

Tori line designs for small longline vessels

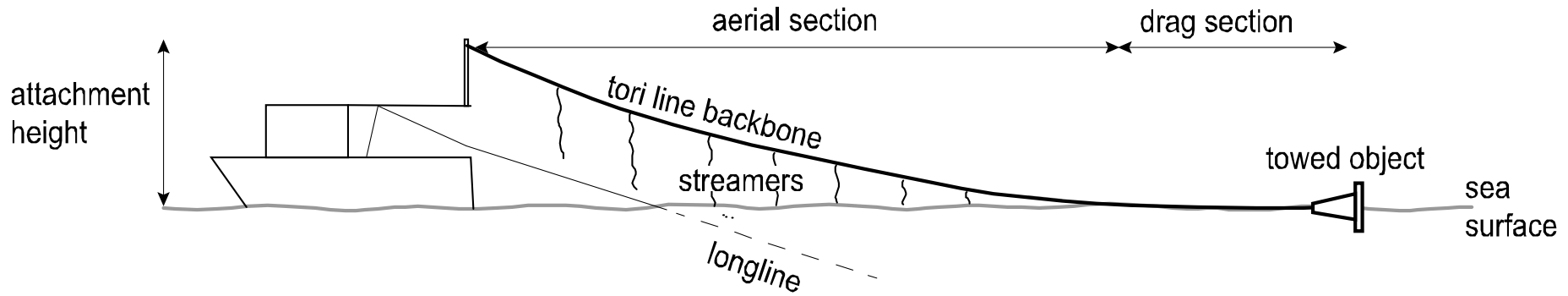
Project objective:

Produce and test tori lines that could be routinely deployed under a range of commercial fishing conditions, and were effective in reducing bird interactions with baited hooks.

A photograph showing a red tori line being deployed from a vessel on the ocean surface. The line is visible as a series of vertical red lines extending from the water's surface. The background is a clear blue sky and a dark blue ocean.

Presentation to CSP Technical Working Group
4661, MIT2015-02 CSP seabird mitigation: small longline vessel trials

Tori lines



Well proven in the literature...

But not much work has been done with small vessels.

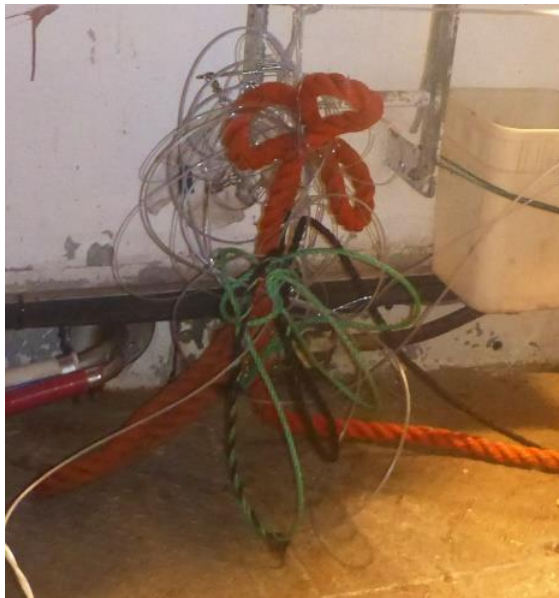
State of play

Observer coverage and liaison project indicate that uptake is poor

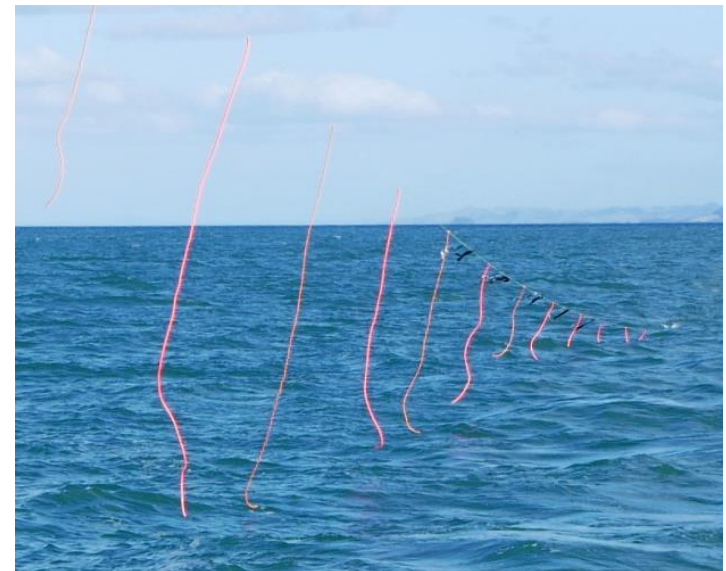
- Skippers state a variety of reasons

Regulations not particularly practical and untested on small vessels

Less of..



