Bycatch Mitigation FACT-SHEET 11 (Updated September 2014)

Practical information on seabird bycatch mitigation measures

Pelagic Longline: Bait caster and line shooter

Bait casters and line shooters have been used by fishermen to improve economic or operational efficiency of fishing and have been considered effective measures to reduce seabird bycatch. However, there is no empirical evidence to support their effectiveness in this regard. This Fact-sheet covers technical issues associated with the use of bait casters and line shooters from the perspective of their use in improving fishing efficiency and ensuring that seabird bycatch is not increased by their use.

What is a Bait Casting Machine?

A Bait Casting Machine (BCM) is a hydraulically operated device designed to deploy baited hooks during pelagic longline setting (prior to the development of BCMs, individual hooks were cast by hand). BCMs are commonly used in high seas pelagic fisheries and are an integral part of the line setting process. The original BCM – developed by Gyrocast Pty Ltd – improved fishing efficiency and, if used correctly, had the potential to reduce the risk of seabird bycatch. Gyrocast BCMs had a five second cycling time, variable power control, the ability to cast hooks up to 23 metres, directional control (i.e. able to switch between port and starboard) and a gimballed mount to compensate for vessel movement (Brothers *et al*., 1999). These features help to reduce bait loss to birds and seabird bycatch by allowing fishermen to 'place' baited hooks under the protection of a streamer line, even in strong winds.

Figure 1. Bait-casting machine in action.

Gyrocast machines were highly engineered and were therefore expensive to manufacture. Despite this, uptake within the pelagic longline industry was good (Brothers *et al*., 1999). Before long, cheaper alternative brands appeared on the market that were adopted by the industry. Unfortunately, these new machines only incorporated the labour saving features of BCMs and not the features that helped to reduce bycatch (they are mainly used to straighten branch lines to reduce tangling). They had no control over distance or direction hooks were cast and the arc of the cast resulted in interference with streamer lines, or baited hooks landing outside the protection of streamer lines.

Effectiveness at reducing seabird bycatch

In theory, BCMs improve fishing efficiency by:

- Reducing tangles in branchlines.
- Reducing bait loss by avoiding propeller turbulence.
- Reducing bait losses to seabirds by better positioning of hooks below streamer lines.

Trials of the early BCMs (Gyrocast), indicated that these machines substantially reduced bait loss to seabirds, provided bait was consistently landed beneath streamer lines (Brothers *et al*., 1999). As mentioned, later models of BCMs have not incorporated the key features necessary to reduce seabird bycatch, in particular distance control. Currently, there is inadequate data to quantify the effectiveness of the current version of these machines.

Recommendations for deployment

The original Gyrocast machine showed great promise as an aid to reducing seabird bycatch. However, these devices are no longer in production. Current models of BCM are designed to improve fishing efficiency and should not be regarded as seabird bycatch mitigation measures.

Problems and solutions

The BCMs currently used lack control over casting power. Consequently, the arc of the cast can interfere with streamer lines and bait may be landed well beyond the location of the streamer line. The ability to adjust the distance and direction of cast are critical performance features of BCMs and should be built into future machines if they are to be regarded as contributing to the reduction of seabird bycatch.

If used to improve fishing efficiency, bait casters should be used with a suite of mitigation measures, including:

- ***Streamer lines*** (Fact-sheet 7)
- ***Line weighting*** (Fact-sheet 8)

Further research

No further research is considered necessary at this stage. As mentioned previously, the critical next step is to manufacture BCMs with variable power control and to ensure they are operated in such a way that baited hooks are consistently placed beneath the area of the water protected by the streamer line(s).

Line shooter in pelagic longline fisheries

What is a line shooter?

A line shooter is a hydraulically operated device designed to deploy the mainline at a speed faster than the vessel's forward motion, which removes tension from the longline. This allows the mainline to enter the water immediately astern of the vessel, rather than up to 30 m behind the vessel. It has been demonstrated that variation in tension on the mainline will affect the sink rates of baited hooks and therefore the risks to seabirds.

Effectiveness at reducing seabird bycatch

Research in the Australian tuna fishery has revealed that setting mainline loose with a line shooter resulted in slower sink rates of baited hooks in surface waters compared to baited hooks attached to mainline set without a line shooter (Robertson *et al*., 2010). The most likely reason for this is that propeller turbulence slowed the sink rates of loose mainlines which, in turn, slowed the sink rates of baited hooks. Although tests against seabirds are required, this result suggests that mainline set loose with a line shooter is likely to increase (not decrease) the risk to seabirds during line setting operations. Regarding the actual fishing (soak) period, baited hooks attached to loose mainlines settle deeper in the water column than hooks attached to mainlines set without a line shooter, which may affect accessibility to diving seabird species. However, the evidence to date suggests the primary – if not all – interactions occur immediately after line setting when baited hooks are clearing surface waters. Until evidence to the contrary is produced it should not be considered that line shooters reduce exposure of baited hooks to seabirds.

Best practice recommendations

Line shooters should not be considered a seabird bycatch mitigation measure (Robertson *et al.,* 2010). If used to improve fishing efficiency, line shooters should be used with a suite of mitigation measures, including:

- ***Streamer lines*** (Fact-sheets 7a and 7b) combined with ***Line-weighting*** (Fact-sheet 8)
- ***Night-setting*** (Fact-sheet 5).

Thanks to Dr Graham Robertson (Australian Antarctic Division) for his contributions to the content of this Fact-sheet.

References

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CONTACTS

Rory Crawford , Senior Policy Officer, BirdLife International Marine Programme, The Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK. Email: rory.crawford@rspb.org.uk BirdLife UK Reg. Charity No. 1042125

ACAP Secretariat, Agreement on the Conservation of Albatrosses and Petrels, 27 Salamanca Square, Battery Point, Hobart, TAS 7004, Australia. Email: secretariat@acap.aq