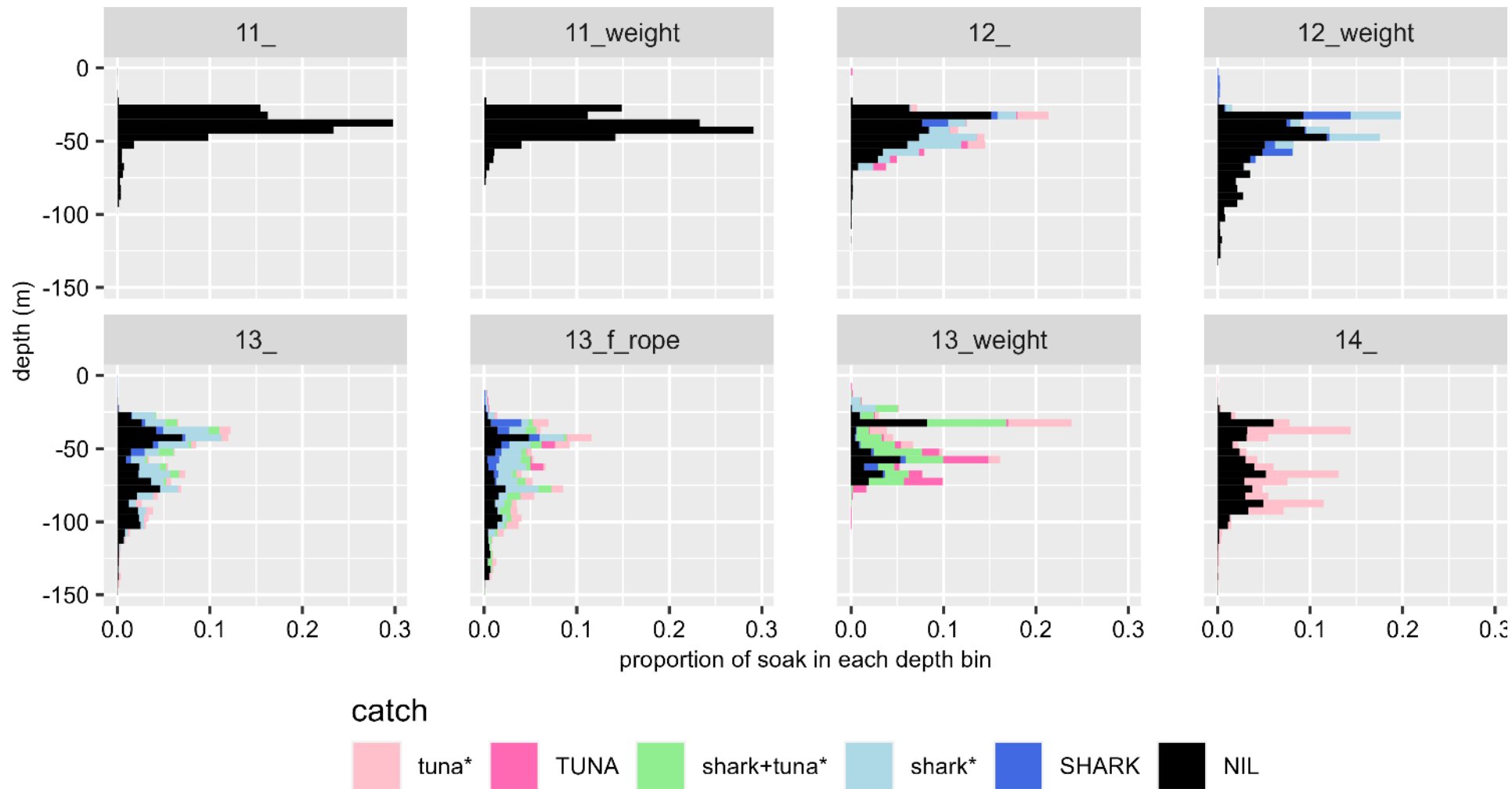
Results – extracting the soak period

Figure 1. Plot of TDR depth during the soak for branchlines one, three, and six in a twelve hook basket with no catch in the basket. Colour indicates filtering to identify the soak period.