More of..



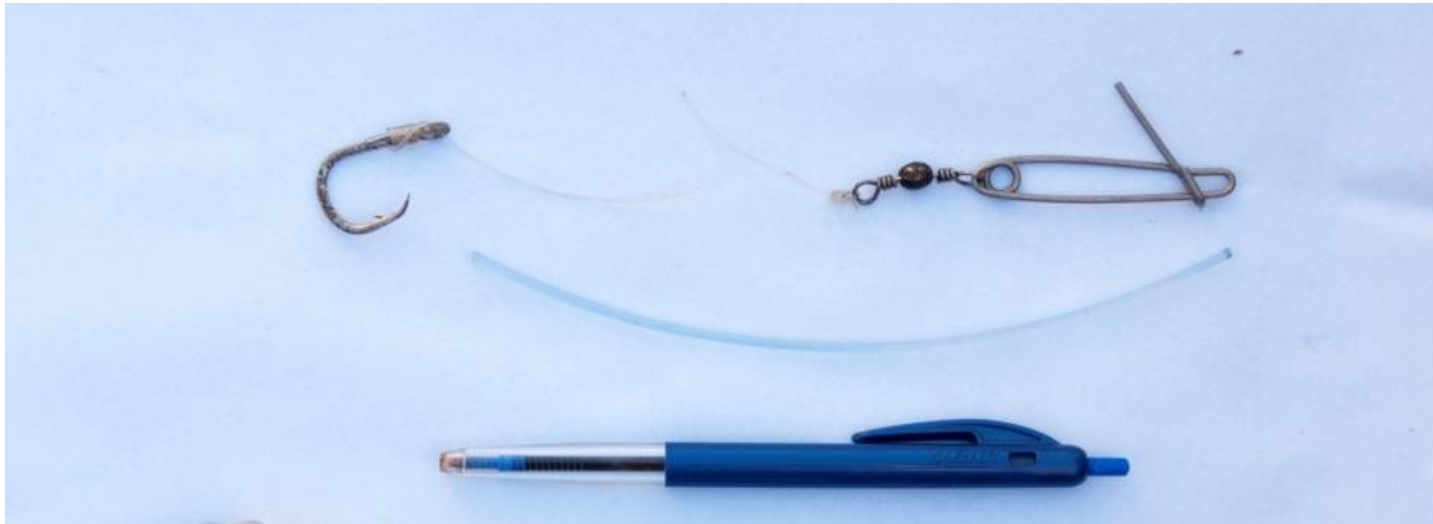
The fleets

Demersal longline snapper

1 or 2 sets per day, just before dawn, occasionally in afternoon

1000 - 7000 hooks per day

Smaller vessels, lighter gear, shorter soaks, shorter trips, shallower sets



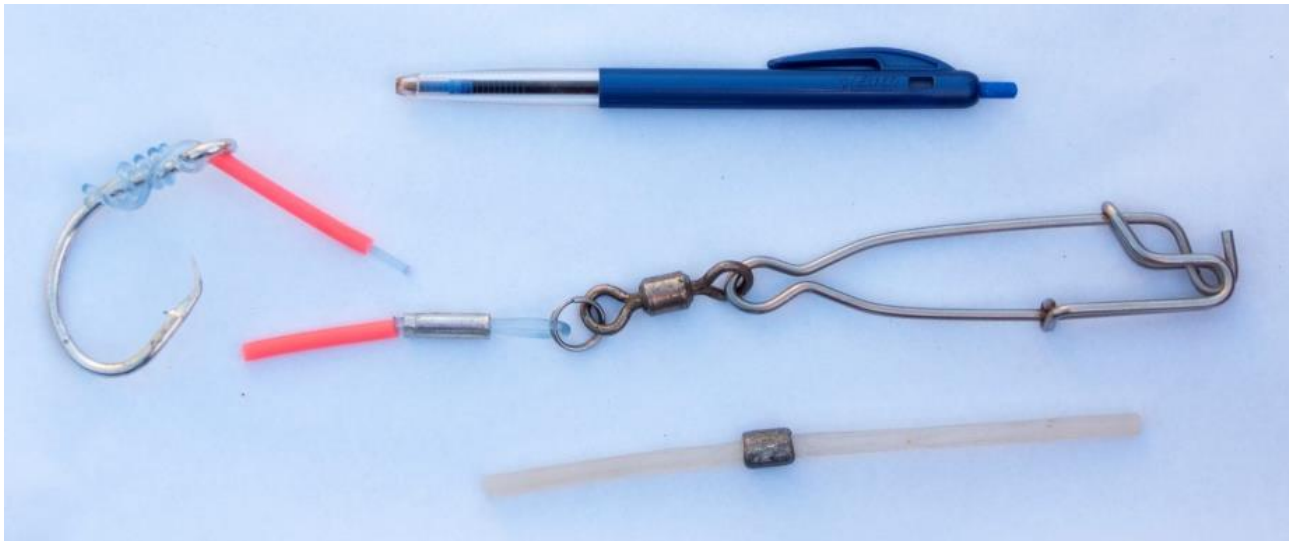
The fleets

Demersal longline bluenose

1 - 4 sets a day, mostly at night, occasionally in afternoon.

500 - 2000 hooks per day

Larger vessels, heavier gear, longer soaks, longer trips, deeper sets.



The fleets

Pelagic longline

1 set a day, mostly at night, occasionally pre-dusk (SWO).

800-1200 hooks per day

Floating gear, lots floats, long snoods. Some weighted.



Regulations - pelagic longliners

ACAP recommendations (vessels <35 m)

75 m aerial extent

7 m high over the vessel stern

Brightly coloured streamers may be short or long, or both.

Short streamers at 1 m intervals or long streamers at 5 m intervals

NZ regulations:

75 m aerial extent

6 m attachment height

Streamers reaching the surface of the water every 5 m for the first 55 m. Streamers of a minimum length of 1 m should also be attached along the whole aerial extent (75 m). Streamers must be attached by swivels.

Regulations - demersal longliners

ACAP recommendations (not split by vessel size)

150 m total length

7 m attachment height

Streamers reaching the sea surface every 5 m

A suitable towed device

NZ regulations (vessels < 20 m)

