Agreement on the Conservation of Albatrosses and Petrels

Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 - 10 May 2013

Report of Seabird Bycatch Working Group

Seabird Bycatch Working Group

In relation to the annexes of the Report, Argentina reserved its position on them. Argentina will present an additional note as an annex to the Report.

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Report of the Fifth Meeting of the Seabird Bycatch Working Group, La Rochelle, France, 1-3 May 2013

PURPOSE

This Report reports on discussions and recommendations of the Fifth Meeting of the Seabird Bycatch Working Group (SBWG), held in La Rochelle, France, 1-3 May 2013, together with progress achieved in implementing the Working Group's Work Programme.

INTRODUCTION, WELCOME AND APOLOGIES

The Seabird Bycatch Working Group Convenor, Barry Baker, welcomed all Working Group members and observers (**ANNEX 1**) and introduced the Working Group's Vice-convenor, Anton Wolfaardt (United Kingdom).

The Convenor noted that there was a large number of observers present, and invited all attendees to contribute fully to the meeting. Those scheduled to lead on agenda items agreed to provide a written report on those items, with contributory text being drafted by participants who made presentations, as well as by several others.

1. BEST PRACTICE SEABIRD BYCATCH MITIGATION CRITERIA AND DEFINITION

Ed Melvin presented SBWG5 Doc 31, which noted that although ACAP routinely uses the term 'best practice' in relation to advice it provides on the use of mitigation measures, no criteria had been established to define what this term meant. The Working Group agreed that there was a need to address this matter, and recommended that the following criteria be applied by ACAP when recommending best practice fishing technologies and techniques to reduce the incidental mortality of albatrosses and petrels in fishing operations.

i. Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly[1] reduce the rate of seabird incidental mortality to the lowest achievable levels.

   Experience has shown that experimental research comparing the performance of candidate mitigation technologies to a control of no deterrent, where possible, or to status quo in the fishery, yields definitive results. Analysis of fishery observer data after it has been collected regarding the relative performance of mitigation approaches are plagued with a myriad of confounding factors. Where a significant relationship is demonstrated between seabird behaviour and seabird mortality in a particular system or seabird assemblage, significant reductions in seabird behaviours, such as the rate of seabirds attacking baited hooks, can serve as a proxy for reduced seabird mortality. Ideally, when simultaneous use of fishing technologies and practices is recommended as best practice,

[1] Any use of the word 'significant' in this document is meant in the statistical context.

research should demonstrate significantly improved performance of the combined measures.

ii. Fishing technologies and techniques, or a combination thereof, shall have clear and proven specifications and minimum performance standards for their deployment and use.

Examples would include: specific bird scaring line designs (lengths, streamer length and materials; etc.), number (one vs. two) and deployment specifications (such as aerial extent and timing of deployment), night fishing defined by the time between nautical dusk and nautical dawn, and line weighting configurations specifying mass and placement of weights or weighted sections.

iii. Fishing technologies and techniques shall be demonstrated to be practical, cost effective and widely available.

Commercial fishing operators are likely to select for seabird bycatch reduction measures and devices that meet these criteria including practical aspects concerning safe fishing practices at sea.

iv. Fishing technologies and techniques should maintain or enhance the efficiency and if possible the catch of fishing operations. Measures that compromise efficiency of fishing operations are unlikely to meet with acceptance and compliance.

v. Fishing technologies and techniques should, to the extent practicable not increase the bycatch of other taxa.

For example, measures that increase the likelihood of catching other protected species such as sea turtles, sharks and marine mammals, should not be considered best practice (or only so in exceptional circumstances).

vi. Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques, and should be clearly specified in fishery regulations.

Relatively simple methods to check compliance include port inspections of branch lines to determine compliance with branch line weighting, determination of the presence of davits (tori poles) to support bird scaring lines, inspections of bird scaring lines for conformance with design requirements. Compliance monitoring and reporting should be a high priority for enforcement authorities.

ADVICE TO THE ADVISORY COMMITTEE

The definition of Best Practice outlined in SBWG report Item 1 (points i to vi) be adopted for use when developing advice on mitigation measures to reduce seabird bycatch.

2. PELAGIC LONGLINE BYCATCH MITIGATION

2.1 Mitigation research update

Agenda Item 2 focused on information sharing and included presentations highlighting initiatives specific to seabird conservation in pelagic longline fisheries. The 11 papers received under this agenda item were divided into two categories: mitigation of seabird bycatch during line setting or mitigation during line hauling. Under the line setting category,

papers were grouped under branch line weighting or bird-scaring lines. Brief summaries of presentations are included below. Prior to presentation under each grouping, the Working Group considered current ACAP best practice recommendations appropriate to each grouping so as to promote targeted discussions on papers that might suggest changes to existing best practice advice.

Mitigation during line setting

Branch line weighting

SBWG5 Doc 33. During nine cruises, 92 sets and 87,098 hooks were observed in the southern Brazilian domestic longline fishery to compare the catch rate of target fish species on branch lines with leaded swivels placed at 2 m and 5.5 m from the hooks. A catch of 3,868 fishes from 16 taxa was recorded. For the main target species, the difference between the total CPUE (per 1,000 hooks) of branch lines set with swivels placed at 2 m and 5.5 m from the hook were ≤ one fish per 1,000 hooks, except for *Thunnus albacares* for which the CPUE was around three fish per 1,000 hooks more for 2 m leaders compared with 5.5 m leaders. The Generalized Linear Model analysis shows that there was no significant difference in the catch rate of target species between the 2 m or 5.5 m leaders. These results support a growing body of evidence that placing line weights closer to the hooks does not negatively affect the catch rate of target species in pelagic longline. Changes to ACAP best practice mitigation are not recommended based on these results.

SBWG5 Doc 34. Electric fishing lights (EFL) have been recently adopted by the southern Brazilian pelagic longline fleet. Each EFL carries two AA batteries, and given its weight out of the water (~160 g) some fishermen argue this device is a replacement for the new line weighting regime of 60g within 2 m of the hook as required by a Brazilian national regulation. A total of 66 repetitions during 11 sets were obtained to compare the sink rate of baited hooks with weighted swivels placed at 3.5 and 5.5 m from the hook, in each case with and without EFLs. The hooks on lines with the weight placed at 3.5 m had the fastest mean sink rates (0.281 - 0.515 m/s), while hook on line with weights placed at 5.5 m had the slowest mean sink rates (0.182 - 0.431 m/s). These results suggest that 3.5 m leader lines with ≥ 60 g leaded swivels, with or without EFLs may achieve satisfactory sink rates, while 5.5 m leaders do not.

SBWG5 Doc 45. New Zealand described the design of an at-sea experimental trial that will test, under normal fishing conditions, the mitigation efficacy and effect on fish catch for a range of mitigation devices developed globally and not currently in widespread use in New Zealand. Trials are currently underway, and results will be presented at the next meeting. New Zealand sought collaboration with others on these trials, or on similar work elsewhere that may result in comparable findings.

SBWG5 Doc 49 reported the results of an experiment to test the effectiveness of reducing the distance between weights and the baited hook in reducing seabird attack rates on baited hooks and seabird bycatch in pelagic longline. This study also analyses the effect on the capture of target species. Two branch line types were tested: a control treatment of standard Uruguayan branch lines with a 75g swivel at 4.5m from the hook and an experimental branch line of 65g Safe Lead 1m from the hooks. The experiment was carried out during five trips on a research vessel on the Uruguayan slope. Results demonstrate that reducing the hook-weight distance in the pelagic longline branch line reduce the seabird attacks (including multiple attacks) and seabird bycatch. Furthermore, this modification appears not to significantly affect the catch of target species.

SBWG5 Doc 50 evaluated the effects of propeller and hull turbulence on the sink rates of baited hooks on one Chilean and two Australian fishing vessels. Hooks were deployed into five different locations relative to the wake: close to the vessel's stern at the centre line of the propeller; into the wake on the upswing and downswing sides of the propeller; and outboard of wake on the upswing and downswing sides of the propeller. Two branch line deployment methods – the 'lead sinker first' and 'hook-and-sinker together'– were also assessed. Within each of the three vessels, baited hooks in the centre position reached 3 m depth 16%, 19% and 30% slower than those in the next slowest position. Mean sink times in propeller upswing and downswing zones were virtually the same. Sink times to 3 m in locations other than the centre of the wake varied by only 2 s (0.02 m/s). Gear sank fastest outboard of vessel wakes on the downswing side of the propeller, but the advantage in deploying to this area was minor. Branch line deployment method made no difference to the sink rates in each of the five bait landing positions. Authors conclude that hooks should be set to avoid the area of maximum propeller upwelling astern of vessels (i.e. the centre position) to reduce bait availability to seabirds and that baits be set to areas that provide the most effective coverage (both laterally and distance astern) by streamer lines.

SBWG5 Doc 51 compares the sink rates and fish catch rates of two new branch line weighting regimes compared to the Australian tuna industry standard weighting configuration of 60 g at 3.5 m from the hook. Baited hooks on gear with a 120 g lead weight 2m from the hook reduced the time to reach 2m, 5m and 8m depths by 16%, 58% and 70%, respectively, compared with industry standard gear (60 g at 3.5 m). Baited hooks with 40 g leads at the hook reduced the time taken to reach 2m, 5m and 8m depth by 33%, 28% and 25%, respectively. No differences in fish catch rates were detected among weighting configurations. This indicates that a 40g lead at or very close to (i.e., ≤ 0.5 m) the hook has the most potential for adoption in fisheries due to: improved crew safety; ease of port-based inspection for compliance purposes; reduced construction costs; reduced bin tangles; and ease of deployment. Based on the improved sink profiles, absence of effects on fish catch and improved crew safety, in January 2012 the permit conditions of fishing operators in Australia's pelagic longline fishery were modified to allow the option of 40 g lead weight at the hook in addition to the current regime of 60 g at ≤ 3.5m from the hook. The modification applies only to operators fishing wholly with dead bait (not a mix of dead and live bait).

SBWG5 Doc 52 (Addendum to SBWG Doc 51) presented data showing high compliance with hook leads in 12 port inspections of three vessels (>12,000 hooks). Recommends that ACAP encourage nations where bioluminescent sliding hook weights (lumo leads) are being adopted in fisheries to conduct port-based inspections of gear bins and record incidences of noncompliance to the correct positioning of hook leads in branch lines and report the findings to ACAP at an appropriate future date.

SBWG5 Doc 31 suggested that 40 g sliding weights placed at the hook should be ACAP best practice for branch line weighting in coastal state fisheries, restating arguments presented in SBWG5 Doc 51. This proposal is based primarily on the assumption that fishers are unlikely to comply with ACAP best practice recommendations of simultaneous use of bird-scaring lines, weighted branch lines and night setting and that line weighting is the only measure to provide a fully reliable and effective safeguard against seabird mortality. It also recommends that advice on branch line weighting best practice be developed for use in circumstances where line weighting is (or is assumed to be) a sole mitigation measure.

The Working Group noted that the preponderance of evidence from experimental research now shows that:

1. branch line weighting reduces seabird interactions with no detectable effect on fish catch rates; and

2. the closer line weights are positioned to the hook the faster baited hooks sink beyond the reach of foraging seabirds, thus, lowering the likelihood of seabird interactions and mortalities with pelagic longlines.

The Working Group welcomed new information that sliding hook weights provide a technology that allows positioning weights in close proximity to hooks, while minimizing the likelihood of injuries to crew and allowing improved opportunity for compliance monitoring of branch line weighting.

Bird-scaring lines

SBWG5 Doc 42. Reports on the results of two experiments comparing bird-scaring line designs using unweighted branch lines in the western North Pacific using newly adopted attack rate by distance astern protocols (see original document for more information). The first experiment compared bird scaring lines with short vs. long streamers using data collected by fishermen. The second compared three bird scaring lines designs (short streamers vs. a combination of short and long streamers vs. short mixed with long streamers) in a controlled experiment on board a chartered vessel. Results of both experiments showed no significant difference in bird catch, attacks or numbers among line designs and that bird scaring line tangles with surface floats were problematic. These results appear to show that all the bird scaring lines tested were ineffective at preventing seabird attacks by Laysan Albatross within 100 m of the vessel. Shearwater bait attacks were few.

SBWG5 Doc 43 compared two (paired) vs. single bird scaring lines using unweighted branch lines in controlled experiments aboard a Japanese chartered fishing vessel fishing in the western North Pacific using newly adopted attack rate by distance protocols (see original paper for more details). Results showed that paired bird scaring lines reduce primary attacks of Laysan Albatross by 48%, secondary attacks by 46%, and catch rates by 55% compared to single bird scaring lines. Few bird attacks occurred within 75 m when paired lines were used. Unweighted branch lines sank to 2 m within the aerial extent of the bird scaring lines. The nine birds caught were too few for statistical comparison of bycatch rates. The authors conclude that paired lines performed best, but further trials are necessary to confirm that paired bird scaring lines significantly reduce seabird mortality when compared to single lines.

SBWG5 Doc 46. This paper updated the information presented by Uruguay in SBWG-4 on the efficiency of a single bird scaring line to reduce seabird bycatch in the Uruguayan pelagic longline fleet. Thirteen trips were carried out on longline vessels to test its effectiveness versus no bird scaring line. The use of a bird scaring line showed a significant decrease in the seabird bycatch. Because the bird scaring line broke in a high proportion of bird scaring line sets, either by entanglement with the longline gear or by tension, a second phase of the experiment was conducted in 2012 in order to improve its performance. During four trips, 26 longline sets were conducted with a bird scaring line with several design modifications and varying setting operations resulting in only two entanglements being recorded, thus dramatically the bird scaring line rupture rate. This work shows that bird scaring line use can reduce seabird bycatch in pelagic longline fisheries when set effectively.

The Working Group welcomed reports of research from Japan on the ACAP research priority of evaluating the performance of one vs. two bird-scaring lines on seabird interactions. The Working Group noted the growing contribution of Japanese scientists to seabird bycatch mitigation research, and further noted that Japan maintains the only active research

programme on seabird bycatch mitigation in the North Pacific. The Working Group also welcomed further work and advancements by Uruguayan scientists on the ACAP high priority research of minimising tangles of bird-scaring lines with longline gear and welcomed news of progress.