Results – first 25 minutes of soak (below 20 metres)

number = basket size,

weight = 250 gram weight on the float rope,

f_rope = a longer float rope (13 m vs 10 m).

Figure 2. Histograms of TDR depth from five to thirty minutes after deployment, by treatment. Bright colours and capital letters indicating catch on the TDR branchline, and weaker colours and lowercase letters indicating catch in the same basket, NIL = no catch in the TDR basket.
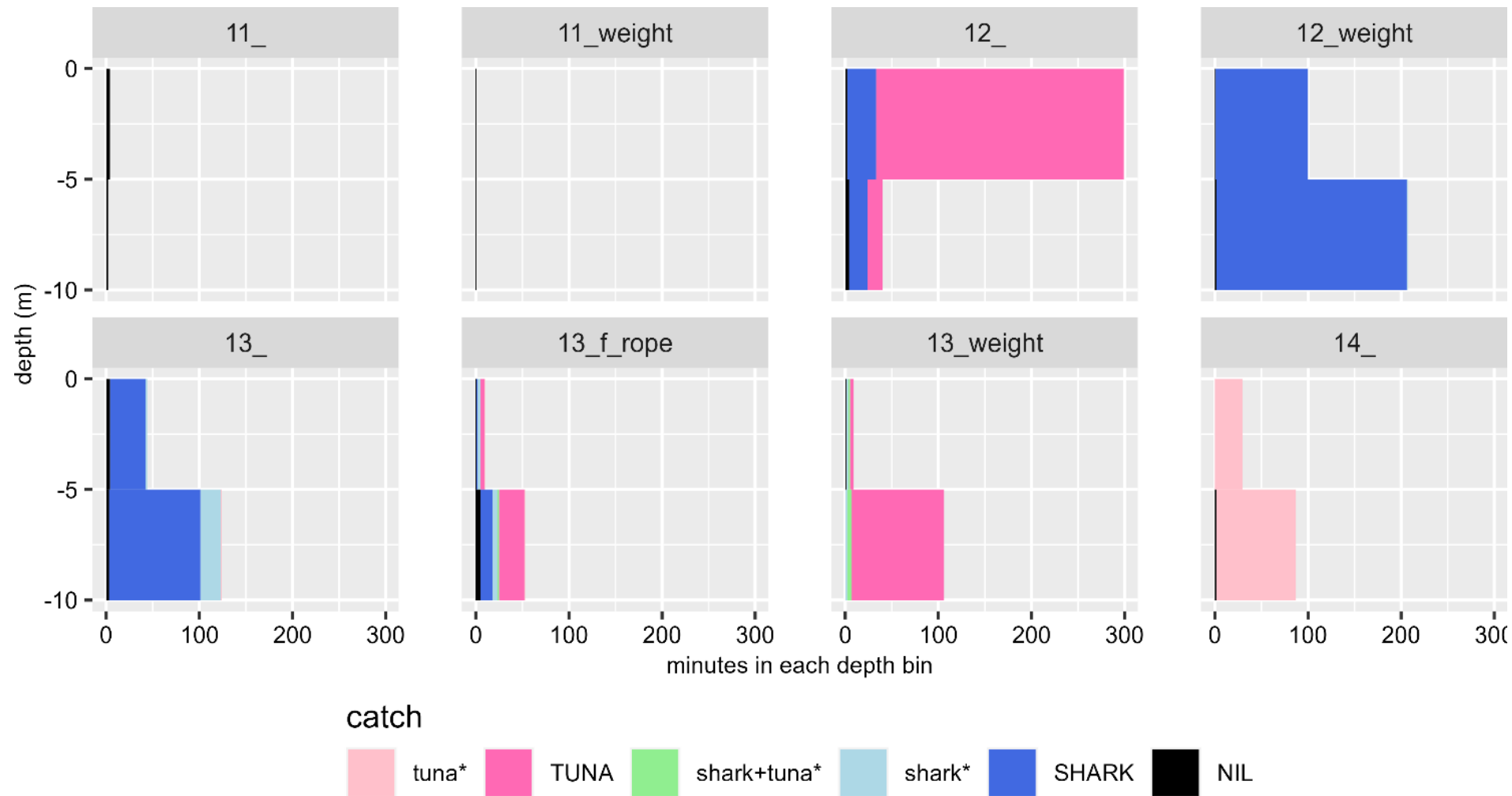
Results – whole soak, longer (and shallower) tails