50 m aerial extent

5 m attachment height

Streamers reaching the surface of the water every 5 m

Research approach

Select vessels

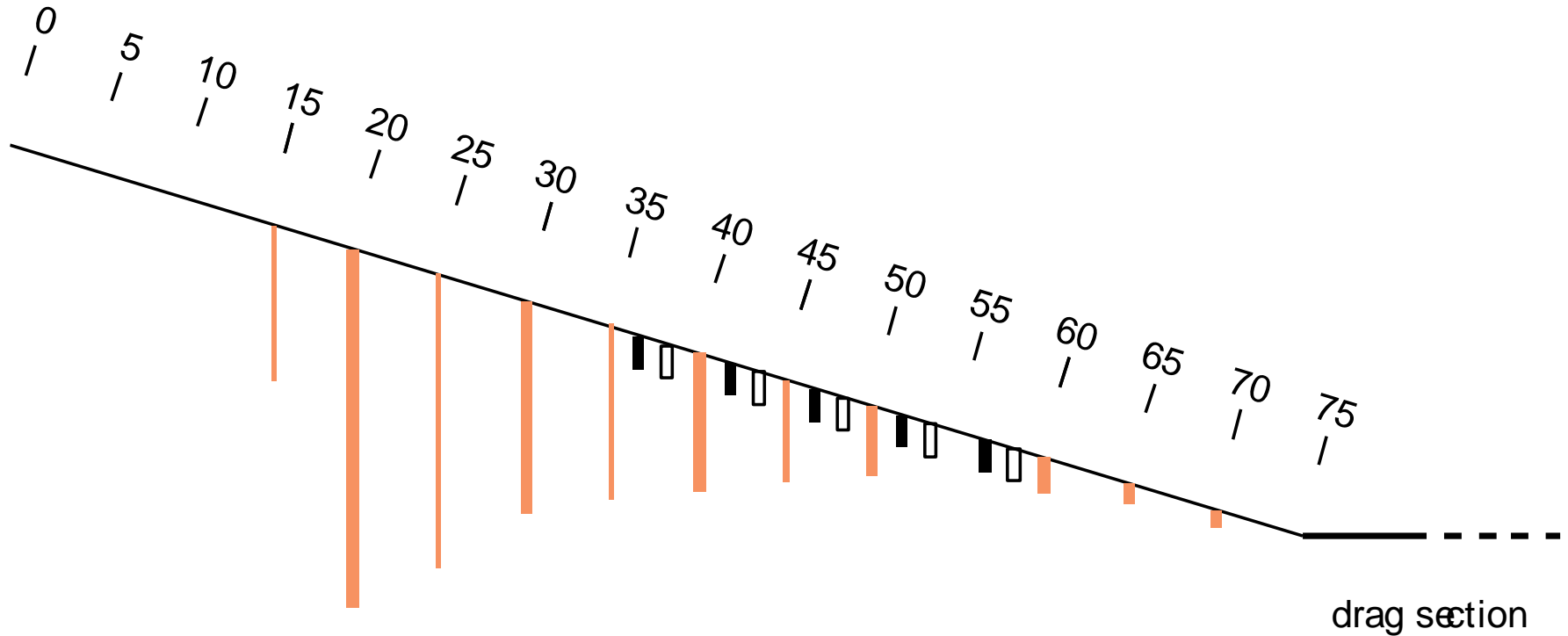
Design and build tori lines / poles

Testing and modification

Measure performance and efficacy

- Bird abundance and behaviour around tori lines
- Tangle / loss rate
- Skipper feedback
- TDR data – how deep are hooks at end of tori line?