Haul Mitigation

SBWG5 Doc 44. The United States reported on the bycatch of albatrosses during line hauling in the Hawaii longline shallow-set fishery. In this fishery, the gear must be set at night and is typically hauled during the day. Most seabird interactions occur when fishermen retrieve the gear and birds are actively feeding. In 2011, this fishery interacted with 49 Laysan albatrosses and 19 Black-footed albatrosses; 78% of these seabirds were released injured and alive. The US recommended that ACAP compile information from countries with longline fisheries to facilitate evaluation of the extent of seabird bycatch during longline retrieval versus deployment and other related operational factors.

The Working Group acknowledged that seabird bycatch during line hauling occurs in several pelagic and demersal longline fisheries. The value of compiling such information and work developing and testing haul mitigation strategies were noted as important additions to ACAP research priorities for pelagic longline fisheries.

2.2 Best Practice Advice

A major product of previous SBWG meetings has been a review of information on current mitigation research for pelagic longline fisheries and the preparation of advice on best-practice mitigation (**ANNEXES 2** and **3**, respectively). The Working Group updated both annexes to reflect new information. As before, it is recommended that the Advisory Committee endorse this advice and encourage Parties to use this information to guide the development of policy and practice within the fisheries under their jurisdiction.

2.3 Mitigation research priorities

The Working Group identified the following mitigation research priorities for the pelagic longline method:

Weighted branch lines: continue work to identify branch line weighting configurations (mass, placement, shape, number of leads and materials) that are effective at reducing seabird bycatch rates. Studies should include evaluations of the effects of branch line weighting on the catch rate of pelagic fishes and provide data that allow evaluation of the relative safety and practicality attributes of various weighting configurations. Studies evaluating the response of seabirds (mortality rates and attack rates) and fishes (catch rates of target and non-target species) to weights (of varying mass) positioned at the hook (hook weights) and the safety attributes of hook weights are the highest priority for research on branch line weighting.

Bird-scaring lines: developing methods that minimise entanglements of the in-water portion of bird-scaring lines with longline floats, while creating sufficient drag to maximise aerial extent, remains the highest priority for research on bird-scaring lines. Research evaluating the effectiveness of one vs. two bird-scaring lines; bird-scaring line design features (steamer lengths, configurations, and materials); and methods for efficient retrieval and stowage of bird scaring lines remain research priorities.

Night setting: determine effectiveness of bird scaring lines and branch line weighting at night by characterising seabird behaviour at night using thermal or night-vision technologies.

Combinations of mitigation measures: continue to evaluate the effectiveness of the simultaneous use of the three ACAP best-practice mitigation methods (night setting, branch line weighting and bird-scaring lines).

Novel technologies: continue to develop novel technologies that release or protect baited hooks to depths beyond the reach of seabirds.

Haul mitigation technologies: developing methods that minimise seabird hooking during hook retrieval.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. supports the current advice that a combination of weighted branch lines, bird scaring lines and night setting represent best practice mitigation for seabird bycatch in pelagic longline fisheries;

ii. affords priority to line weighting when considering mitigation for seabird bycatch on the basis that line weighting is integral to fishing gear and has the advantage of being more consistently implemented, subject to the following:

   a. weighting regime characteristics are adequately specified;
   b. safety issues are adequately addressed; and
   c. issues relating to application to artisanal fisheries are taken into account.

iii. notes the review of mitigation technology available for pelagic longline gear (**ANNEX 2**)

iv. endorses the revised best practice advice for mitigation in pelagic longline fisheries (**ANNEX** 3) and encourage Parties to use this information to guide the development of policy and practice within the fisheries under their jurisdiction.

3. DEMERSAL LONGLINE BYCATCH MITIGATION

3.1 Mitigation research update

SBWG5 Doc 10 provided an update of recent developments of a promising mitigation measure for demersal longline vessels called the 'Kellian line shooter' that was being developed in New Zealand. The device is towed behind the vessel and guides the mainline and branch lines through a series of 'rollers' that is designed to rapidly sink baited hooks. To date the line setter has had only preliminary at-sea testing in New Zealand with design and further development trials being conducted in a flume tank. It was noted that New Zealand coastal demersal longline fisheries include a variety of gear types, and that the Kellian line shooter has the prospect of being a device which could apply across a wide range of these, and other demersal longline fisheries.

SBWG5 Doc 40 provided details of the work of the BirdLife Albatross Task Force in the Namibian demersal longline fishery for hake. The estimated annual seabird mortality for this fishery of 22,821 (14,351 - 32,675) birds killed each year, of which 85% are White-chinned petrels. Line weighting experiments comparing 5 kg steel weights with the concrete weights currently used in this fishery imply that seabird bycatch could be reduced by 75% through the use of steel weights. These findings were welcomed and it was recognised that best practice mitigation measures for this fishery should include a combination of line weighting, night setting and the use of bird-scaring lines: At-sea mitigation trials reported from previous years (SBWG4 Doc 17) indicate that this combination could potentially reduce seabird bycatch to negligible levels.

It was recognised that the cumulative bycatch rates from the Namibian hake trawl (**SBWG5 Doc 38**) and demersal longline fisheries of Namibia represented the highest levels of seabird bycatch in trawl and longline fisheries that have been tabled to the WG. It was also noted that the provenance of the White-chinned petrels caught was likely to be from islands in the Indian Ocean; the Black-browed albatrosses were likely to be from the declining population on South Georgia (Islas Georgias del Sur)[2], and the yellow-nosed albatrosses would be from Tristan da Cunha, and that bycatch of Atlantic yellow-nosed albatrosses emphasises the priority of assessing the population of Atlantic yellow-nosed Albatross on Tristan. The WG agreed that further engagement with the Namibian Government to discuss their role with ACAP was a high priority.

Discussion was also held regarding potential bycatch of ACAP listed species in Angola, and it was agreed that preliminary discussions and investigations with relevant agencies in Angola was a priority for the Agreement. It was suggested that contacting the Benguela Current Commission could be a productive way to commence this process.

In relation to demersal longline fisheries generally, the Working Group identified a shared issue in Chile, Argentina, USA and potentially other regions, where some demersal fisheries place buoys between the weights to raise sections of the line off the sea-bed. However, these buoys slow hook sink rate, in some cases meaning that hooks don't sink sufficiently within the protection of the bird scaring line. In the USA, the floats are being used by fishermen to reduce depredation of catch by hagfish. In Argentina, it has been demonstrated that seabird bycatch was more frequent near the buoys. It was proposed that a potential solution could be to add a small weight on the dropper line and extend the buoy line, which could speed the sink rate of the hooks near the buoys in the first few metres. The WG agreed that this was a priority research area for the Agreement.

3.2 Review of current mitigation for demersal longline gear

The Working Group noted that research results presented at the meeting reinforced the current ACAP best practice advice. Information on the Chilean, or trotline, system was presented and had been used to update both the ACAP review and best summary advice for demersal longline mitigation. (**ANNEX 4** and **5**, respectively). It is recommended that the Advisory Committee encourages Parties to use this advice to guide the development of policy and practice within demersal longline fisheries under their jurisdictions.

[2] "A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur e Islas Sandwich del Sur) and the surrounding maritime areas".

3.3 Mitigation research priorities

The Working Group confirmed previous advice that development and testing of mitigation measures for small vessels remains the main outstanding research priority.

In addition, it was recommended that addressing the influence of placing additional buoys between weights in some demersal longline fisheries to raise sections of the line off the sea-bed, and thus reducing sink rates, was another key research priority, together with possible mitigation options.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. notes that research results presented at the meeting reinforce the current ACAP best practice advice;

ii. notes that information on the Chilean, or trotline, system presented at the meeting has been used to update both the ACAP review (**ANNEX 4**) and best summary advice (**ANNEX 5**) for demersal longline mitigation;

iii. encourages Parties to use this advice presented in Annex 5 to guide the development of policy and practice within demersal longline fisheries under their jurisdiction;

iv. notes the high levels of estimated annual seabird mortality in the Namibian demersal longline fishery for hake and encourage the adoption in Namibia of best practice mitigation; and

v. endorses the updated list of research priorities, including the addition of a new priority area of research: investigating the influence on sink rates of additional buoys that are used in some demersal longline fisheries to raise sections of the line off the sea-bed, as well as developing mitigation options.

4. TRAWL BYCATCH MITIGATION

4.1 Mitigation research update

The Working Group reviewed eight papers on seabird bycatch and mitigation in trawl fisheries. The UK presented **SBWG5 Doc 07**, which provided initial results from work carried out in the Falkland Islands (Islas Malvinas)[2] demersal trawl fishery to examine the relationship between seabird collisions with warp cables and levels of unobserved or cryptic mortality. The paper also introduced a warp attachment device (corpse catcher) that was designed to increase the probability that birds dragged underwater and drowned would be retained until hauling. Mortalities observed from a trailing vessel, and not the trawler, comprised at least 23% of the total recorded mortality and injury. This work highlights the importance of undetected mortality and that seabird mortality figures associated with warp strikes are underestimated. The corpse-catcher proved to be substantially more effective than warp splices in retaining seabird carcasses. The Working Group welcomed the research and encouraged further work to quantify the extent and nature of undetected mortality associated with trawl fisheries in order to improve the accuracy of seabird bycatch estimates.

SBWG5 Doc 08 provided details of a new Bird Scaring Line device being tested in the Falkland Islands (Islas Malvinas)[2] demersal trawl fishery. The new device is made up of bird scaring lines that are fixed to two 14m booms attached to the stern of the vessel. The boom mounted system was designed to overcome some of the performance constraints of the traditional bird scaring lines, especially during strong cross-winds. In comparing the relative efficacy of the traditional and new systems, there have been no differences (based on contact rates), and some birds have been killed with the new system. However, the results are based on only 10 days of fishing, and further work is required.

In response to SBWG5 Doc 07 and SBWG5 Doc 08, the Argentine Delegation informed the meeting that it had presented a note to the Secretary concerning these documents, which it requested be attached to the SBWG report as an Annex (**ANNEX 10**). The United Kingdom provided a response which is attached to the report as an Annex (**ANNEX 11**).

SBWG5 Doc 09 describes a particular type of demersal trawl, where multiple nets (usually three), are deployed simultaneously. This type of gear is used in the New Zealand scampi trawl fishery, where observers have noted multiple net captures of birds, particularly shearwaters and petrels with diving ability. This occurred because the central net is liable to billow open on haul, allowing birds to enter. The paper reports on the first stage of work to address this problem, and describes the “net restrictor”, which is designed to prevent the central net billowing open on trawl. Sea trials are currently underway to test this device, and results will be reported at the next meeting. The net restrictor has been added to the list of measures in the ACAP Review of Seabird Bycatch Mitigation for Trawl fisheries (**ANNEX 6**).

SBWG5 Doc 11 Rev 1 reported information on the optimal design of bird scaring lines and bird bafflers, which are a mandatory requirement for large trawl vessels in New Zealand. A range of designs and materials were tested, with observational information collected on their performance and wear. Recommendations were made regarding the optimal material for streamers (Kraton), the backbone length in relation to block height, and terminal drag objects. In relation to bird bafflers, the paper describes a new “curtain baffler” design, based on the “Burka baffler”, and recommends this and other baffler designs require robust at-sea testing before recommendations on their use can be made. Fact sheets illustrating the findings are provided as appendices to the report, and this information has been used to update the relevant sections of the ACAP Review of Seabird Bycatch Mitigation for Trawl fisheries (**ANNEX 6**).

SBWG5 Doc 28 described seabird mortality in Argentinean ice trawlers and the effect of discards on the occurrence of interactions with fishing gear. Results are consistent with the ACAP best practice advice in that the rate of interactions (collisions with both warp and netsonde cables) increased with the level of discards. More recent investigations also show that the quantity and composition of the discards influence seabird interactions. This research indicates that seabird abundance might not be a reliable proxy indicator of risk to seabirds of trawl fisheries, or at least that the risk of seabird interaction associated with the ice trawlers is very dependent on the composition of the seabird assemblage, area and fishery characteristics. It was reported that an off-setting towed device, the Tamini Tabla, is under development in Argentina. This device has been designed to reduce entanglements between bird scaring lines and warp cables. A description of the device has been included in section 4 of the ACAP Review of Seabird Bycatch Mitigation for Trawl fisheries (**ANNEX 6**).

SBWG5 Doc 36 described results of research conducted by the Argentine Albatross Task Force (BirdLife International) on seabird mortality rates and the efficacy of a bird scaring line in the Argentinean bottom trawler freezing fleet. The study demonstrates the effectiveness of

streamer lines in reducing the number of contacts as well as the efficacy of a novel towed device in minimising entanglements between the bird scaring lines and fishing gear. Reported mortality rates are high and highlight the importance of further research to improve the spatio-temporal coverage of observations.

SBWG5 Doc 38 gave an update of the work of the Albatross Task Force (ATF, BirdLife International). Oli Yates presented a brief overview of the seabird bycatch mitigation work carried out in demersal trawl fisheries in Argentina (see above), Namibia and Chile (see below). In all cases, bird scaring lines were found to reduce significantly seabird interactions with trawl cables.

SBWG5 Doc 39 provided results from work conducted on demersal trawl vessels in Chile between June 2011 and August 2012 to evaluate seabird mortality. A total of 20 trips and 198 trawls, totalling 557.8 hours observation effort were achieved. Seabird assemblage and abundance was distinct for austral winter and summer months. Albatrosses were prevalent in winter, Pink-footed shearwater in summer. A preliminary annual seabird mortality estimate for this fishery suggests that 890 (438 – 1,418) birds are killed in this fishery due to interactions with trawl cables and the third wire. The use of bird scaring lines eliminated cable-related seabird mortality.

SBWG5 Doc 41 indicates that on the basis of at-sea observations of seabird mortality and fishing effort data, an estimated 8,000 birds are killed each year in the Namibian demersal trawl fishery, 5,010 (62%) of which are albatrosses.