number = basket size,

weight = 250 gram weight on the float rope,

f_rope = a longer float rope (13 m vs 10 m).

Figure 3. Histograms of TDR depth during the whole soak, by treatment. Bright colours and capital letters indicating catch on the TDR branchline, and weaker colours and lowercase letters indicating catch in the same basket, NIL = no catch in the TDR basket.
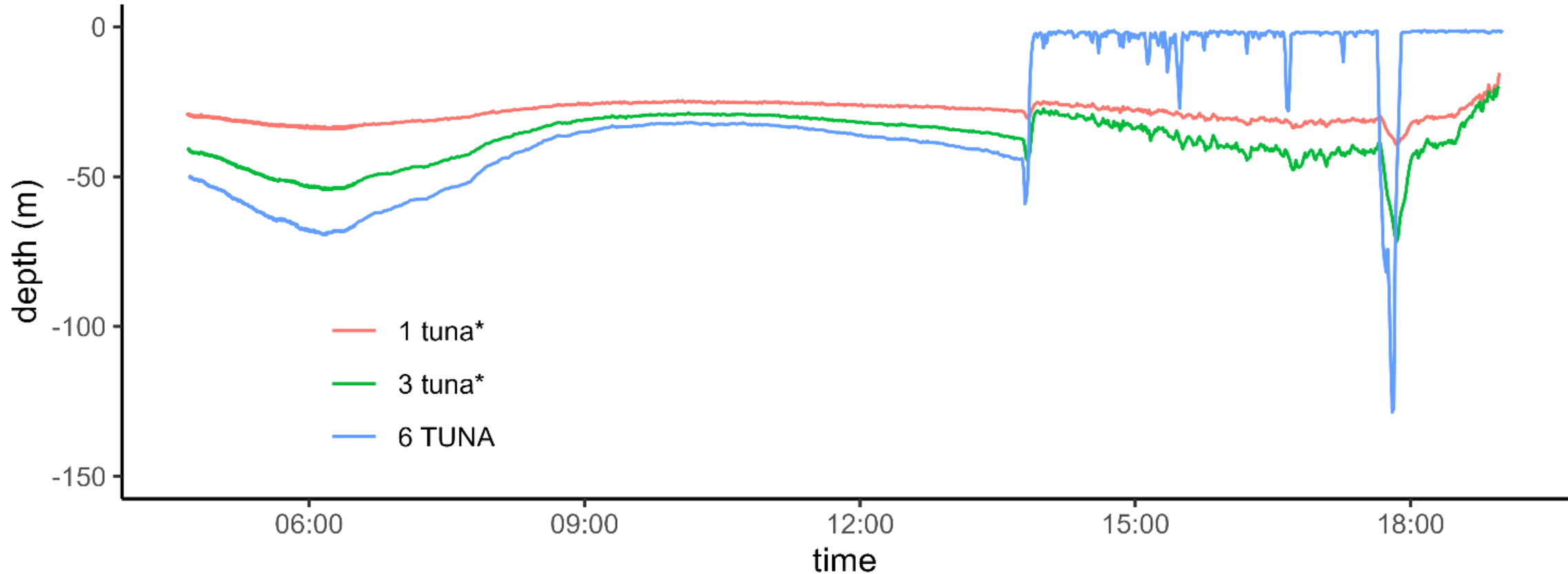
Results – whole soak, above 10 metres