Tori line design – aerial section



streamer
material

5 mm plastic tubing
9 mm plastic tubing

holo graphic tape
black plastic tape

Tori line design – drag section

Snapper demersal longliners

30 or 40 m 9 mm diameter rope, series of floats and a towed object

Bluenose demersal longliners

100 m 9 mm rope section, single towed object



Pelagic longliners

100 m 9 mm rope or 250 m 5 mm diameter monofilament nylon

Tori poles

Two pole types tested

- 3.9 m 62 mm diameter carbon
- 5.0 m 52 mm fibreglass

Different installation for each vessel

Moveable attachment point

Some vessels had existing high point



Tori poles



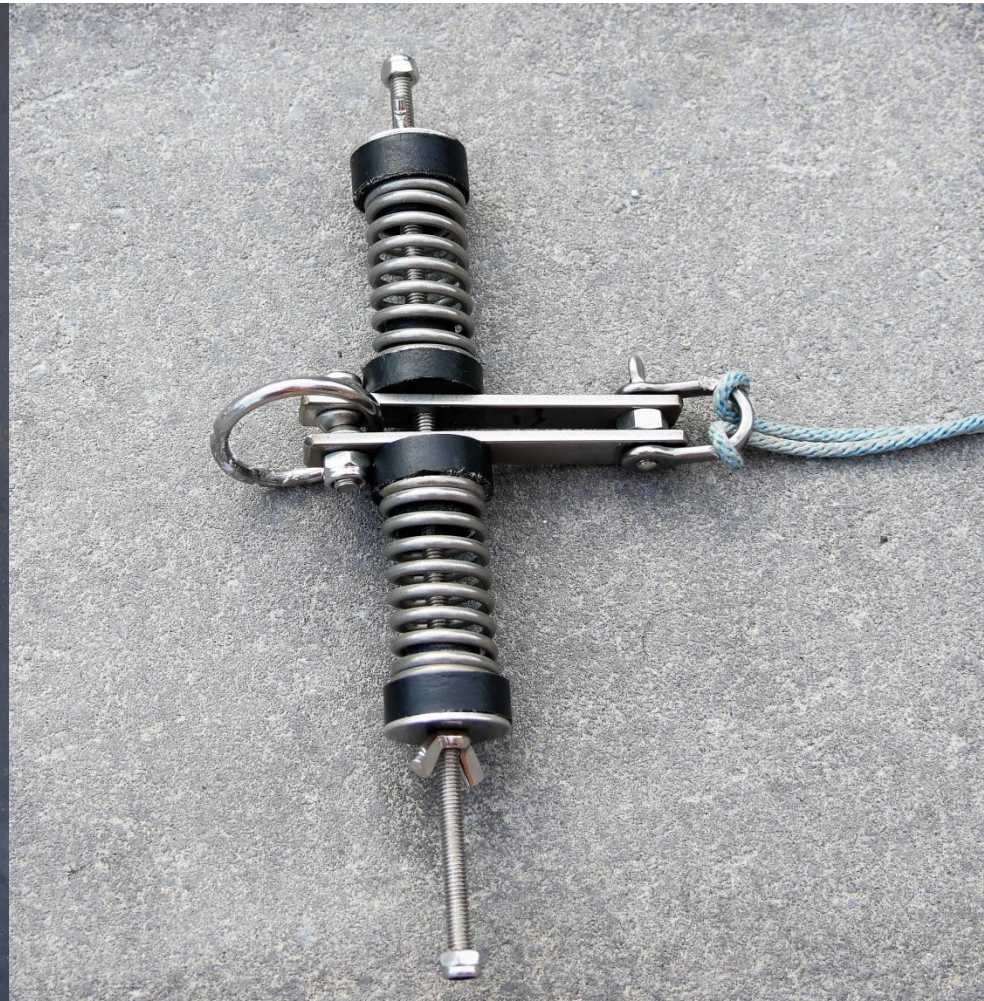
Tori poles



Tension release

Repeatable breakaway tension

Pre-set between 5 and 30 kg



Results summary

- 22 vessels
- 75 m aerial extent feasible on surface liners
- 50 m aerial extent feasible on snapper liners