4.2 Review of current mitigation for trawl gear

The Working Group welcomed the research being carried out to test and improve bycatch mitigation measures in trawl fisheries, and based on the findings presented reaffirmed the importance of bird scaring lines to reduce seabird interactions and mortality associated with cable strikes. The Working Group noted that research results presented at the meeting reinforced the current ACAP best practice advice, and agreed that there is no need to change the advice at this stage (**ANNEX 7**). It is recommended that the Advisory Committee encourages Parties to use this advice to guide the development of policy and practice within trawl fisheries under their jurisdictions.

On the basis of the research presented, a few additions and changes have been made to the ACAP review of seabird bycatch mitigation for trawl fisheries (**ANNEX 6**). These include specifications for streamer materials and deployment guidelines, descriptions of the Tamini Tabla off-setting towed device and net restrictor being tested in the New Zealand scampi fishery, and further information on baffler designs.

4.3 Mitigation research priorities

The Working Group noted that at the previous (SBWG4) meeting four research areas were identified as the highest priorities for further reducing seabird bycatch in trawl fisheries, and that these priorities should remain. It is further recommended that options to improve the efficacy of bird scaring devices in reducing seabird interactions with trawl gear should continue to be investigated, and the outcomes of these investigations should inform best practice advice and implementation:

a) options to reduce seabird interactions with warp cables by manipulating the time, nature and location of offal discharge, recognising size and operational differences between vessels;

b) methods to reduce seabirds becoming entangled in nets during hauling;

c) methods that can be applied to various fisheries/seabird assemblages to determine relationships between seabird abundance, cable interactions and mortality (quantifying the level of undetected or cryptic mortality); and

d) the applicability of net binding across pelagic fisheries.

e) methods and designs to improve efficacy of bird scaring devices in reducing seabird interactions with trawl gear.

The Working Group requested that the Advisory Committee encourages Parties and others to prioritise these areas of research and to keep the group informed of developments in research on seabird mortality and mitigation in trawl fisheries.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. notes that research results presented at the meeting reinforce the current ACAP best practice advice; this includes the use of mitigation measures that protect the warp cable, managing offal discharge and discards, and reducing the time the net is exposed on the surface (**ANNEX 7**);

ii. notes that specifications for streamer materials and deployment guidelines, descriptions of the Tamini Tabla off-setting towed device, information on the net restrictor being tested in the New Zealand scampi fishery, and further information on baffler designs presented at the meeting have been used to update the ACAP review (**ANNEX 6**);

iii. encourages further work to improve the accuracy of seabird bycatch estimates, by quantifying the extent and nature of undetected mortality associated with trawl fisheries;

iv. encourages Parties to use this advice presented in **ANNEX 7** to guide the development of policy and practice within trawl fisheries under their jurisdiction; and

v. endorses the updated list of research priorities, including the addition of a new priority area of research: to investigate options to improve the efficacy of bird scaring devices in reducing seabird interactions with trawl gear.

5. GILLNET BYCATCH MITIGATION

5.1 Working Papers

Agenda Item 5 focused on information sharing and included presentations highlighting initiatives specific to seabird bycatch in gillnet fisheries. Two working papers were received under this agenda item – the first working papers received by the Working Group on seabird bycatch in gillnet fisheries.

SBWG5 Doc 56 outlines a soon to be published global review by BirdLife International that estimates that, conservatively, 400,000 birds are killed annually as bycatch in gillnets. While the most vulnerable species are alcids, loons, penguins, shags and seaduck, pursuit divers such as shearwaters are also susceptible. Levels of bycatch in gillnets of Waved Albatross

are sufficient to cause concern, as are those of Pink-footed shearwater. There have also been recorded captures of other ACAP species, including White-chinned Petrel, Westland Petrel, giant petrel (unidentified), Black-browed Albatross, Grey-headed Albatross and Short-tailed Albatross. It is potentially a problem for Balearic shearwater in the Mediterranean, where there is limited data on gillnet effort and bycatch levels.

SBWG5 Doc 19 summarised preliminary results from a review of the literature on gillnet mitigation relevant to seabirds since an earlier review in 2007. The paper highlighted the paucity of recent work in this area, and identified spatial and/or temporal closures as the most promising measures, as well as possibilities for gear modification and/or use of pingers.

5.2 Context and Mitigation

It was noted that there are a wide variety of net fisheries and there will likely be a wide variation in risks posed to seabirds. If ACAP is to address assessment and mitigation in these fisheries, it would be worthwhile considering a broad definition of net-fishery types (e.g. bottom-set gill and tangle nets, surface set nets, ring nets, purse seines) in the same way that line fisheries had been separated. As with line fisheries, there is also likely to be variance in appropriate mitigation responses depending on the scale of the fisheries. The SBWG did not reach a conclusion on this issue.

In South America, particularly Ecuador, Chile, Peru and Brazil, artisanal fisheries play an important role in generating employment opportunities and in supplying sources of protein to local and national markets, involving a large number of people and vessels. Artisanal fishing effort is increasing as a result of increasing population and unemployment. Gillnets are extensively used in these fisheries due to low operating costs. Gillnets are the most widely used fishing gear in Peru, representing 33% of the Peruvian artisanal fleet (5,295 vessels). There are vessels that have the ability to alternate gear depending on the season or the target species, and vessels can have two or more gears.

Both gillnet documents (SBWG5 Docs 19 and 56) submitted to the Working Group and the ensuing discussion confirmed that there has been little research to date on gillnet bycatch mitigation measures, and that more is necessary. Potential gillnet mitigation measures and practices that have been identified include time/area closures, transition to alternative fishing methods, mesh-size requirements, multi-filament vs. monofilament netting, suspender lines on drift gillnets (drop net below float line), sensory deterrents (increased visibility of netting or portions of the net, and increased acoustic ‘visibility’ of net, using acoustic alarms), elimination of tie-downs, low-profile nets, reduced soak time, net attendance/patrolling to release incidental catch, provision of equipment to facilitate safe release of bycatch (e.g. net cutters), fishing depth, time of day, net weighting and setting speed (as they effect net sink rate of the net and net stability on the bottom), and avoiding aggregations of seabirds.

Spatial/temporal closures were noted as the most promising mitigation route in the short-term; though it was noted that any proposals for widescale bans on gillnetting would be difficult to enforce and would likely have serious impacts on dependent communities. Gear-switching to other methods (e.g. fish traps, longlines) may be a possible option, though displacement of impacts needs to be carefully considered and monitored. It was suggested that a focus on surface gillnets, which are most likely to impact on (broadly surface-feeding) ACAP species, would be a useful place to start.

Additionally, it is important to differentiate recreational from commercial (including artisanal) gillnet fishing in terms of considering impacts on fishers.

In relation to ACAP species, the following represent the main barriers to quantifying and reducing bycatch:

i. Very limited data on fishing effort and behaviour of gillnet fisheries overlapping with ACAP species, and the difficulty of using a consistent metric of fishing effort.

ii. Consequently, there is generally poor data on seabird bycatch levels. Priority areas highlighted in BirdLife's global review with relevance to ACAP species include the Mediterranean, southwest and southeast Atlantic, southeast and southwest Pacific, Japanese and Korean waters.

iii. No technical bycatch mitigation measures have been fully developed or defined as best practice for gillnet fisheries – as identified by both SBWG5 Doc 19 and SBWG Doc 56. More research is required to develop technical modifications that reduce bycatch levels in gillnet fisheries.

However, while these gaps are being addressed, there are some options presently available to reduce bycatch where it has been identified as a serious problem. Such measures might be viewed as 'initial' or 'interim' best practice. Spatial/temporal closures are an effective means to remove bycatch pressure on impacted populations. This is particularly relevant where fisheries exist close to colonies of sensitive species or in other areas of high seabird abundance. Removal of nets at night and compulsory net attendance by fishers can also reduce bycatch levels. Net attendance allows fishers to safely remove some birds caught soon after capture.

Ongoing work in Peru is currently testing battery-powered light emitting diodes (LEDs) to illuminate nets as a mitigation option for demersal gillnets. A preliminary analysis of seabird bycatch was inconclusive, due in part to small sample size. This work, although primarily focused on mitigating sea turtle bycatch, also showed promise as a potential mitigation measure to reduce seabird bycatch in demersal as well as in surface net fisheries. BirdLife and ProDelphinus have received funding from the National Fish and Wildlife Foundation to trial further gillnet mitigation measures in Peru, Chile and Ecuador, with particular emphasis on reducing Pink-footed shearwater bycatch. BirdLife are also seeking funding to research gillnet mitigation measures in the Baltic Sea. There are projects commencing this year in Germany and Poland examining the potential for gear-switching.

5.3 Mitigation research priorities

The SBWG recommends the following work:

i. Work is conducted to identify overlaps between ACAP species susceptible to gillnet bycatch and gillnet fisheries. This is particularly important for surface driftnets, which are likely to impact ACAP species most. The Mediterranean, southwest and southeast Atlantic, southeast and southwest Pacific, Japanese and Korean waters are areas of particular concern based on existing information.

ii. Research is instigated to examine the scale of ACAP species bycatch in gillnet fisheries – a combination of observer effort and rapid assessment (see SBWG5 Doc 6) could achieve this.

iii. Gillnet bycatch mitigation measure development is supported as a research priority, to identify solutions and inform ACAP best practice advice. This could be done in fisheries where there is direct relevance to ACAP species, e.g. Waved Albatross, or

could be targeted towards ACAP 'surrogates' – e.g. Short-tailed Shearwater – which are known to suffer from high bycatch levels in gillnet fisheries.

iv. Track ongoing gear-switching research and consider role in fisheries with impacts on ACAP species.

v. In the interim, it is recommended that a combination of measures (such as spatial/temporal closures, net removal and compulsory net attendance) be utilised to reduce ACAP species bycatch in the most critical areas.

vi. To differentiate between recreational and commercial fishing (including artisanal) when considering impacts on fishermen.

vii. Develop intersessionally definitions and descriptions of the different types of net fisheries, including purse-seine fisheries – i.e. defining what gear configurations are included in this category.

ADVICE TO THE ADVISORY COMMITTEE

i. There is generally limited data on global gillnet fishing effort and bycatch levels of albatrosses and petrels, but levels of bycatch in gillnets of Waved albatross are sufficient to cause concern, as are those of Pink-footed shearwater. Captures of other ACAP species include White-chinned Petrel, Westland Petrel, giant petrel, Black-browed Albatross, Grey-headed Albatross and Short-tailed Albatross and Balearic Shearwater;

ii. No technical bycatch mitigation measures have been fully developed or defined as best practice for gillnet fisheries;

iii. Gear switching and spatial and temporal closures are currently the main options available to reduce seabird bycatch;

iv. The Advisory Committee should support intersessional work to develop definitions and descriptions of the different types of net fisheries, including purse-seine fisheries, as current gears used are extremely diverse and their impact on non-target species largely unknown.

6. ARTISANAL FISHERIES AND INTENTIONAL TAKE

No papers were provided on intentional take of albatrosses and petrels and this issue was not considered further at this meeting

SBWG5 Doc 55 highlighted outcomes of a meeting held from 30 Nov to 1 Dec 2012, in Santa Rosa, Ecuador, with fishermen in the artisanal demersal longline hake fishery. This meeting was organised to discuss bycatch of Waved albatrosses and other vulnerable species in relation to experimental gear modification trials (increased line weighting, faster setting techniques) in attempts to reduce bycatch. It was noted that since 2010 no bycatch of Waved albatrosses has been observed in the fishery. During the meeting fishermen indicated that since 2010 gear modifications in the fishery have, in effect, doubled line weighting which may have played an important role in the observed reduction in bycatch. Onboard observer monitoring in this fishery will continue in 2013 during periods of peak Waved Albatross abundance as well as efforts to further quantify the degree to which gear modifications in the

fishery continue. (See Section 3 for further information on bycatch mitigation in other demersal longline fishing operations).

There was also a discussion during the session of the definition of “artisanal” fisheries and it was noted that ACAP does not have a specific definition of this fishery type. The need for definitions and/or clarifications of terms generally (e.g. “artisanal”, “small scale”) was expressed and it was recommended that a list of terms with definitions be prepared by the Advisory Committee and ACAP parties that draws together information from international forums and institutions (e.g. FAO, RFMOs) as well as national level legislation and regulations that define fishery types for the purposes of management. A similar recommendation was put forward during the Gillnet Session regarding the need to categorise gillnets.

ADVICE TO THE ADVISORY COMMITTEE

i. No papers were provided on intentional take of albatrosses and petrels. While this topic falls within the Terms of Reference for the SBWG, it remains an area which has not been addressed substantially by the Agreement to date.

ii. For the purposes of management, the Advisory Committee is encouraged to support intersessional work to clarify the many terms used to describe the many “artisanal”, “small scale” and subsistence’’ fishing operations that occur across the range of Annex 1 species.

7. BYCATCH DATA COLLECTION

SBWG5 Doc 16 reviewed the bycatch data provided by Parties and collaborating Range States, and outlines considerations and recommendations for the further development of the bycatch data reporting process. The paper highlighted that the temporal and spatial resolution of the data currently provided are too coarse to enable useful assessments of seabird bycatch levels and trends. A number of recommendations are made that were considered by the Working Group.

It was noted that the objective of the bycatch data reporting process is to regularly review and update data on the current levels and trends of incidental mortality of ACAP-listed albatrosses and petrels in relevant fisheries and to assess the implementation and effectiveness of bycatch mitigation measures in those fisheries.

Currently, fisheries effort and bycatch data are provided at a fishery (fleet)-wide scale, which limits the types of assessments that can be undertaken. At such a broad scale it is not possible to assess and monitor rates and levels of bycatch of ACAP species; it will only be possible to provide a very low-level assessment of bycatch. A major constraint of the current data is that it is not possible to match bycatch rate data with an appropriate measure of fishing effort. Applying a bycatch rate from a particular area/time across a whole fleet much/some of which may not be interacting with the seabirds is not appropriate.

In order to meet the stated ACAP objective, it is necessary to improve the resolution of the fisheries effort and bycatch data that Parties and Range States report. It is recommended that data should be provided at a spatial scale of 5x5 degrees grid square or finer, for each quarter of the year. Bycatch information should be reported at the highest possible taxonomic

resolution, preferably by species, and per gear type. If data are provided at this resolution, bycatch could be scaled up to the fisheries being monitored to estimate the total number of individuals (by species) killed annually in each fishery. This would serve as a useful indicator for ACAP that could be used to assess and track the performance of the Agreement.

