



Agreement on the Conservation
of Albatrosses and Petrels

Review of Seabird Bycatch Mitigation Measures for Pelagic Longline Fishing Operations

Abstract

Since the last meeting of the IOTC Working Party on Ecosystems and Bycatch a considerable amount of research has been undertaken on seabird bycatch mitigation measures for pelagic longline fishing operations. Evidence is emerging that the use of appropriate configurations of weights on branchlines is currently the most effective means of reducing seabird access to baits, although it still needs to be used in conjunction with other measures, such as bird scaring lines (BSL) and night setting. The results of this research have been reviewed by ACAP's Seabird Bycatch Working Group (SBWG) and a summary of key findings are provided to assist IOTC in its consideration of the efficacy of seabird bycatch mitigation measures currently in use within the IOTC convention area, as required by IOTC Resolution 10/06.

Introduction

Recent research has highlighted the importance of preventing seabird access to baited hooks through use of measures such as branchline weighting, bird scaring lines (BSL), night setting and underwater setting chutes. The results of this research were reviewed in 2010 by ACAP's Seabird Bycatch Working Group (<http://www.acap.aq/english/english/advisory-committee/ac5/ac5-outcomes>). Evidence is emerging that night setting or the use of appropriate configurations of weights on branchlines are currently the most effective means of reducing seabird access to baits, although both these still need to be used in conjunction with other measures, such as bird scaring lines. Research is continuing to improve our knowledge of the most effective line-weighting regimes.

There are currently six seabird bycatch mitigation measures specified in IOTC Resolution 10/06. Since WPEB 5 research has been undertaken on four of these: weighted branchlines, bird scaring lines, night setting and line shooters. A summary of these research findings follows.

Weighted branch lines

Two recent studies have examined the effects of adding weights to branchlines — Melvin et al. 2010, and Robertson et al. 2010a).

The Melvin research, conducted with the support of the Japan Tuna Fisheries Cooperative Association, found that in order to defend baited hooks with streamer lines from bird depredation (and in particular white-chinned petrels), the distance at which baits sink beyond the birds' reach (10 m) must be within the aerial extent of the streamer line. Branchlines with 60 g weights attached 60 – 70 cm from the hook sank fastest and with the least variation to all target depths (2 m, 5 m and 10 m) and reduced the distance at which birds have access to baits to just less than 100 m – the target aerial extent of bird scaring lines and 1/3 that of unweighted lines (307 m). The research found that branchline weighting had no effect on catch rates of target fish (tuna and swordfish).

The research conducted by Robertson et al. (2010a) found that there were no detectable differences in sink rates of baited hooks between different species of bait within the same bait life status (alive/dead), but that on average, live bait sank much slower than dead bait, greatly increasing the exposure of baited hooks to seabirds. In relation to the sink rate of hooks baited with dead bait, the study found that a 160 g weight placed 2 m from the hook sank the fastest, averaging 0.27 m/s and 0.74 m/s from 0-2 m and 4-6 m depths, respectively.

Results from Robertson et al (2010a) indicate that in order to achieve sink rates sufficient to ensure that dead baits reach depths of 10 m within 100 m of their deployment (and therefore under protection of the bird scaring lines) would require:

40 g weight attached at the hook;

60 g weight attached within 1m of the hook; or

98 g weight attached within 2m of the hook.

It should be stressed that these are minimum specifications, and increasing weight or decreasing distance from the hook would further improve sink rates.

Bird scaring lines

Melvin et al. (2010) undertook a comparison of a hybrid bird scaring line (with long and short streamers) with a light bird scaring line (only short streamers). The research found that there were no statistically significant differences in seabird mortality rates, overall seabird attack rates on baited hooks, and measures of attack rate by distance between the two types of lines. However, there were substantial and important differences in the performance of these BSLs that were not detected using statistical approaches and further research will be undertaken this year to quantify them.

The research found that when streamer lines are deployed, most seabird attacks occur beyond their aerial extent. The research also found that baits on unweighted branchlines were still accessible to White-chinned Petrels (WCPE) beyond 100 m astern and that it was in this area that most albatross mortality occurred, as a function of secondary attacks on

baits returned to the surface by white-chinned petrels. A similar response is likely when shearwaters or other *Procellaria* petrels are abundant

These results indicate that bird scaring lines should not be considered as a primary seabird bycatch mitigation measure unless they are combined with appropriate weighting of the branchline or some other measure that takes the bait to a depth of 10m within the aerial extent (and protection) of the streamer line.

Night setting

Melvin et al. (2010) noted that in 2009 several vessels participating in the South Africa tuna joint venture fishery quickly approached or exceeded their seabird bycatch limits, indicating that the mitigation measures they were using – primarily twin BSLs and night setting - were insufficient to prevent seabird mortalities. Night setting is one of the most effective seabird bycatch mitigation measures in long-line fisheries, but is less effective in periods around the full moon. In such situations night setting should be used in combination with both streamer lines and appropriate weighting of the branchline, or some other measure that takes the bait to a depth of 10 m within the aerial extent of the streamer line.

Line shooters

Robertson et al (2010b - IOTC-2010-WPEB-07) examined the effectiveness of a line shooter as a seabird bycatch mitigation device. In the study the mainline was set in three configurations typically used in Australia's pelagic longline fishery: (a) surface set tight with no slackness astern; (b) surface set loose with 2 s of slack astern; and (c) deep set loose with 7 s of slack astern.

The study found that tension on the mainline had a powerful effect on sink rates. Baited hooks on branch lines attached to tight mainlines reached 2 m depth nearly twice as fast as those on the two loose mainline tensions, averaging 5.8 s (0.35 m/sec) compared with 9.9 s (0.20 m/sec) and 11.0 s (0.18 m/sec) for surface set loose and deep set loose tensions, respectively. The likely reason for the difference is propeller turbulence. Tight mainline entered the water aft of the area affected by turbulence whereas the two loose mainlines and the clip ends of branch lines were set directly into it about 1 m astern of the vessel. The turbulence presumably slowed the sink rates of baited hooks at the other end of the branch lines.

The results suggest that a mainline deployed with a line shooter (as in deep setting) into propeller turbulence at the vessel stern slows the sink rates of baited hooks, potentially increasing their availability to seabirds. Unless mainline can be set to avoid propeller turbulence the use of line shooters for deep setting should not be promoted as an effective deterrent to seabirds.

Offal Management

Seabirds are attracted to offal that is discharged from vessels and management of discharge is an important mitigation measure in demersal longline and trawl fisheries. However, the amount of waste generally discharged in pelagic longline operations is considerably less than that with other fishing operations. Offal retention and/or incineration may also be impractical on small vessels. As a result, offal management or full retention is of

considerably lesser importance as a mitigation measure in pelagic longline operations. While full offal retention, or at least not discharging offal during line setting, should be encouraged as good deck practice, it should only be considered as a supplementary measure in pelagic fisheries. It is recommended that this measure be removed from the suite of measures currently advocated as primary mitigation measures in Resolution 10/06.

References

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