- 75 m aerial section feasible for larger snapper liners
- 50 m aerial extent achieved on two bluenose liners
- One bluenose vessel found a long tori line impractical

Tori line observations

Tori Line Observation Form

Trip Set

Bait 1 % salted (y/n)


Bait 2 % salted (y/n)

Wind speed (knots) Setting speed (knots)

Swell height (m)

Observer eye height (m)

Bird count by species (feel free to use group codes) Visibility score

Wind direction 

Swell direction 

OBSERVATION PERIOD 1

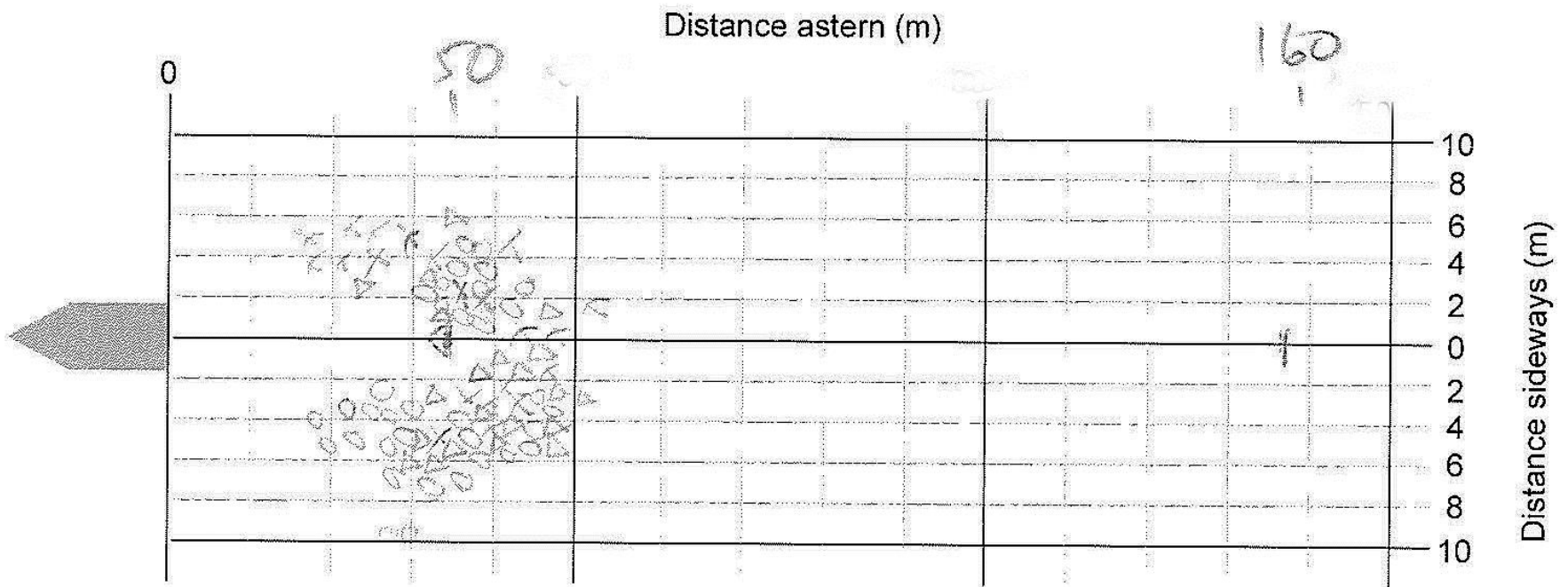
Species	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total < 200m	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Aerial section	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Drag section	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Behind tori line	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