Some Parties or Range States may not be in a position to immediately provide data at this spatial-temporal resolution; whereas, others may already be able to provide data at a finer scale. The reporting and assessment framework should be designed to accommodate the full range of submitted data. In order to facilitate a progressive improvement in the resolution of data reported, it would be useful to determine the reasons why Parties are currently unable to provide data at the recommended resolution.

ACAP performance indicators relating to seabird bycatch are still under development. It is proposed that the quality of data provided and the outcomes of the assessment process (i.e. the number of birds killed per annum in each fishery), would be good candidate indicators for the Agreement. These could be used to track improvements in the quality and quantity of data submitted, and the performance of fisheries with respect to seabird bycatch and the use and effectiveness of mitigation measures. Such indicators could also help identify priority fisheries and actions for ACAP and Parties. Until there are sufficient data to estimate the number of birds killed per fishery, an interim bycatch indicator could be established which at a very broad level, could assess risk, by, for example, determining overlap of ACAP species with the monitored fisheries.

It is important to note that although the proposed bycatch indicator (i.e. the number of birds killed annually per fishery and relevant bycatch rates) will provide a useful tool for ACAP to track performance, it will not provide an indication of the impacts at the population level. In the longer-term, it will be ideal to assess bycatch rates in relation to demographic data on affected ACAP species and populations.

There are many fleets that impact ACAP species that fall outside of the jurisdiction of ACAP Parties and collaborating Range States. Consequently, it will not be possible to determine easily the precise global impacts of bycatch on ACAP species. However, it is still considered useful to assess the impacts of fisheries for which ACAP Parties and others have jurisdiction and data. Currently, RFMOs are being encouraged to collect and report data at a similar resolution to that being proposed for ACAP. Other (non-collaborating) Range States that are monitoring seabird bycatch should also be encouraged to collect, as well as report, data at the same resolution as above so that in the future it may be possible to establish links with data available from other sources.

There are a number of issues that need to be resolved or at least accounted for in order to progress the development of the bycatch reporting and assessment framework. These include concerns about data confidentiality (and how the data are presented), and time-lags in the availability of data. Other concerns include duplication with other reporting requirements, and the capacity and resources to extract and report data in multiple formats to different organisations. It will be necessary to request from Parties feedback on their ability to provide data at the recommended resolution, and to understand the nature of any constraints, so that these can be considered and addressed. It is also recognised that an expert group may need to be established to develop the analytical framework, which may have resource implications for ACAP.

The Working Group highlighted the need to urgently progress the process for improving bycatch data reporting and assessment. It was acknowledged that there is a need to adopt a

progressive approach to developing the bycatch data reporting and assessment framework. The Working Group recommended that the Advisory Committee continue to support an intersessional process to progress the bycatch data collection and assessment framework.

ANNEX 8 outlines the types of assessments that are possible depending on the spatial/temporal resolution of the data available. The purpose of this Annex is to provide an indication of how the available data influence the type of assessments that can be carried out.

SBWG5 Doc 23 reviewed the data collection requirements of the scientific observer programmes in the longline fisheries of the five tuna Regional Fisheries Management Organisations (tRFMOs). It was noted that the CCSBT has had an observer programme established since 2001, whereas the remaining tRFMOs have only established longline observer programmes in the last three years, with implementation of three of these programmes only commencing in 2012 – 2013 period. The effectiveness of these observer programmes is difficult to gauge due to the low level of reporting by many Members. All tRFMOs require a level of observer coverage well below the 20% level of observer coverage recommended at WCPFC-SC2. The tRFMOs vary in the extent to which they require members to collect the critical data recommended by ACAP's Seabird Bycatch Working Group (SBWG).

The Working Group highlighted the importance of progressing work related to observer programmes and data collection and reporting in the tRFMOs as outlined in SBWG5 Doc 23. The Working Group recommended the Advisory Committee endorse continued engagement by ACAP with RFMOs to achieve these objectives. Further discussion on this matter is provided under agenda item 9.

SBWG5 Doc 25 provided information on the use of electronic monitoring (e-monitoring), which involves the use of fixed cameras on fishing vessels to record data on fishing activity. It is particularly suited for collecting data on rare events, such as seabird bycatch, where 100% observer coverage may be necessary statistically, but is not possible due to the relatively high cost of providing onboard observers. E-monitoring is also considered to be useful for monitoring compliance in respect of implementation of mitigation measures.

It was noted that trials by some Parties had encountered logistical and technological difficulties, and the analysis of the images collected can be resource intensive and that typically, only a percentage of the images are analysed. It was recommended that efforts be focused on the use of e-monitoring for monitoring bycatch events and compliance rather than on other potential uses, such as the identification of seabird assemblages.

It was noted that e-monitoring can collect data for use in the management of other bycatch species, as well as target species. The Working Group recognised that e-monitoring programmes are only likely to be a cost-effective solution if used to meet a multiple range of management objectives. The technology would be useful not only for RFMOs, but also for small vessels, which may not be in a position to carry onboard observers. It was agreed that collaboration with other organisations having an interest in promoting/developing e-monitoring should be encouraged and that ACAP Parties and the Secretariat should actively promote the development and use of e-monitoring in fisheries where seabird bycatch occurs.

A number of Parties and collaborating Range States indicated that they were in the process of developing or introducing e-monitoring. It was agreed that it would be useful for ACAP to engage in initiatives to investigate and progress the use of e-monitoring, and especially to influence the direction of research underway or planned to ensure that seabird bycatch

mitigation issues are adequately incorporated. In this respect it was recommended that ACAP could usefully collaborate on an e-monitoring project with the International Sustainable Seafood Foundation (ISSF). This would require a contribution of AUD 10,000. The Working Group also discussed a proposal to contribute funding to and implement other research activities associated with e-monitoring. It was agreed that further information is required to determine more specifically the priority areas of e-monitoring on which ACAP should focus before providing any additional funding or developing new projects. The Working Group encouraged Parties involved in e-monitoring to provide feedback at the next meeting of the SBWG, at which time the issue can be further discussed.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. continues to support an intersessional process to progress the bycatch data collection, reporting and assessment framework, and the progressive improvement in the resolution of data submitted for this process;

ii. endorses continued engagement by ACAP with RFMOs to improve their observer programmes, and data collection and reporting protocols;

iii. engages in initiatives to investigate and progress the use of e-monitoring to influence the direction of research underway or planned to ensure that seabird bycatch mitigation issues are adequately incorporated;

iv. collaborates on an e-monitoring project with the International Sustainable Seafood Foundation (ISSF), which would require a contribution of AUD 10,000; and

v. encourages Parties involved in e-monitoring to provide feedback at the next meeting of the SBWG, to determine more specifically the priority areas of e-monitoring on which ACAP should focus.

8. DEVELOPMENT OF INDICATORS

At AC6 the committee recommended the suite of State-Pressure-Response indicators (see below) should be further developed.

Indicators relating to seabird bycatch

State (S)

1) Availability of data for definition of at-sea ranges of ACAP species

2) Availability of bycatch data relevant to ACAP species

Pressure (P)

1) Bycatch rates and levels of ACAP species

Response (R)

1) Implementation of seabird bycatch mitigation within EEZs

2) Engagement with RFMOs on seabird bycatch issues

3) Research and development for effective seabird mitigation measures

SBWG5 Doc 13 highlighted some of the considerations required to further develop suitable bycatch indicators.

It was noted that reporting on the progressive acquisition of relevant bird tracking data (Index S(1)) was being reported through the PCSWG. In relation to the availability of bycatch data (S(2)) and bycatch rates and levels (P(1)), the relevance of work being progressed in the review of bycatch data reporting (SBWG5 Doc 16) was highlighted. It was agreed that the development of indicators, including interim indicators, will best be developed alongside the work proposed to develop a data assessment framework, and suitable indicators would integrate well into the tiered approach proposed. It was recognised that the robust estimation of bycatch rates across species would require more detailed data on fishing effort and bycatch than is currently available to ACAP.

In relation to R(1), the implementation of mitigation within EEZs, a summary of information currently held by ACAP was not easy to assess. The structure of reporting by Parties may require modification in order to populate a robust indicator. For R(2), engagement with RFMOs, it was recognised that SBWG5 Doc 53 (Developing methods to review the effectiveness of of tRFMOs) contained detail of a number of methods for reviewing effectiveness that may act as good indicators for progress with RFMOs, and further intersessional work on that area will be progressed. The group noted this indicator covered several elements, and that in addition to monitoring the number of CMMs, and the extent to which the CMMs follow best practice, it was also important to measure the degree of implementation and compliance with seabird bycatch mitigation regulations. It was agreed it would be useful to refine the R(2) proposal to reflect this. Recommendations were also made on aligning R(3), on research and development for mitigation, to measure the extent to which research reported to the group align to relevant ACAP priority research areas. It was suggested that a further Response indicator might be to note the number of fisheries that had adhered to ACAP best practice guidelines for seabird bycatch reduction as a condition of sustainable fishery certification schemes. An intersessional group was established to further develop and refine these indicators, and the related and required reporting needs, and were tasked with reporting back to the next SBWG meeting.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. notes the proposed indicators presented at the meeting;

ii. continues to support an intersessional process to further develop and refine the suite of State-Pressure-Response Indicators that have been proposed for seabird bycatch. This work should be harmonised with the work proposed for the bycatch data reporting and assessment framework, and feedback provided at the next meeting of the SBWG; and

iii. considers what data would be appropriate as baselines for assessing global trends in bycatch levels and rates and formulate suitable indicators.

9. RFMO COORDINATION

9.1 Review of strategy for engagement with RFMOs

SBWG5 Doc 24 reported on the substantial progress that has been achieved with the implementation of ACAP's RFMO Engagement Strategy with the adoption/amendment of seabird conservation measures by all five RFMOs. It was noted that action is now required to ensure the effective implementation of these conservation measures and to amend them, as appropriate. To achieve these outcomes additional data will be required, above that which is currently available. A revised list of actions to implement the framework was provided, which was endorsed by the SBWG.

It was also noted that all five tuna RFMOs now have observer program requirements for their longline fleets, although the level of coverage required is low - 5% in most cases except for the CCSBT where observer coverage of 10% of total catch is required.

The SBWG recommends that the Advisory Committee endorse the revised list of actions to be taken in the tuna RFMOs identified in Table 2 of SBWG5 Doc 24 and support the implementation of these actions and provide the resources necessary to achieve this.

9.2 Consider methods to review the effectiveness of seabird bycatch mitigation regulations in tuna RFMOs

SBWG5 Doc 53 identifies that all five tuna commissions have stated intentions to review the effectiveness of their seabird bycatch mitigation requirements, including ICCAT and IOTC reviews in 2015 and 2016, respectively, but methods for such reviews have not been identified, and are impeding progress.

The Working Group recognised that this topic was important. The link was also noted with the work underway to develop one or more ACAP seabird bycatch indicators (SBWG5 Doc 13), and ACAP best practice for data collection and reporting (SBWG5 Doc 16).

An intersessional group was formed to progress the identification of minimum elements and appropriate methods and indicators to review the effectiveness of seabird bycatch mitigation requirements in the tuna RFMOs, and to consider the value of harmonising such methods across the tuna and other RFMOs so that cumulative impacts on albatrosses and petrels can be assessed and monitored. The starting point will be intersessional discussion and elaboration of the R2 indicators proposed in SBWG5 Doc 13, with the aim of having canvassed views before the CCSBT ERSWG meeting in August 2013, and to produce a document to consider for submission to the ICCAT SCRS meeting in September 2013. It was recognised that it would be important to canvas support from ACAP Parties to these meetings.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. notes the progress that has been achieved through the implementation of the RFMO engagement strategy and plan;

ii. continues to implement the RFMO engagement plan. Endorse the revised list of actions to be taken in the tuna RFMOs (identified in Table 2 of SBWG5 Doc 24), support the implementation of these actions and provide the resources necessary to

undertake this work. These actions relate to promoting the effective implementation of seabird conservation measures, refinement of those not following the current best practice advice; and

iii. supports the work of the intersessional group established to identify minimum elements and appropriate methods and indicators to review the effectiveness of seabird bycatch mitigation requirements in the tuna RFMOs.

10. PRIORITY ACTIONS FOR CONSERVATION

The Secretariat introduced **SBWG5 Doc 17** and advised of the progress made since AC6 in the development of the at-sea prioritisation framework, including the endorsement of this tool by MoP4. The Parties were alerted to a forthcoming request to intersessionally update and review the data on which this framework relies. New Zealand indicated that it would welcome this opportunity to ascertain that any fisheries that are impacting the Black Petrel are indeed properly accounted for in this framework, together with other ACAP species and fisheries identified in the New Zealand level II risk assessment, as requested in SBWG5 Doc 37.

SBWG5 Doc 41 confirmed that the Namibian demersal Hake trawl fishery should appear on the list of priorities given the recent annual mortality estimate for this fleet.

SBWG5 Doc 47 reported results on the bycatch of Wandering, Tristan, Southern and Northern royal albatrosses in pelagic longline fisheries in the southwest Atlantic. Analyses were based on data from the national observer programme of Uruguay (about 5,900,000 hooks observed) collected on board the Uruguayan pelagic longline fleet (2004-2011) and on Japanese pelagic longline vessels operating in Uruguay (2009-2011) under an experimental fishing licence. Despite the differences between fleets in the distribution of fishing effort, some spatial and temporal patterns were found in the bycatch of these species. High bycatch levels of Northern and Southern royal albatrosses were recorded over the shelf break. Wandering and Tristan albatrosses are mainly captured in more pelagic areas, where numerous fleets operate. Results showed that setting the longline at night reduced the bycatch of great albatrosses in pelagic longline fisheries. However, the catch rates observed during the most luminous moon phases require further attention. The combined use of night setting and bird scaring lines may not be sufficient to reduce the bycatch of great albatrosses during the full moon; therefore other complementary measures should be used during this period.