number = basket size,

weight = 250 gram weight on the float rope,

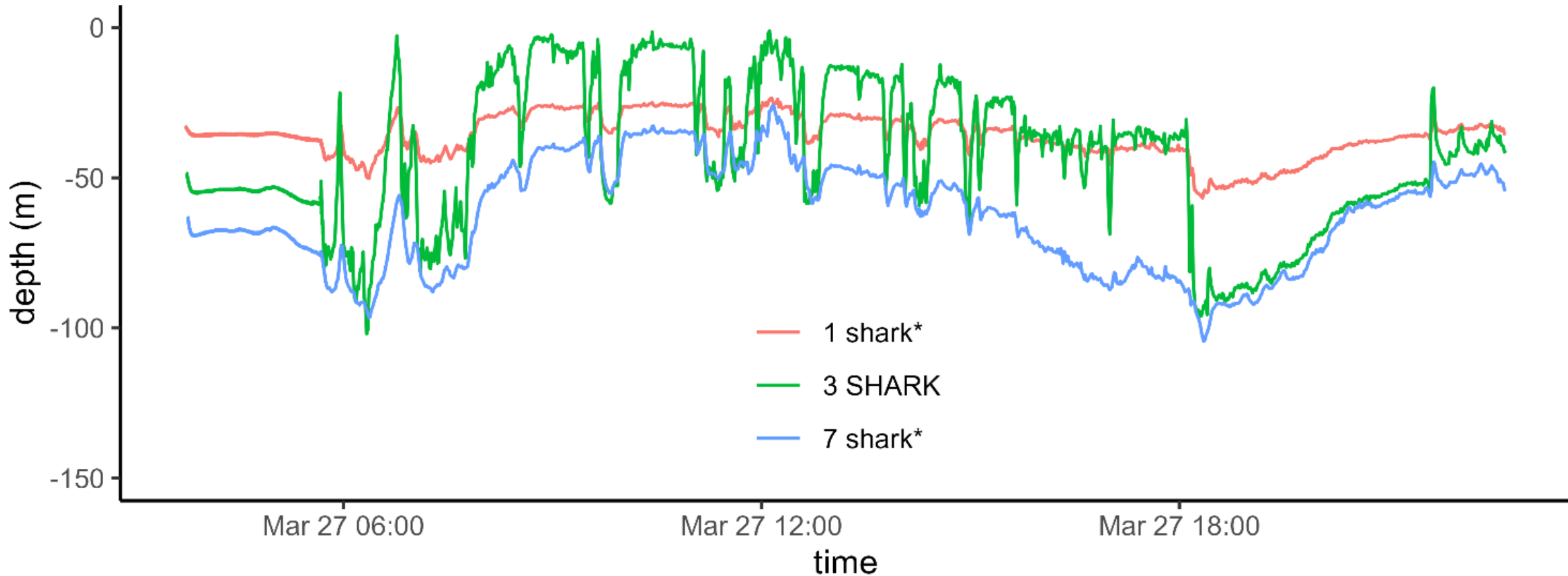f_rope = a longer float rope (13 m vs 10 m).