5 min count of dives for petrels and shearwater only, excluding cape pigeons and storm petrels

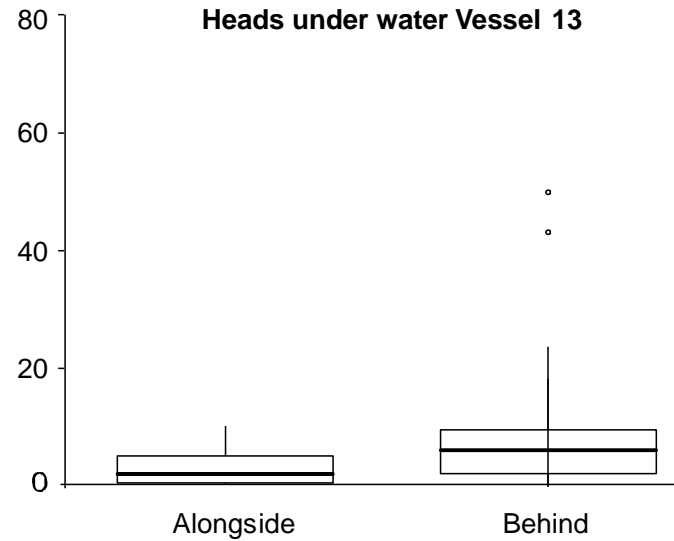
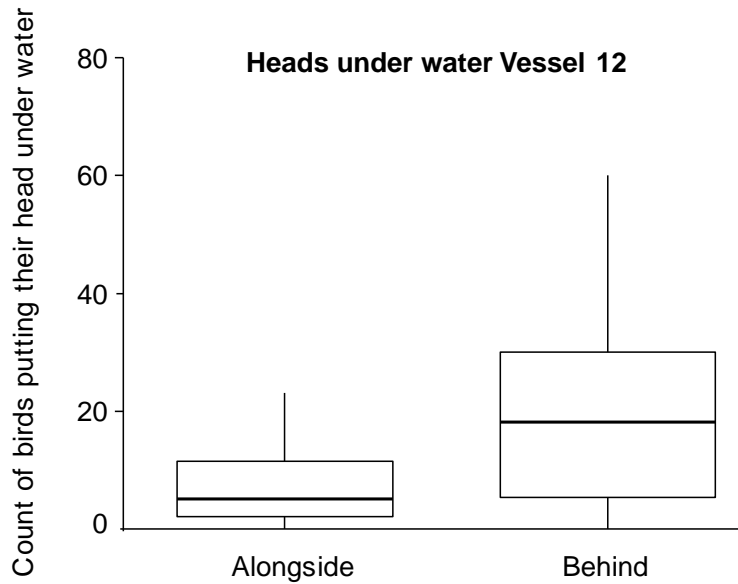
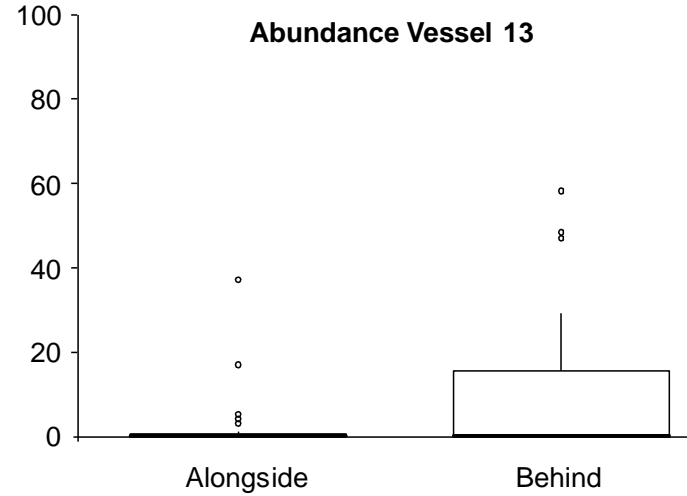
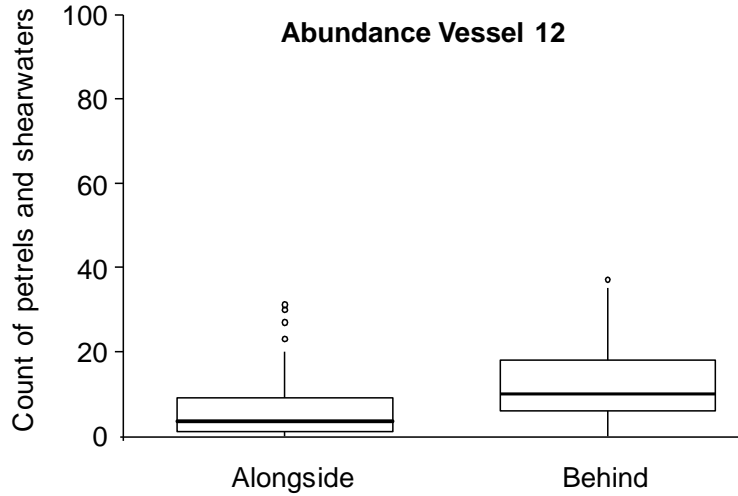
Start time	<input type="text"/>	End time	<input type="text"/>
Aerial section	<input type="text"/>		
Drag section	<input type="text"/>		
Behind tori line	<input type="text"/>		