ADVICE TO THE ADVISORY COMMITTEE

As required by the MOP, a workshop to review and update the prioritisation framework for at-sea threats should be conducted immediately prior to the SBWG6 meeting

11. FAO IPOA/NPOA-SEABIRDS

Reports were received from Argentina, Canada, Uruguay, Chile, Australia and New Zealand on progress toward the development and implementation of National Plans of Action – Seabirds. Reports from observers were also provided on activities by the European Union and Namibia toward the development of Plans of Action for seabirds.

Argentina presented three papers relating to the implementation of their NPOA-Seabirds. **SBWG5 Doc 26** reported on a workshop held in 2012 to review the implementation of Argentina's NPOA-Seabird. Funded by the Federal Fisheries Council (CFP), participants from government, scientific and academic institutions, and NGOs reviewed progress, leading to the establishment of a Technical Advisory Group which will monitor progress on implementation, and report back to CFP on the development and refinement of mitigation regulations. **SBWG5 Doc 29** reported that seabird mortalities in the demersal longline fishery were reduced by an order of magnitude between 2001 and 2010. This decrease was driven primarily by a substantial decrease in fishing effort from 30 to 5 million hooks per year over the period in question. The study provides a baseline of the levels of incidental mortality prior to the implementation of the National Plan of Action−Seabirds. **SBWG5 Doc 30** reported on a comprehensive strategy funded by the CFP to address seabird bycatch in trawl fisheries. The strategy involves the establishment of an effective link between scientific knowledge, fisheries management, and on-board fishing practices. This work was initiated in 2010 with five companies (ten vessels) which have signed the MSC Certification for the Patagonian grenadier (*Macruronus magellanicus*), and includes research on bycatch mitigation, on-board training and outreach aimed a crews and skippers as the main target audience.

BirdLife reported that is estimated that over 200,000 seabirds are killed annually in European fisheries, both in Europe and their distant water fleets. After 10 years of deliberations, it was encouraging that in November 2012 the European Commission had adopted a European Community Plan of Action (ECPOA) to reduce seabird bycatch.

The ECPOA's key stated objectives are minimising, and where possible eliminating seabird bycatch in longline, trawl and net fisheries. BirdLife noted the important role that the FAO Best Practice Technical Guidelines had played in forming the framework for the ECPOA and in respect of addressing non-longline fisheries (e.g. gillnets).

However, in early April 2013, the EU Council of Ministers failed to endorse the implementation of the Community Plan of Action. The UK and the Netherlands were the only countries to support the plan. Spain, Portugal, Poland, Malta and Estonia did not support the plan and asked for more scientific data and a risk assessment. In response, it was agreed to develop a database over the next year.

The WG referred his situation to the AC, noting that securing the support of the EU Council and subsequent implementation of the plan was an important step towards reducing seabird bycatch associated with EU vessels, wherever they operate

BirdLife report that the Albatross Task Force had been working closely with industry and government through a series of workshops and meetings to finalise a draft Namibian NPOA-Seabirds, which alongside a Hake Management Plan, recommend the adoption of bird scaring lines in longline and trawl hake fisheries and reduction of seabird bycatch by 80%. It is hoped that plan will be adopted by the Ministry for Fishery and Marine Resources.in the near future. The Working Group agreed that this was a critical step toward reducing the high level of bycatch recorded in these fisheries. Australia indicated it is updating the Threat Abatement Plan for the incidental catch (or bycatch) of seabirds in oceanic longline fishing operations. A public consultation paper on proposed changes to the plan will be released around mid-2013.

The New Zealand government approved their 2013 NPOA on 26 April 2013, which has substantially updated their 2004 NPOA. The NPOA-Seabirds 2013 is the result of the combined efforts of government, tangata whenua, environmental Non-Government

Organisations and the commercial fishing sector and exemplifies the Ministry for Primary Industries' (MPI) approach to working in partnership with stakeholders to achieve positive outcomes. The NPOA-Seabirds 2013 sets out objectives for five years to guide management of incidental seabird catch in New Zealand fisheries. The current management approach will see the objectives achieved through integration into the Ministry for Primary Industries annual and five year plans for fisheries.

BirdLife International recollected the considerable discussion on this topic at MoP4 (ref to para and Annex statement) and the concerns expressed by BirdLife and WWF over the draft plan. BirdLife therefore congratulated New Zealand on the subsequent stakeholder consultation and for prompt production of the final plan. In particular BirdLife welcomed the statement in the news release by the NZ Ministry for Primary Industries that the key actions will include: "ensuring effective prevention methods are applied in all New Zealand fisheries and by New Zealand vessels on the high seas" and "reducing capture rates through continuous practical improvement in all New Zealand fisheries". In addition BirdLife welcomed the specific commitment within the NPOA to developing a species-specific action plan for Black Petrel. However, recognising that New Zealand has assessed Black Petrel as the seabird species at highest risk from bycatch mortality in domestic commercial fisheries, that the most relevant fishery is demersal longlining for snapper and that ACAP has developed best-practice advice very relevant to these types of fishery, BirdLife urged New Zealand immediately to implement appropriate mitigation in this fishery and asked what actions New Zealand planned to take in this regard.

New Zealand recognised that Black petrels were identified as at the highest risk in its domestic risk assessment, particularly from bottom longline in valuable fisheries for snapper and bluenose. An action plan will be developed that will outline how further information on this species will be collected, including research, and how captures can best be mitigated through a new seabird advisory group and fisheries planning processes. Mitigation in these fisheries will also benefit the third highest ranked species at risk (Flesh-footed shearwater).

Uruguay reported that it is currently undertaking its 5 year review of its NPOA, and hopes to complete this by the end of 2013.

Chile reported that work was also underway to expand its NPOA to apply to fisheries beyond longline gear.

In the United States, the two key agencies involved with addressing seabird bycatch (the marine fisheries agency, NOAA Fisheries, and the agency addressing seabird responsibilities, US Fish & Wildlife Service), signed an MOU to address conservation of migratory birds. Seabird bycatch is expressly addressed and the MOU identifies ways to enhance collaborations between the federal agencies. ACAP has noted in the past how important it is for these types of agencies to be effectively communicating and collaborating with each other. This MOU in the United States provides an example of this type of collaboration.

Canada released its National Plan of Action (NPOA) for Reducing the Incidental Catch of Seabirds in Longline Fisheries in 2007. The NPOA, developed jointly by the Department of Fisheries and Oceans (DFO) and Environment Canada (EC), focused on techniques and technologies that once implemented, would contribute towards mitigating the incidental take of seabirds in longline fisheries. In 2012, Canada released an update of the NPOA (“Canada’s Progress Report on the Implementation of Key Actions Taken Pursuant to the National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries)”.

The Progress Report, again developed by DFO and EC, outlines seabird bycatch mitigation in Canada, ongoing and completed actions, and future initiatives. Additionally, the Progress Report provides a summary of seabird bycatch numbers in Canadian fisheries.

ADVICE TO THE ADVISORY COMMITTEE

i. Note the progress undertaken by ACAP parties and Range States to develop and implement NPOA-Seabirds.

ii. Encourage all Parties and range states to adopt, implement and review NPOA-Seabirds in accordance with FAO's best practice technical guidelines.

12. MITIGATION FACT SHEETS

SBWG5 Doc 15 reviewed the ongoing collaboration between BirdLife and ACAP on the development, maintenance and dissemination of the series of mitigation fact sheets. Three substantive issues were discussed: (1) clarifying and agreeing a formalised review process proposal; (2) harmonisation with the SBWG's ongoing reviews of best practice advice, and (3) dissemination of the fact sheets.

The Working Group supported the following recommendations contained in SBWG5 Doc 15. To the extent feasible, updates to existing fact sheets will be finalised within the timeframe of SBWG meetings and only measures agreed by the Working Group will be included in the update process. It was noted that this did not include the development of any new factsheets that may be required in the future, which would require intersessional work led by BirdLife in close collaboration with nominated SBWG members. It was also agreed to change from numbered versions of fact sheets to 'last reviewed' dates.

On the matter of harmonising fact sheet with best practice advice, it was agreed that any necessary changes to fact sheets also be covered in discussions on best practice modifications conducted at SBWG meetings. It was suggested by the Secretariat that those fact sheets covering mitigation measures that are not considered best practice could be withdrawn – attendees reflected that time would be needed to consider this and it was noted that any decision to discontinue a particular factsheet would need to be approved by the AC. BirdLife International indicated that, notwithstanding future AC decisions, they might maintain some of fact sheets discontinued by ACAP as BirdLife-only branded products. Further discussion on this matter should be deferred to AC8.

The BMIS database (see Item 16.4) was suggested as a potential site for further distribution of the fact sheets The WG recommended that Secretariat and BirdLife staff work with SBWG members to develop a strategy for the dissemination of fact sheets to be tabled at SBWG6.

The potential for dissemination of the fact sheets through a computer app (or similar) was discussed, in relation to onboard iPads being developed for observers by the International Sustainable Seafood Foundation. It was recognised that such a tool could also have wider benefits for the dissemination of the fact sheets.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that:

i. future updates to existing fact sheets be undertaken within the timeframe of SBWG meetings to ensure harmonisation with ACAP's best practice mitigation advice for various gear types; and

ii. the Secretariat undertake intersessonal work with BirdLife staff and SBWG members to develop a strategy for the dissemination of fact sheets to fishery managers, fishers and other key target audiences.

13. PROGRESS REPORTS FOR ACAP FUNDED PROGRAMMES

The Advisory Committee Chair referred Working Group Members to **AC7 Inf 01** which provide a summary of outcomes and progress achieved with projects funded through the Advisory Committee's grants scheme in 2012. The Working Group noted the good progress made with projects funded through the ACAP grants scheme and expressed its support for the grants scheme's operations.

14. USE OF LETHAL EXPERIMENTS TO TEST EFFICACY OF MITIGATION DEVICES

Igor Debski (New Zealand) presented **SBWG5 Doc 22** which proposed a framework in which to consider the need for lethal and non-lethal approaches to testing mitigation measures. Key components around which the framework is built are risk determination for seabirds affected by experiments and experimental outcomes, stakeholder considerations, and the practicalities of experimental work. The paper defines the following two terms:

- *Lethal Metric* – an experimental response variable comprising the death, or potentially lethal injury, of seabirds, and
- *Lethal Experiment* – an experiment using a lethal metric which may elevate seabird deaths above the level of bycatch that would have occurred under normal fishing operations.

The paper also provided examples of lethal and non-lethal experiments that have effectively tested mitigation measures.

Developing robust conclusions about the efficacy of mitigation measures requires experimental testing and the use of quantitative methods. However, such experiments have the potential to injure and kill birds. Given the role of ACAP in supporting favourable conservation status for albatrosses and petrels, conducting lethal experiments affecting these species is an ethical challenge. In addition to concerns at the population level, particularly for species classified as threatened, standard ethical issues relating to wildlife research apply.

The UK saw a distinction between the technical merits of a research design that may have lethal consequences for ACAP species, and the direct funding of such projects, using collective Party funds. The former is a scientific issue (addressed by SBWG5 Doc 22) while the latter is a policy issue. On the basis of likely animal welfare concerns, the UK indicated

that it would be reluctant to support the funding projects of projects by ACAP that involved a lethal approach to research. If there is strong support from other Parties for ACAP to fund projects which involved such experiments, the UK would need to obtain Ministerial guidance on the matter. The UK suggested that such policy level issues be referred by the AC for discussion by the MoP. This position was supported by Australia and Argentina.

The point was raised in the Working Group that so called "lethal experiments" occur in the context of "lethal fisheries" and that the legacy of responsibly conducted experiments evaluating changes in seabird bycatch rates in response to different seabird bycatch mitigation measures, is measured in decades, if not centuries. In the case of the US demersal longline fisheries in Alaska, USA experimental research (two fisheries over two years) conducted in 1999 and 2000 resulted in the mortality of over 300 birds (none of which were threatened species) in a fishery that averaged over 12,000 bird mortalities per year (Melvin *et al*. 2001). The legacy of that work in 2013 is that over 100,000 seabird mortalities will have been prevented from 2002 through 2012 as fishermen adopted bird scaring lines with research-proven performance standards beginning in 2002. In this context, so called "lethal experiments" made a fishery 78% less lethal over the long term.

ACAP parties should be mindful of the legitimate concerns regarding animal rights, which have the potential to undermine ACAP research priorities and conservation goals with regard to seabird bycatch mitigation. With regard to specific recommendations in SBWG5 Doc 22, it was further noted that predictions of adequate sampling levels to yield definitive outcomes through power analysis, are often frustrated by high and or unknown levels of variation in species specific seabird interactions (inter-annual and spatial). An overly conservative power analysis can lead to inconclusive outcomes and many dead birds. Although knowing the effects of experimental mortality on seabird populations is highly desirable, it is rarely possible. The provenance of birds killed in fisheries and extent of mortality are rarely known, nor are cumulative impacts to populations and species. It was agreed that research evaluating seabird bycatch mitigation measures should be done responsibly. It was noted that the legitimate concerns of animal rights advocates must be weighed against clear progress towards ensuring a positive conservation status for albatrosses and petrels listed under the Agreement. The Working Group felt that this was a sensitive issue which would benefit from further discussion by the AC, MoP and Parties.

ADVICE TO THE ADVISORY COMMITTEE

i. Developing robust conclusions about the efficacy of mitigation measures requires experimental testing and the use of quantitative methods. Experimental testing of mitigation devices has formed the basis of ACAP's assessment of best practice measures.

ii. Mitigation experiments in some cases could have the potential to injure or kill birds. Conducting lethal experiments that affect threatened species is an ethical challenge.

iii. Consideration of the technical merits of a lethal research design that may have lethal consequences for ACAP species is a scientific or technical issue. Direct funding of lethal projects, using ACAP funds is a policy issue.

iv. SBWG members felt that decisions on policy level issues on this topic were the province of the Advisory Committee and, as such, should be referred to the AC, and perhaps the MoP, for further discussion.

15. POLICY ON PUBLICATION OF MEETING DOCUMENTS

AC7 Doc 21 addresses the submission of papers to ACAP's Working Groups or Advisory Committee meetings (and to other fora) and consequent issues for the subsequent publication of manuscripts in peer-reviewed journals. The issue is that once available online, these documents are effectively 'public' and journal editors might not consider such manuscripts suitable for publication. In addition to the issue of journal publication of meeting documents, the SBWG also discussed ways of more efficiently distilling the key outcomes of meeting papers in respect of the SBWG Work Programme and advice.