Figure 4. Histograms of TDR depth less than 10 m during the whole soak, by treatment. Bright colours and capital letters indicating catch on the TDR branchline, and weaker colours and lowercase letters indicating catch in the same basket, NIL = no catch in the TDR basket. Total = 200 deployments
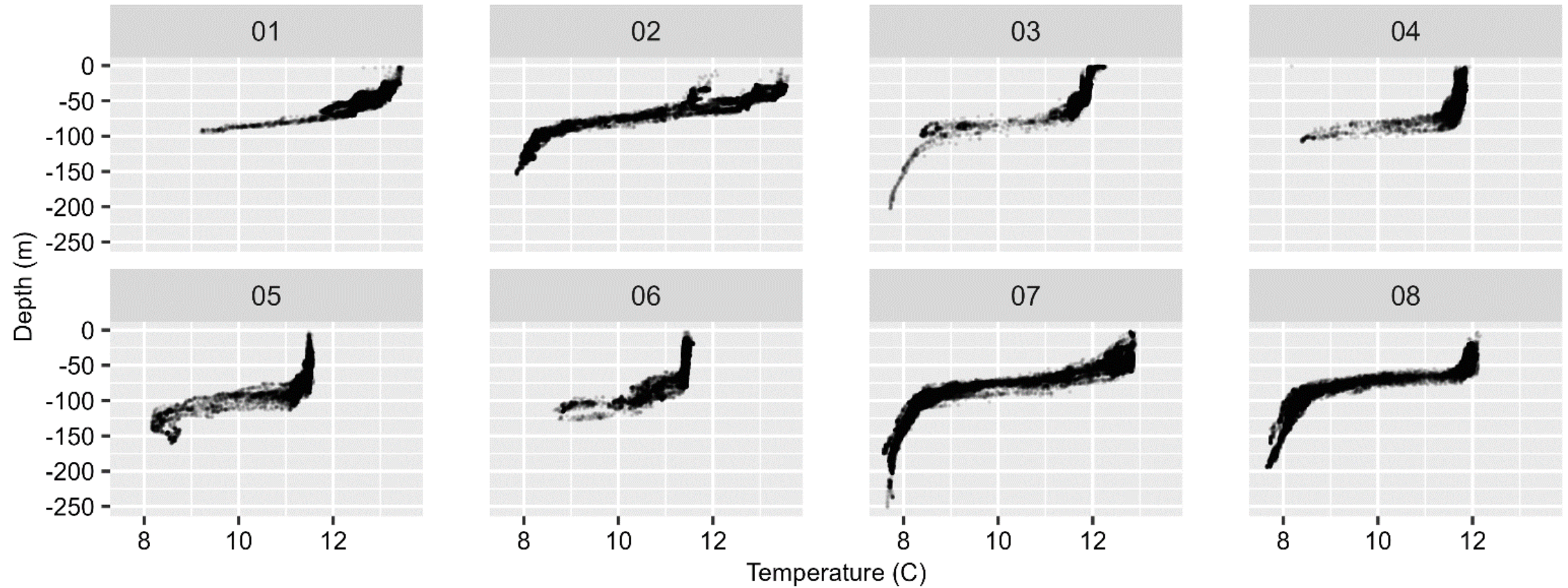
9

Results – tuna example

Figure 5. Plot of TDR depth over time for three branchlines in the same basket in positions one (red), three (green) and six which caught a tuna (blue).
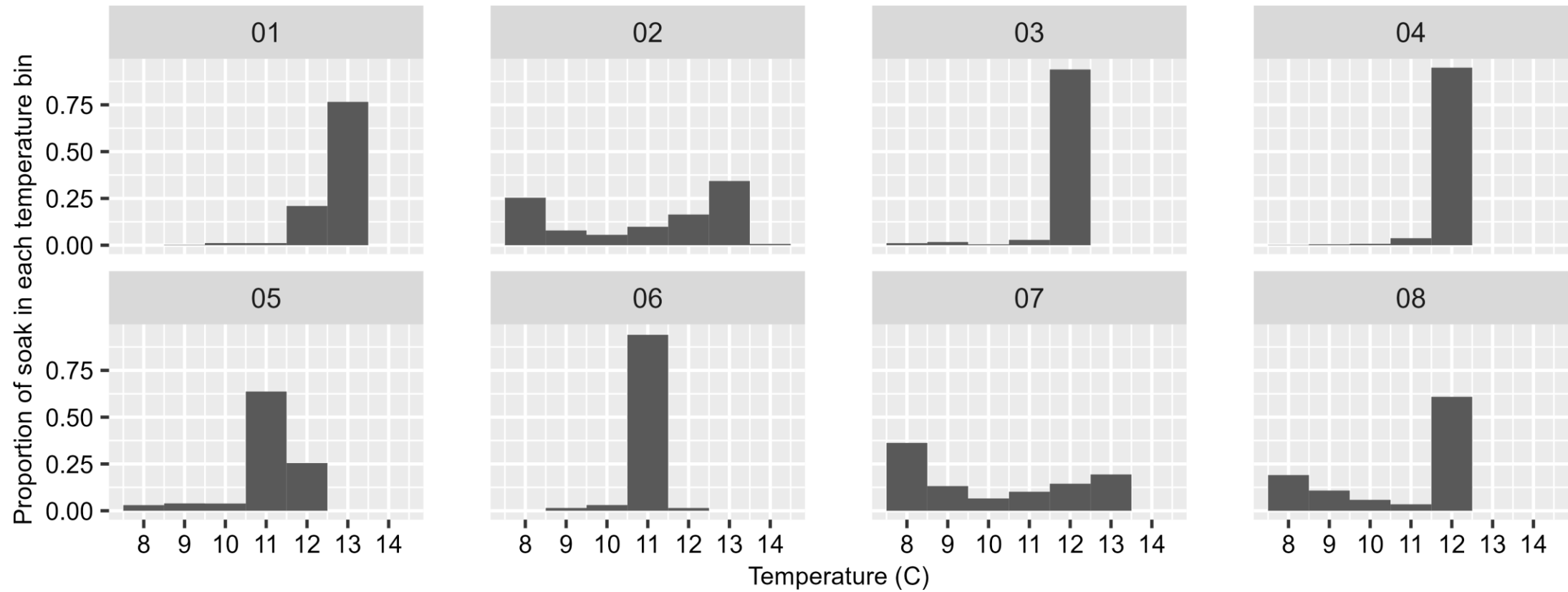
Results – shark example