Tori line observations

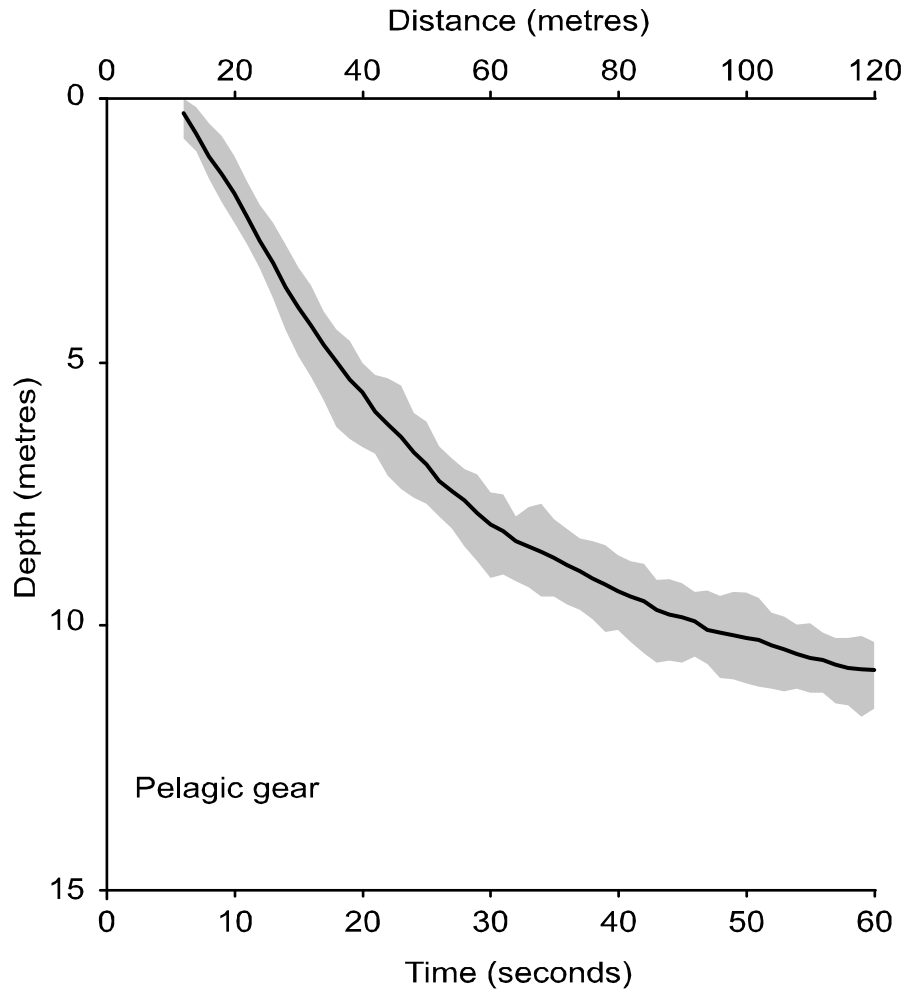
Tori line diagram showing position mainline, tori line(s) and location of dives recorded