To address these matters, it is recommended that the Advisory Committee approve the following procedures:

ADVICE TO THE ADVISORY COMMITTEE

Submission of papers

i. Papers submitted to ACAP shall be freely publicly available except those that shall be accorded password protection because: (a) the submission has already been published/ submitted for publication and copyright issues may apply (in this case a summary of the paper should be provided to ACAP as an open access document), or (b) the author specifically requests password protection.

ii. Authors submitting papers shall be asked to indicate whether or not the current footnote should be included.

Procedure in respect of submitting papers

i. All documents shall clearly indicate any recommendations they wish ACAP to consider.

ii. Substantive discussion of specific papers at ACAP Working Groups should be confined to consideration of these recommendations.

iii. To the extent possible, Working Group convenors should attempt to develop a compilation of recommendations from submitted papers, collated in respect to specific agenda items to help focus discussion.

iv. Any such compilation should be circulated with the final version of the annotated agenda prior to the Working Group meeting.

16. TOOLS AND GUIDES

16.1 Hook removal guide

The Secretariat introduced **PCSWG1 Doc 07,** summarised the feedback already provided by the PCSWG, and sought any additional input from the SBWG. A number of practical suggestions were made by SBWG delegates to improve the guidelines and a small breakout group was formed to further develop the guidelines in the margins of this meeting. These amendments will be incorporated into the guide.

16.2 Photo identification guide for bycatch seabirds in tuna fisheries

SBWG5 Doc 14 sought input from the Working Group on a range of issues associated with the development of an identification guide of bycaught seabirds, which is being prepared for use by the observer programmes of the tRFMOs.

Uruguay noted that it has extensive data to contribute to this project and offered to share this expertise with the Secretariat. A small breakout group led by the Secretariat was formed to consider in the margins of the meeting some of the issues raised in the paper and in particular whether sampling of bycatch for genetic analysis should be endorsed by the Working Group.

The breakout group noted that extensive sampling of bycaught seabirds is already being undertaken by many national observer programmes and that the genetic analysis of these samples would provide highly valuable population level data. It was recommended that ACAP 1) develop a central repository of information on where samples are held in order that researchers can access these samples; and 2) develop guidelines for the collection and curation of samples for DNA analysis. As there was insufficient time in which to consider all of the issues raised in the paper it was decided to continue this work in the intersessional period.

The Secretariat is lacking photos of a number of species in the guide and participants were asked to forward any photos they have of dead, wet birds, as well as photos of live birds on the wing at sea, to the Secretariat for inclusion in the guide.

16.3 Seabird Smart Training Workshops and Liaison Officer for New Zealand Inshore Fisheries

SBWG5 Doc 35 reported on a very positive engagement with fishermen on matters of seabird biology and bycatch mitigation through a series of port workshops Some of the resources developed to support this initiative were available to delegates at this meeting. These resources are also available online (www.southernseabirds.org).

16.4 Bycatch Mitigation Information System (BMIS)

AC7 Inf 05 was introduced by the Secretariat and meeting delegates were encouraged to make use of this very helpful resource and to provide feedback to the Secretariat of the Pacific Community about any further improvements they could recommend as well as any updates on bycatch mitigation they were involved in.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. supports the revision and finalisation of the hook removal guidelines during the inter-sessional period;

ii. supports efforts by the Secretariat and Convenors to progress the seabird identification guide during the inter-sessional period;

iii. encourages the submission of suitable photos of dead or live birds (especially in flight), to the Secretariat for inclusion in the identification guide;

iv. supports the development a central repository of information on where samples are held in order that researchers can access these samples; and

v.	develops guidelines for the collection and curation of samples for DNA analysis.

17. ECOLOGICAL RISK ASSESSMENT

17.1 Review/update of CCAMLR seabird risk assessment

SBWG5 Doc 18 noted that, at its 2011 meeting, the CCAMLR Scientific Committee (para 4.15 of SCXXX report) agreed that the routine review of incidental mortality and of the implementation of conservation measures associated with mitigation measures, could be undertaken by the (CCAMLR) Secretariat and reported to the Scientific Committee. The Scientific Committee encouraged further coordination between the Secretariats of ACAP and CCAMLR in order to ensure that requests for information to ACAP on bycatch mitigation and data with which to review seabird risk assessments are provided on a schedule that allows consideration by the appropriate expert group of ACAP. However, no formal approach had yet been received from the CCAMLR Secretariat for this to be undertaken.

In these circumstances, the Working Group agreed that it would be premature to discuss whether, and if so to what extent, ACAP could contribute to such an undertaking. Not only would this have potential substantial resource implications (recent seabird bycatch risk assessments in tuna RFMOs had usually been multi-year projects), but any response from ACAP, even in principle, should be conditional on a clear indication by CCAMLR of the detail of the process envisaged.

Given the continuing success of CCAMLR in maintaining seabird bycatch at negligible levels, the utility of CCAMLR reviewing its risk assessment process was unclear to the Working Group.

The Working Group noted that SBWG5 Doc 18 raises interesting issues, including the extent to which the ISO standards of risk management are appropriate frameworks and benchmarks for seabird bycatch risk assessments by organisations such as CCAMLR and RFMOs.

The CCAMLR process of risk assessment was published by Waugh *et al.* (2008) and summarised in Croxall (2008). The concept and principles of seabird bycatch risk assessment, pioneered by CCAMLR were subsequently used by most tuna RFMOs, where they had been developed and refined in much greater detail and sophistication. These risk assessments have themselves also been published, together with an assessment of relevant best practice (Small *et al*. 2013), produced under the auspices of ACAP.

17.2 New Zealand Risk Assessment Process

SBWG5 Doc 12 (including two attachments) described the approach used by New Zealand to the assessment of risk to seabirds associated with fishing-related mortality. The method is designed to assess the likelihood that incidental mortality (including cryptic mortality) for each of 70 species from all commercial NZ fisheries exceeds a level that allows for the maintenance of a favourable conservation status (interpreted as >50% of carrying capacity). An “exposure-effects” approach based on the spatio-temporal overlap of bird distributions and fishing effort is used. Overlap is used to estimate potential fatalities by scaling by the vulnerability to capture of each species to each fishery, estimated from observer records. Black Petrel and Salvin’s Albatross were the two species estimated to be at most risk from

NZ fisheries, whereas 44 species were assessed as being at very low risk. The framework does not address fatalities from other fishing or from non-fishing impacts. Disaggregating risk scores and contributions to uncertainty has been found to be very useful for prioritising potential research and risk management responses.

BirdLife commended New Zealand for the comprehensive and useful analysis and asked how the risk assessment would be used as a monitoring tool. The Working Group was informed that New Zealand's NPOA has an objective to move higher risk species to lower risk categories. The risk assessment would be used to assess performance, and movement to a lower risk category could occur as a result of lower bycatch and/or better information. BirdLife noted that Black Petrel had the highest risk score and asked what action would be taken to address the risk from fisheries interactions. New Zealand indicated that it would establish a seabird advisory group to guide action, and that it would develop a species-specific action plan with actions implemented through fisheries plans. BirdLife noted the urgency for practical action to reduce Black Petrel bycatch in New Zealand fisheries; the assessed risk (to a population of <1,000 annual breeding pairs, assessed as decreasing) was already conservative because Black Petrel bycatch in fisheries outside the New Zealand EEZ (and already ACAP conservation priorities) were not included in the risk assessment.

New Zealand recognised the risk and had already identified action on Black Petrel as one of its three highest priorities. The New Zealand Ministry for Primary Industries will integrate this work into annual fisheries plans so that clear and accountable actions can be taken, monitored and reported. New Zealand also recognised fatalities outside its EEZ and would actively cooperate with other countries whose vessels have interactions with seabirds — particularly those that breed in New Zealand — through ACAP, relevant Regional Fisheries Management Organisations, and bilateral information-sharing and assistance where relevant.

17.3 MSC Fisheries Standard in relation to bycatch

SBWG5 Doc 20 was presented by the Marine Stewardship Council (MSC). MSC is an independent non-profit organisation that sets an international standard for sustainable fishing and aims to use its ecolabel to recognise and reward sustainable fishing practices. The MSC is committed to being in line with 'best practice' management, and is currently undertaking a Fishery Standard Review. In relation to performance indicators on bycatch, it is specifically looking at ways to improve requirements pertaining to information accuracy and mitigation measures. The paper invited experts such as ACAP to contribute to the Fisheries Standard Review through consultations and workshops. More information is available at: http://improvements.msc.org/database/fisheries-standard-review. The paper also noted that MSC fisheries assessments would benefit from the ready availability of information on bycatch levels, impacts on species and best practice mitigation measures.

BirdLife International welcomed the paper from MSC and encouraged ACAP and Working Group members, both individually and collectively, to provide input to the MSC consultation, in order to enhance the effectiveness of assessment and the known and potential impact of fishery-specific bycatch on seabird populations as part of the MSC fisheries standard and certification processes.

BirdLife noted that SBWG5 Doc 20 might usefully add a reference to the FAO Technical Guidelines for Responsible Fisheries, especially the Supplement on Best practice to reduce incidental catch of seabirds in capture fisheries (http//www.fao-org/docrep/015/i1145e/i1145e00.htm).

BirdLife indicated that an important element for MSC should be the development and use of a standardised reporting format, specifically for seabird bycatch (see e.g. Weidenfeld 2012), with a checklist of topics and issues to be explicitly addressed by those seeking certification.

The Working Group recommended that the ACAP Secretariat should contribute to the MSC consultation any existing documents and information relating to best practice in terms of recording and reporting seabird bycatch data and the implementation of appropriate best (and improving) practice methods to mitigate or eliminate such bycatch.

The Working Group encouraged the participation of its Members in the MSC workshops in London, Seattle and Latin America in 2013 and asked the Secretariat to interact with potential attendees to ensure they had available relevant ACAP documents.

The Working Group noted that formal ACAP input to MSC would be confined to the input of existing ACAP documents to the current consultation. ACAP would not contribute advice in respect of any specific fishery seeking certification.

ADVICE TO THE ADVISORY COMMITTEE

It is recommended that the Advisory Committee:

i. works with Marine Stewardship Council processes to ensure that ACAP best practice advice and standards in relation to recording and reporting seabird bycatch data and implementation of appropriate best (and improving) practice methods to mitigate seabird bycatch are adopted into MSC assessments; and

ii. encourages the participation of Parties in the MSC workshops in 2013, and to request the Secretariat to interact with potential attendees to provide the relevant ACAP documents.

18. RECENT RESEARCH – SPECIES' DISTRIBUTION AND OVERLAP WITH FISHERIES

SBWG5 Doc 06 reported the results from reviews of several existing data sets and the implementation of one new study toward better clarifying and quantifying Pink footed shearwater (PFSH) vulnerability to fisheries interactions in the south-east Pacific Ocean. The PFSH breeds on three islands off Chile and undertakes trans-equatorial migration to foraging grounds off the Pacific coast of Central and North America, is categorised as Vulnerable by the IUCN and has an estimated breeding population of approximately 28,000 pairs. The document provided evidence for PFSH interactions with fisheries in Chile, Peru and Ecuador and highlights the potential for bycatch in multiple fisheries. Port-based assessment surveys at 13 ports in Chile yielded an estimated annual mortality of ca. 1,000 PFSH - a previously unidentified source of mortality. Satellite tracking reveal fine-scale coastal movements of the species and its affinity with waters over the continental shelf and shelf-break. PFSH are potentially vulnerability to interactions with gillnet, purse-seines trawl, driftnet and longlines. Estimates PFSH mortality in the driftnet fishery is 0.004 PFSH set^{-1}. Given the size of the Peruvian gillnet fleet (ca. 3000 vessels, 80,000+ trips annually), this catch rate could result in considerable levels of total catch.

PCSWG1 Doc 15 provided results of recent and current research on the Balearic shearwater *Puffinus mauretanicus* in the Atlantic and Mediterranean. The population of Balearic

shearwater has been reassessed at over 25,000 individuals, roughly twice the previous estimate, following recent surveys away from breeding sites. Breeding birds from Eivissa appear to forage not only on the Iberian shelf and around breeding sites, but also in Moroccan and Algerian waters. During winter, Balearic shearwaters occur off western Iberia and Brittany, sometimes in large flocks (e.g. > 5,000 observed in Brittany in 2010). Bycatch affects the species in both the Mediterranean and the Atlantic areas. Preliminary results suggest that Mediterranean bycatch mainly occurs in longline fisheries, whereas purse-seiners and trawlers may capture more birds in the NE Atlantic.

SBWG5 Doc 27 reports on ongoing research conducted in Argentina on the spatial overlap between Black-browed albatrosses (BBAs) during the non-reproductive period and six fisheries. The BBA was considered a case study given that the species is frequently reported in the bycatch of Argentine fisheries and fisheries in neighbouring fisheries. This study opens up the possibility of further analysis at a regional scale involving collaboration with Uruguay and Brazil.

SBWG5 Doc 48 reported the results of a study to increase the sample size previously used to analyse the longline bycatch composition (but also to infer about species distribution) of shy-type albatrosses in the south-west Atlantic. Using a molecular method, 28 of 29 sampled specimens were identified as White-capped albatrosses (*Thalassarche steadi*). The remaining bird was an immature male of Shy Albatross (*T. cauta*). This constitutes the first certain record of Shy Albatross for the southwest Atlantic. The study concluded that the Shy Albatross should be considered as vagrant in the south-west Atlantic until further information is available. The White-capped Albatross, a regular visitor, is the predominant species of the two in terms of numbers and is the most affected by the pelagic longline fishery.

SBWG5 Doc 54 provided information on the continued reduction in incidental seabird mortality in the French EEZ in CCAMLR subareas 58.5.1 and 58.6 for the period 2008/2009 to 2011/2012. In the Kerguelen island sector of fishery seabird mortality decreased by 79% between the 2007/2008 and the 2011/2012 fishing seasons. The use of a Bird Exclusion Device reduced the number of seabirds caught during hauling operations by 79.6 % between 2007/2008 and 2011/2012. The Action Plan to reduce seabird mortality remains in force.