Figure 6. Plot of TDR depth over time for three branchlines in the same basket in positions one (red), three, which caught a blue shark (green), and seven (blue)

Results – temperature

Figure 7. Plots of temperature vs depth for all TDR records, by set.

Results – temperature

Figure 8. Histograms of TDR temperature during the whole soak, by set, with one-degree centigrade temperature bins

Discussion - birds

- Gear setup does influence depth but other factors are important (current, drift, wind, waves), especially when these act differently on different parts of the line.

- Fish influence depth, especially in top 10 m, but the effect seems to be reasonably localised.

- Whether shooting gear deeper reduces frequency at which hooks are brought close to the surface is not clear (will also depend on whether catch is different).

- Weight at hook will help (anecdotal evidence of lower bycatch with Hookpods + weight).

- Heavier Hookpods?

- Longer snoods would help too.

- 200 deployments (a fifth of a set) produced roughly two hours of a hook above 10 m.

- Likely to be beside fish on the surface, in daylight, = reasonably visible to birds.

- Mitigating instances of shallow hooks is not straightforward.

Discussion - turtles

- For this trip – not particularly relevant overlap wise

- Need to think in three dimensions a bit more:

  Where are the fish

  Where are the turtles

  How this changes diurnally

- How different gear setups / soak periods may influence overlap

- Need to consider influence of gear changes on both birds and turtles

  (where overlapping with both)

Discussion - thinking a bit sideways

- Minimising shark bycatch will help reduce hook availability

- Catch fish as efficiently as possible:
    Catch most kg of quota per day
    Catch most kg of quota per unit of risk (e.g. per hook, per hook soak hours, per overlap)
    Catch most kg of quota per bird

- For example:
    Shooting shallow may be efficient in terms of most kg of quota per set
    But shooting deeper may mean more kg of quota per bird (and less sharks?)

- Should consider these factors when formulating codes of practice / capture responses, especially if they force fishers to fish less efficiently.

- Record hook number for all captures

- Overlap is important but it is not the whole story – at times birds will forage more aggressively.

Feedback please

Particularly…..

- Defining the soak period: Removed first five minutes

  Last record was last whole minute > 1.5 m depth

- Dealing with TDR branchlines that catch fish – they are not really a risk, but identify risk.

- Deploying TDRs in blocks, typically three per basket for three consecutive baskets, with another basket of the same treatment at either end of the block.

- Bite time is not always obvious – haven't attempted to identify this

Acknowledgements

The owner, skipper, crew, and shore side support

Igor and Tiffany at DOC

Rosa at Seafood New Zealand