Tori line observations



Sink rate data pelagic gear



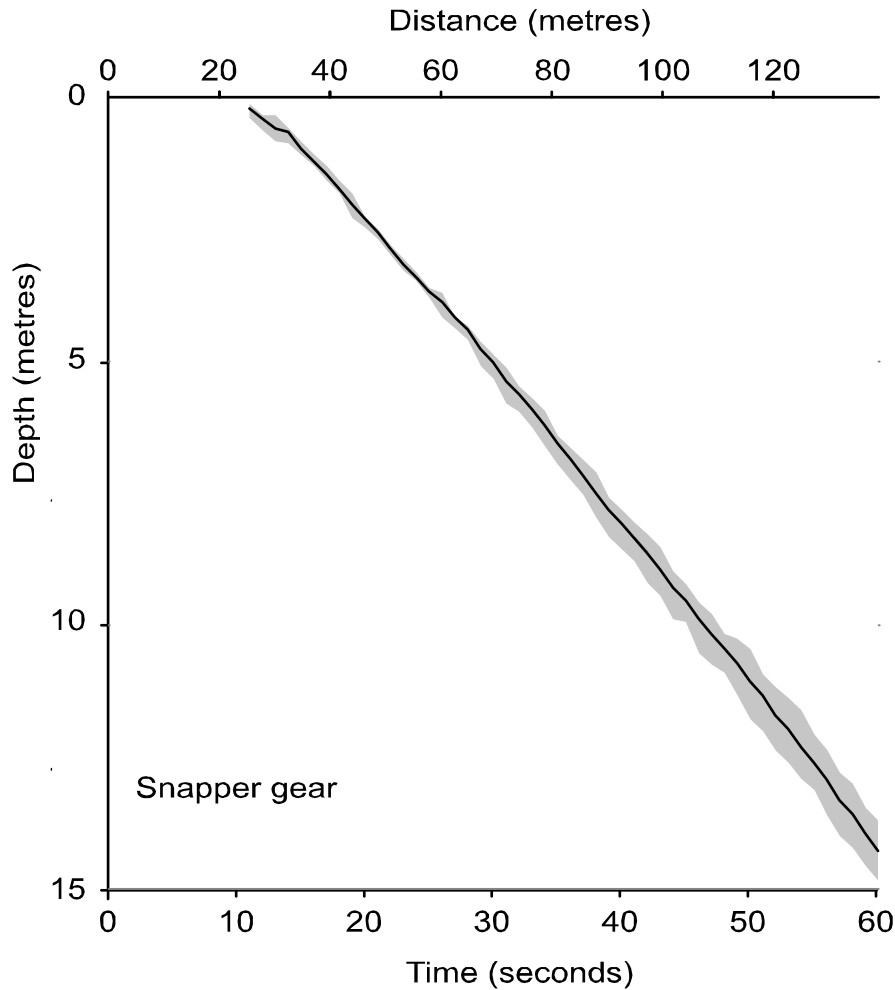
38g weight at 0.5 m from hook

Indicative of all hooks

n = 22

grey = interquartile range

Sink rate data snapper gear



3.5 kg every 25 hooks

Can increase weight if birds are present

Indicative of slowest sinking hooks (between weights)

$n = 8$

Grey = interquartile range

Conclusions / Recommendations

Regulations

- Incorporate lessons learnt
- **Pelagic** 75 m aerial extent is feasible
- **Snapper** 50 m feasible, 75 m is suggested for those setting faster
- **Bluenose** 50 m feasible in some cases – suggest vessel by vessel approach

Compliance

- Proactive

Conclusions / Recommendations

Supply tori setups to all small longliners

Continue to learn

- Tori observations on all observer trips
- Continue to gather feedback from skippers
- Promote tori lines as a part of successful mitigation approach

Acknowledgements

Skippers / Owners / Crew

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Observers

CSP team