19. LISTING OF NEW SPECIES ON ANNEX 1

SBWG considered **AC7 Doc 24** and **AC7 Doc 25** on the nominations of Pink-footed Shearwater and Galapagos Petrel, respectively, to Annex 1 of the Agreement. From the perspective of SBWG's work, if these species were to be added to Annex 1, it appeared likely that further efforts may be required to understand the bycatch of Pink-footed Shearwater (and research mitigation techniques, see Agenda item 5). It was noted that there were indications that the species may be killed incidentally in tuna purse seine fisheries, and that this would be a new type of fishing gear which the Agreement would need to consider. SBWG noted that the information in SBWG5 Doc 06 could usefully be added to the draft species assessment.

There are no known at-sea threats to the Galapagos Petrel, but AC7 Doc 25 considers that further immediate research is needed to determine if there are interactions between the petrel and fisheries. SBWG felt that it was important to assess whether or not ACAP could add substantially to the conservation of any species added to the Annex. It was important that ACAP remained focussed on its current tasks, and not allow too much dilution of efforts.

SBWG agreed that it would be helpful, subject to resource and priorities, to review the process and "criteria" for listing (and possibly delisting) of species on Annex 1 (AC7 Doc 20 and AC3 Doc 18), as had been suggested by the PACSWG. This would help in providing guidance and advice to the Meeting of the Parties and to Parties considering nominations of further species. With respect to the issue of delisting, SBWG did not discuss the matter substantially but noted that any delisting process would need to adopt a precautionary approach.

ADVICE TO THE ADVISORY COMMITTEE:

The Working Group advises the Advisory Committee:

i. that the Pink-footed shearwater is a strong candidate for listing on Annex 1 of the Agreement, based on the at-sea threats it currently faces;

ii. that the Galapagos Petrel may not be a strong candidate for listing on Annex 1 of the Agreement and further immediate research is needed to determine if there are interactions between this species and fisheries. The extent to which ACAP can assist in improving its conservation status remains unclear; and;

iii. that the Cooper/Baker criteria for listing new species on Annex 1 should be reviewed during the inter-sessional period.

20. SBWG WORK PROGRAMME

The Work Programme was considered and a draft Revision of Section Three of the Advisory Committee Work Programme 2013-2015 was prepared for consideration by the Advisory Committee (**ANNEX 9**).

ADVICE TO THE ADVISORY COMMITTEE:

The Advisory Committee is requested to consider and endorse the revised work programme (**ANNEX 9**).

21. SBWG MEMBERSHIP

The AC Chair indicated that nominations are sought for Advisory Committee Officials during AC7. Barry Baker confirmed that he would not be available to serve as Convenor for another term. Reference was made to the size of the SBWG agenda, the workload implications and the need of increasing the number of officials appointed in this Working Group. Current membership of the SBWG is listed in **ANNEX 1**.

22. ADOPTION OF REPORT

The report of the Fifth Meeting of the SBWG was adopted by the Working Group.

23. CLOSING REMARKS AND ACKNOWLEDGEMENTS

The Convenor and Vice-convenor of the Working Group thanked the Members and Observers for their valuable contributions to the meeting and in developing the report, and the authors of the excellent papers submitted for consideration.

They also thanked France and the ACAP Secretariat for providing an excellent venue and facilities for the meeting; Marco Favero, Ed Melvin, Graham Robertson, Ben Sullivan, Mark Tasker, Igor Debski, Warren Papworth, and Wiesława Misiak for their assistance during both the intersessional period and at the meeting; John Croxall, Rory Crawford, Cleo Small, Martin Cryer and Jeff Mangel for their assistance in drawing the report of the meeting together; Juan Pablo Seco Pon, Mathilde Huon and Wiesława Misiak for administrative and technical assistance during the meeting; and Alexandra Borghese, Claire Garteiser, Sandra Hale and Roslyn Wallace for interpretation services.

The Members also thanked the Convenor and Vice-convenor for their leadership and commitment in progressing the work of the Working Group.

The Convenor then closed the meeting.

ANNEX 1. LIST OF BSWG5 MEETING PARTICIPANTS AND NON-ATTENDING BSWG MEMBERS

SBWG Members	
Barry Baker (Convenor)	
Rob Crawford	Department of Environmental Affairs, South Africa
Igor Debski	Department of Conservation, New Zealand
Andrés Domingo	Dirección Nacional de Recursos Acuáticos, Uruguay
Marco Favero	Universidad Nacional de Mar del Plata, Argentina
Elisa Goya	Instituto del Mar del Peru (IMARPE), Peru
Sebastián Jiménez	Dirección Nacional de Recursos Acuáticos, Uruguay
Svein Løkkeborg	Institute of Marine Research, Norway
Ed Melvin	University of Washington, United States of America
Ken Morgan	Environment Canada, Canada
Tatiana Neves	Projeto Albatroz, Brazil
Graham Robertson	Australian Antarctic Division (AAD), Australia
Cleo Small	Birdlife International
Ben Sullivan	Birdlife International
Mark Tasker	Joint Nature Conservation Committee (JNCC), United Kingdom
Anton Wolfaardt (Vice-convneor)	Joint Nature Conservation Committee (JNCC), United Kingdom
Advisory Committee Members	
Jonathon Barrington	Australia
Martine Bigane	France
Marco Favero	Advisory Committee Chair
Germán Proffen	Argentina
Marcelo Garcia Alvarado	Chile
Maria Laura Tombesi	Argentina
Observers	
Joanna Alfaro-Shigueto	Pro-Delphinus, Peru
Javier Arata	Instituto Antartico Chileno (INACH), Chile
Jorge Azócar	Instituto de Fomento Pesquero, Chile
Christophe Barbraud	Centre national de la recherche scientifique (CNRS), France
Amélie Boué	LPO, France
Nigel Brothers	Humane Society International, Australia
Charles Cheng	Chinese Wild Bird Federation
Rory Crawford	BirdLife International
Martin Cryer	Ministry for Primary Industries, New Zealand
Elizabeth Flint	Pacific Reefs National Wildlife Refuge, U.S. Fish and Wildlife Service, USA
Rosemary Gales	DPIPWE, Australia
Johannes de Goede	Department of Agriculture, Forestry and Fisheries, South Africa
Karine Delord	Centre national de la recherche scientifique (CNRS), France
Stephanie Good	Marine Stewardship Council

Neil Klaer	Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
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ANNEX 2. ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR PELAGIC LONGLINE FISHERIES

Agreement on the Conservation of Albatrosses and Petrels

ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR PELAGIC LONGLINE FISHERIES

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

Weighted branch lines, bird scaring lines and night setting are best practice mitigation in pelagic longline fisheries. ACAP-SBWG has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in pelagic fisheries and this document is a distillation of that review.

BEST PRACTICE MEASURES	
1.	Branch line weighting
2.	Night setting
3 a)	Bird scaring lines for vessels >35m in total length
b)	Bird scaring lines for vessels <35m in total length
OTHER CONSIDERATIONS	
4.	Side setting with line weighting and bird curtain
5.	Blue dyed bait
6.	Line shooter
7.	Bait caster
8.	Underwater setting chute
9.	Management of offal discharge
10.	Live bait
11.	Bait thaw status
12.	Area closures

BEST PRACTICE MEASURES

1. Branch line weighting

Scientific evidence for effectiveness in pelagic fisheries

PROVEN AND RECOMMENDED. Should be used in combination with night setting and bird scaring lines. Brothers 1991; Boggs 2001; Sakai *et al*. 2001; Brothers *et al*. 2001; Anderson & McArdle 2002; Gilman *et al*. 2003a, Hu *et al*. 2005; Melvin et al., In Press; Melvin et al., 2011.

Caveats /Notes

Weights will shorten but not eliminate the zone behind the vessel in which birds can be caught. Branch lines should be weighted to sink the baited hooks rapidly out of the diving range of feeding seabirds. Weighted lines sink faster and more consistently, resulting in dramatic reductions in seabird attacks on baited hooks. Scientific studies have demonstrated that branch line weighting configurations with more mass close to the hook sinks the hooks most rapidly (Gianuca et al. 2011; Robertson et al. 2013), reduces seabird attacks on baits (Jiménez et al. 2013; Gianuca et al. 2011) and consequently is most likely to reduce mortalities (Jiménez et al. 2013). Studies of a range of weighting regimes, including regimes with weight at the hook, have shown no negative effect on target catch rates (Jiménez et al. 2013; Robertson et al. 2013; Gianuca et al. 2013). Continued refinement of line weighting configurations (mass, number and position of weights and materials) with regard to effectively reducing seabird bycatch and safety concerns through controlled research and application in fisheries, is encouraged.

Line weighting has been shown to improve the effectiveness of night setting and bird scaring lines in reducing seabird bycatch. Of this combination that makes up this best practice mitigation, line weighting is integral to the fishing gear and has the advantage of being more consistently implemented and thus facilitates compliance and port monitoring. On this basis it is important to enhance the priority accorded to line weighting, providing certain pre-conditions can be met, inter alia:

a) weighting regime characteristics adequately specified;
b) safety issues adequately addressed;
c) issues relating to application to artisanal fisheries are taken into account.

Need for combination

Should be combined with bird scaring lines and night setting

Research needs

Continue work to identify branch line weighting configurations (mass, placement, shape, number of leads and materials) that are effective at reducing seabird bycatch rates. Studies should include evaluations of the effects of branch line weighting on the catch rate of pelagic fishes and provide data that allow evaluation of the relative safety and practicality attributes of various weighting configurations. Studies evaluating the response of seabirds (mortality rates and attack rates) and fishes (catch rates of target and non-target species) to weights

(of varying mass) positioned at the hook (hook weights) and the safety attributes of hook weights are the highest priority for research.

Minimum standards

Current minimum standards for branch line weighting configurations are:

Greater than 45 g attached within 1 m of the hook or;

Greater than 60 g attached within 3.5 m of the hook or;

Greater than 98 g weight attached within 4 m of the hook.

Positioning weight farther than 4 m from the hook is not recommended.

These regimes have been adopted in the Hawaiian (45 g at 1 m) and Australian (60 g at 3.5 m and 98 g at 4 m) pelagic longline fisheries and latter two regimes have been adopted by the Western and Central Pacific Fishing Commission (the WCPFC provisions also include the option of branch lines being configured with weights of 45 g to 60 g within 1 m of the hook). NB. The 98 g weights specified in the Australian fishery pertain to the line weighting experiment of Robertson et al. 2010. The commercially available leaded swivels used in the experiment weighed 98 g (not 100 g).

Implementation monitoring

Coastal state fisheries (vessels <35 m total length): Line weights crimped into branch lines technically very difficult to remove at sea. Inspection before departure from port of all gear bins on vessels considered an acceptable form of implementation monitoring.

Distant water fisheries (vessels >35 m total length): Technically possible to remove and/or re-configure gear at sea. Implementation monitoring by monitoring line sets using appropriate methods (e.g., observer inspection of line setting operations; video surveillance; at-sea compliance checks). Video surveillance conditional on mainline setter being fitted with motion sensors to trigger cameras.

2. Night setting

Scientific evidence for effectiveness in pelagic fisheries

PROVEN AND RECOMMENDED. Should be used in combination with weighted branch lines and bird scaring lines. Duckworth 1995; Brothers *et al*. 1999; Gales *et al.* 1998; Klaer & Polacheck 1998; Brothers *et al*. 1999; McNamara *et al*. 1999; Gilman *et al*. 2005; Baker & Wise 2005; Jiménez *et al*. 2009.

Caveats /Notes

Less effective during full moon, under intensive deck lighting or in high latitude fisheries in summer.Less effective on nocturnal foragers e.g. White-chinned Petrels (Brothers *et al.* 1999; Cherel *et al*. 1996).

Need for combination

Should be used in combination with bird scaring lines and weighted branch lines

Research needs

Determine effectiveness of bird scaring lines and branch line weighting at night by characterising seabird behaviour at night using thermal or night vision technologies.

Minimum standards

Night defined as between nautical twilight and nautical dawn.

Implementation monitoring

Requires VMS (satellite transmitter) or fishery observers. Vessel speed and direction vary between transiting, line setting, line hauling and when vessels are stationary on fishing grounds. VMS-derived assessment of vessel activity in relation to time of nautical dawn and dusk considered acceptable for implementation monitoring. Alternatively VMS-linked sensors fitted to mainline setting and hauling drum could be used to indicate compliance, as could sensors to trigger video surveillance cameras. This facility is currently unavailable and requires development.

3 a). Bird scaring lines for vessels > 35m in total length

Scientific evidence for effectiveness in pelagic fisheries

PROVEN AND RECOMMENDED. For vessels > 35 m in length two bird scaring lines is considered best practice. Bird scaring lines with the appropriate aerial extent can be more easily rigged on large vessels. Two bird scaring lines are considered to provide better protection of baited hooks in crosswinds (Melvin *et al*. 2004; Melvin *et al.* 2011). Hybrid bird scaring lines (with long and short streamers) were more effective than short bird scaring lines (only short streamers) in deterring diving seabirds (White-chinned petrels) (Melvin *e.al*. 2010; Melvin *et al.* 2011).

Caveats /Notes

Potentially increased likelihood of entanglement, particularly if attachment points on davits (tori poles) are insufficiently outboard of vessels. To achieve a minimum aerial extent bird-scaring lines line should be attached to the vessel such that it is suspended from a point a minimum of about 8 m above the water at the stern Development of a towed device to prevent tangling with fishing gear essential to improve adoption and compliance.

Diving species increase vulnerability of surface foragers (albatrosses) due to secondary interactions.

Need for combination

Should be used with appropriate line weighting and night setting.

Research needs

Developing methods that minimise entanglements of the in- water portion of bird-scaring lines with longline floats, while creating sufficient drag to maximise aerial extent, remains the highest priority for research on bird-scaring lines. Research evaluating the effectiveness of one vs. two bird-scaring lines; bird-scaring line design features (steamer lengths,

configurations, and materials); and methods for efficient retrieval and stowage of bird scaring lines remain research priorities.

