



Longline vessels attract hundreds of seabirds such as petrels and albatrosses intent on an easy meal.



Sink rate recorders were attached to hooks to assess the effect of different lead weight characteristics, bait types and other factors on hook sinking.



Lines were set using different bait types – in this case squid – to assess its effects on hook sink rate. Experiments were also conducted in conjunction with bird scaring lines (red streamers pictured).

Working towards seabird-safe longlining in pelagic tuna and billfish fisheries

Eighteen threatened seabird species breed in Australia and its Antarctic territories. A further 16 threatened species visit Australia's oceans in search of prey.

Unfortunately, these birds face the very real threat of becoming incidental bycatch in longline fisheries. The Australian Government helps to conserve these species through its contributions to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the Agreement on the Conservation of Albatrosses and Petrels (ACAP), and its own Recovery Plan for Albatrosses and Giant Petrels.

The Seabird Bycatch and Ecology group of the Southern Ocean Ecosystems programme at the Australian Government Antarctic Division works

with industry to develop seabird-safe fishing methods. The group also provides scientific advice to enable the government to meet its responsibilities under CCAMLR and ACAP. The group undertakes:

- research on seabird population status and trends;
- fisheries interactions studies to determine where threatened species are likely to be caught;
- bycatch mitigation work with industry to develop seabird-safe fishing methods; and
- engagement in the policy process to improve uptake of seabird-friendly practices in southern hemisphere fisheries.

There has been considerable success so far. Both the Australian Government and CCAMLR introduced a suite of mitigation measures that have reduced seabird bycatch to sustainable levels within their regulated subantarctic fisheries.

For Australia these are the Heard and McDonald Islands fishery and the Macquarie Island fishery (*Australian Antarctic Magazine* 8:18-19). These fisheries have, in some areas, achieved very low levels of incidental seabird bycatch through the implementation of mitigation measures.

Despite these successes there is more work to do. Seabirds, such as albatrosses and petrels, range around the world in search of prey. They are true world travellers; an albatross from Heard Island may spend part of the winter feeding in the Great Australian Bight. Other albatrosses are known to circumnavigate the world between breeding seasons. To conserve southern hemisphere seabirds effectively we must work in fisheries throughout their foraging ranges, even if the fisheries surrounding the birds' breeding islands are seabird-safe.

Because many subantarctic seabirds forage further north during the winter, attention has turned to the pelagic longline tuna and billfish fisheries that operate at those latitudes. Tuna and swordfish vessels set on average 1000 hooks a day on longlines extending over 90 km. Even if only a tiny fraction of these hooks is taken by seabirds, the resulting bycatch can be alarming. Birdlife International estimates that there are several tens of thousands of seabirds killed annually on longlines. These estimates apply to the open ocean (unregulated) fishery. Regulated fisheries that operate within national exclusive economic zones, such as Australia's Eastern Tuna and Billfish

Fishery, are a good starting point for mitigation research. Practical and effective mitigation strategies that are developed in regulated fisheries may ultimately be adopted by similar types of fisheries operating on the high seas.

With this in mind, and to reduce the number of seabirds caught in the Eastern Tuna and Billfish Fishery, the Australian Government Antarctic Division and the Australian Fisheries Management Authority chartered the fishing boat, *Assassin*, to conduct an experiment aimed at increasing the sink rate of baited hooks. Understanding the factors that affect the sink rate of baited hooks is important because most seabird mortality occurs at or near the water's surface as the fishing gear is sinking. Measures that increase sink rates and limit the time baits are exposed should reduce the catch rate of seabirds.

We measured the effect of three different lead weighted swivels on hook sink rates. We also measured the effect of placing these weights at four different distances from the hook, and the effect of bait type (squid, saury and mackerel) and whether the bait was alive or dead.

The experiment resulted in a recommended line weighting regime (swivel weight and distance from the hook) that is currently being trialled in the fishery. Time will tell if these measures prove effective in reducing seabird bycatch to levels that are deemed to be safe to seabirds.

In the mean time, work on other mitigation measures continues. The development of a practical and effective bird scaring streamer line, to use in conjunction with the line weighting regime, is being pursued. Streamer lines are currently required in the East Coast Tuna and Billfish Fishery, but a lack of established performance criteria has resulted in a range of styles and constructions being used by fishers. Streamer lines are highly variable across the fleet and highly variable in their effectiveness.

Mitigation measures that prove effective in the Eastern Tuna and Billfish Fishery are likely to be effective in the large, unregulated open ocean fisheries. A significant future hurdle will be finding the means by which these measures might be adopted by these fisheries. However, a precedent for wide-spread uptake exists. Fast sinking longlines developed for demersal (bottom) fishing have proved an effective seabird deterrent (*Australian Antarctic Magazine* 5:14-15). These lines have been widely adopted in the Patagonian toothfish fisheries in the Southern Ocean because of CCAMLR's adoption of minimum sink rate standards (creating the incentive for uptake), and because the lines are practical for fishers to use. If similar incentives can be developed for tuna fisheries, both in national economic zones and on the high seas, the results of our research could yield significant seabird conservation dividends worldwide.

KIERAN LAWTON, GRAHAM ROBERTSON and BARBARA WIENECKE
Southern Ocean Ecosystems Programme, AGAD