Minimum standards

Vessels should deploy bird scaring lines with a minimum aerial extent of 100 m. Streamers should be: brightly coloured, a mix of long and short streamers, placed at intervals of no more than 5 m, and long streamers attached to the line with swivels that prevent streamers from wrapping around the line. Long streamers should reach the sea-surface in calm conditions.

If large vessels use only one bird scaring line it should be set to windward of sinking baits. If baited hooks are set outboard of the wake, the bird scaring line attachment point to the vessel should be positioned several meters outboard of the side of the vessel that baits are deployed.

Baited hooks shall be deployed within the area bounded by the two bird scaring lines. Bait-casting machines shall be adjusted so as to land baited hooks within the area bounded by bird scaring lines

Implementation monitoring

Requires fisheries observers, video surveillance, or at-sea surveillance (e.g. patrol boats or aerial over-flights).

3 b). Bird scaring lines for vessels <35m in total length

Scientific evidence for effectiveness in pelagic fisheries

PROVEN AND RECOMMENDED. Imber 1994; Uozomi & Takeuchi 1998; Brothers *et al.* 1999; Klaer & Polacheck 1998; McNamara *et al.* 1999; Boggs 2001; CCAMLR 2002; Minami & Kiyota 2004; Melvin 2003. For vessels < 35 m in length a single BSL in combination with night setting and appropriate line weighting has been found effective for mixed and short bird scaring lines (ATF 2011; Domingo *et al.,* Gianuca *et al.* 2011).

Caveats /Notes

To achieve a minimum aerial extent bird-scaring lines line should be attached to the vessel such that it is suspended from a point a minimum of about 7 m above the water at the stern.

Development of a towed device to prevent tangling with fishing gear essential to improve adoption and compliance.

Diving species increase vulnerability of surface foragers (albatrosses) due to secondary interactions.

Need for combination

Should be used with appropriate line weighting and night setting.

Minimum standards

Vessels should deploy bird scaring lines with a minimum aerial extent 75 m. Streamers should be brightly coloured. Short streamers (>1 m) should be placed at 1 m intervals along

the length of the aerial extent. Two designs have been shown to be effective: a mixed design that includes long streamers placed at 5 m intervals over the first 55 m of the bird scaring line and a design that does not include long streamers. Bird scaring lines should be the lightest practical strong fine line. Lines should be attached to the vessel with a barrel swivel to minimise rotation of the line from torque created as it is dragged behind the vessel.

Towed devices to create drag can tangle with float lines leading to interruptions in vessel operations and in some cases lost fishing gear. Short streamers can be tied into the line to bristle the line and create a bottlebrush like configuration to generate drag while minimising the chance of fouling streamer lines on float lines. Breakaways should be incorporated into the bird scaring line in-water extent to minimise safety and operational problems should a longline float foul or tangle with the in-water extent of a bird scaring line.

Implementation monitoring

Requires fisheries observers, video surveillance, or at-sea surveillance (e.g. patrol boats or aerial over-flights).

OTHER CONSIDERATIONS

4. Side setting with line weighting and bird curtain

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN AND NOT RECOMMENDED FOR SOUTHERN HEMISPHERE FISHERIES. Brothers & Gilman 2006; Yokota & Kiyota 2006.

Caveats /Notes

Only effective if hooks are sufficiently below the surface by the time they reach the stern of the vessel and protected by a bird curtain. In Hawaii, side-setting trials were conducted with bird curtain and 45-60 g weighted swivels placed within 0.5 m of hooks. Japanese research concludes must be used with other measures (Yokota & Kiyota 2006). Not tested in southern hemisphere fisheries and cannot be recommended at this time.

Need for combination

Lines set from the side of vessels must be appropriately weighted and protected by an effective bird curtain. Requires thorough testing in southern hemisphere fisheries.

Research needs

Currently untested in southern hemisphere fisheries against assemblages of diving seabirds (e.g. *Procellaria* sp. petrels and *Puffinus* sp. shearwaters) and albatrosses - urgent need for research.

Minimum standards

Clear definition of side setting is required. As noted, side setting trials in Hawaii were conducted in conjunction with a bird curtain and 45-60 g leaded swivel < 1 m of the baited hook. Hawaiian definition is a minimum of only 1 m forward of the stern, which is likely to reduce effectiveness. The distance forward of the stern refers to the position from which baits are manually deployed. Baited hooks must be thrown by hand forward of the bait

deployment location if they are to be afforded “protection” by being close to the side of the vessel.

Implementation monitoring

Requires fisheries observers or video surveillance.

5. Blue dyed bait

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN AND NOT RECOMMENDED. Boggs 2001; Brothers 1991; Gilman *et al*. 2003a; Minami & Kiyota 2001; Minami & Kiyota 2004; Lydon & Starr 2005.Cocking *et al*. 2008.

Caveats /Notes

New data suggests only effective with squid bait (Cocking *et al*. 2008). Onboard dyeing requires labour and is difficult under stormy conditions. Results inconsistent across studies.

Need for combination

Must be combined with bird scaring lines or night setting.

Research needs

Need for tests in Southern Ocean.

Minimum standards

Mix to standardised colour placard or specify (e.g. use ‘Brilliant Blue’ food dye (Colour Index 42090, also known as Food Additive number E133) mixed at 0.5% for minimum 20 minutes).

Implementation monitoring

The current practice of dyeing bait on board vessels at sea requires observer presence or video surveillance to monitor implementation. Assessment of implementation in the absence of on-board observers or video surveillance requires baits be dyed on land and monitored through port inspection of all bait on vessels prior to departure on fishing trips.

6. Line shooter

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN AND NOT RECOMMENDED. Robertson *et al*. 2010.

Caveats /Notes

Mainline set into propeller turbulence with a line shooter without tension astern (e.g. slack) as in deep setting significantly slows the sink rates of hooks (Robertson *et al*. 2010). Use of a line shooter to set gear deep cannot be considered a mitigation measure.

Need for combination

Not Applicable.

Research needs

Not Applicable.

Minimum standards

Use of this measure is not recommended as a mitigation measure.

Implementation monitoring

Not Applicable.

7. Bait caster

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN AND NOT RECOMMENDED. Duckworth 1995; Klaer & Polacheck 1998.

Caveats /Notes

Not a mitigation measure unless casting machines are available with the capability to control the distance at which baits are cast. This is necessary to allow accurate delivery of baits under a bird scaring line. Current machines (without variable power control) likely to deploy baited hooks well beyond the streaming position of bird scaring lines, increasing risks to seabirds. Few commercially-available machines have variable power control. Needs more development.

Need for combination

Not recommended as a mitigation measure at this time.

Research needs

Develop (and implement) casting machine with a variable power control.

Minimum standards

Not recommended as a mitigation measure

Implementation monitoring

Not Applicable

8. Underwater setting chute

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN AND NOT RECOMMENDED. Brothers 1991; Boggs 2001; Gilman *et al*. 2003a; Gilman *et al*. 2003b; Sakai *et al*. 2004; Lawrence *et al*. 2006.

Caveats /Notes

For pelagic fisheries, existing equipment not yet sturdy enough for large vessels in rough seas. Problems with malfunctions and performance inconsistent (e.g. Gilman *et al*. 2003a and Australian trials cited in Baker & Wise 2005).

Need for combination

Not recommended for general application at this time.

Research needs

Design problems to overcome.

Minimum standards

Not yet established

Implementation monitoring

Not Applicable.

9. Management of offal discharge

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN. McNamara *et al*. 1999; Cherel *et al*. 1996.

Caveats /Notes

Supplementary measure. Definition essential. Offal attracts birds to vessels and where practical should be eliminated or restricted to discharge when not setting or hauling. Strategic discharge during line setting can increase interactions and should be discouraged. Offal retention and/or incineration may be impractical on small vessels.

Need for combination

Must be combined with other measures.

Research needs

Further information needed on opportunities and constraints in pelagic fisheries (long and short term).

Minimum standards

Not yet established for pelagic fisheries. In CCAMLR demersal fisheries, discharge of offal is prohibited during line setting. During line hauling, storage of waste is encouraged, and if discharged must be discharged on the opposite side of the vessel to the hauling bay.

Implementation monitoring

Requires offal discharge practices and events to be monitored by fisheries observers or video surveillance.

10. Live bait

Scientific evidence for effectiveness in pelagic fisheries

LIVE BAIT NOT RECOMMENDED. Trebilco *et al*. 2010; Robertson *et al*. 2010.

Caveats /Notes

Live fish bait sinks significantly slower than dead bait (fish and squid), increasing the exposure of baits to seabirds. Use of live bait is associated with higher seabird bycatch rates.

Need for combination

Use of live bait is not a mitigation measure.

Research needs

Not Applicable.

Minimum standards

Live bait is not a mitigation measure.

Implementation monitoring

Not Applicable.

11. Bait thaw status

Scientific evidence for effectiveness in pelagic fisheries

NOT RECOMMENDED. Brothers 1991; Duckworth 1995; Klaer & Polacheck; Brothers *et al*.1999; Robertson & van den Hoff 2010.

Caveats /Notes

Baits cannot be separated from others in frozen blocks of bait, and hooks cannot be inserted in baits, unless baits are partially thawed (it is not practical for fishers to use fully frozen baits). Partially thawed baits sink at similar rates to fully thawed baits.

Need for combination

Not a mitigation measure

Research needs

Not Applicable.

Minimum standards

Not recommended as a mitigation measure.

Implementation monitoring

Not Applicable.

12. Area closures

Scientific evidence for effectiveness in pelagic fisheries

PROVEN AND RECOMMENDED. Avoiding fishing at peak areas and during periods of intense foraging activity has been used effectively to reduce bycatch in longline fisheries.

Caveats /Notes

An important and effective management response, especially for high risk areas, and when other measures prove ineffective**.** Highly effective for target locations/seasons but may displace fishing effort into adjacent or other areas which may not be as well regulated, thus leading to increased incidental mortality elsewhere.

Need for combination

Must be combined with other measures, both in the specific areas when the fishing season is opened, and also in adjacent areas to ensure displacement of fishing effort does not merely lead to a spatial shift in the incidental mortality.

Research needs

Further information about the seasonal variability in patterns of species abundance around fisheries.

Minimum standards

No work done but highly recommended.

Implementation monitoring

Vessels equipped with VMS and activities monitored by appropriate management authority is considered appropriate monitoring. Areas/seasons should be patrolled to ensure effectiveness if IUU activities are suspected.

13. Haul Mitigation

Scientific evidence for effectiveness in pelagic fisheries

UNPROVEN. Strategies to reduce seabird hooking during the haul have yet to be developed for pelagic longline fisheries.

Caveats /Notes

No information

Need for combination

No information

Research needs

Developing methods that minimize seabird hooking during line hauling

Minimum standards

No information

Implementation monitoring

No information

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ANNEX 3. ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF PELAGIC LONGLINES ON SEABIRDS

Agreement on the Conservation of Albatrosses and Petrels

ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF PELAGIC LONGLINES ON SEABIRDS

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

Goal: Reduce the bycatch of seabirds to the lowest possible level.

SUMMARY

A combination of weighted branch lines, bird scaring lines and night setting are best practice mitigation in pelagic longline fisheries. These measures should be applied in areas where fishing effort overlaps with seabirds vulnerable to bycatch to reduce the incidental mortality to the lowest possible levels. Other factors such as safety, practicality and the characteristics of the fishery should also be recognised.

Currently, no single mitigation measure can reliably prevent the incidental mortality of seabirds in most pelagic longline fisheries. The most effective approach is to use the above measures in combination.

INTRODUCTION

The incidental mortality of seabirds, mostly albatrosses and petrels, in longline fisheries continues to be a serious global concern and was major reason for the establishment of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). In longline fisheries seabirds are killed when they become hooked and drowned while foraging for baits on longline hooks as the gear is deployed. They also can become hooked as the gear is hauled; however, many of these seabirds can be released alive with careful handling. Although most mitigation measures are broadly applicable, the application and specifications of some will vary with local longlining methods and gear configurations. For example, most scientific literature on seabird bycatch mitigation in pelagic fisheries relates to larger vessels, with little research attention to smaller vessels and the gear configuration and methods of artisanal fleets; seabird bycatch mitigation advice is under development. ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in pelagic fisheries and this document is a distillation of that review (AC6 Final Report ANNEX 13).

Best Practice Measures

1. Branch line weighting

Weights will shorten but not eliminate the zone behind the vessel in which birds can be caught. Branch lines should be weighted to sink the baited hooks rapidly out of the diving range of feeding seabirds. Weighted lines sink faster and more consistently, resulting in dramatic reductions in seabird attacks on baited hooks. Scientific studies have demonstrated that branch line weighting configurations with more mass close to the hook sinks the hooks most rapidly, reduces seabird attacks on baits and consequently is most likely to reduce mortalities. Studies of a range of weighting regimes, including regimes with weight at the hook, have shown no negative effect on target catch rates. Continued refinement of line weighting configurations (mass, number and position of weights and materials) with regard to effectively reducing seabird bycatch and safety concerns through controlled research and application in fisheries, is encouraged.

Line weighting has been shown to improve the effectiveness of night setting and bird scaring lines in reducing seabird bycatch. Of this combination that makes up this best practice mitigation, line weighting is integral to the fishing gear and has the advantage of being more consistently implemented and thus facilitates compliance and port monitoring. On this basis it is important to enhance the priority accorded to line weighting, providing certain pre-conditions can be met, inter alia:

a) weighting regime characteristics adequately specified;
b) safety issues adequately addressed;
c) issues relating to application to artisanal fisheries are taken into account.

Current recommended minimum standard for branch line weighting configurations are:

GREATER THAN 45 G ATTACHED WITHIN 1 M OF THE HOOK OR;

GREATER THAN 60 G ATTACHED WITHIN 3.5 M OF THE HOOK OR;

GREATER THAN 98 G WEIGHT ATTACHED WITHIN 4 M OF THE HOOK.

POSITIONING WEIGHT FARTHER THAN 4 M FROM THE HOOK IS NOT RECOMMENDED.

The Working Group anticipates further research on line weighting and that these regimes may be revised in the future.

2. Night setting

Setting longlines at night, between nautical twilight and nautical dawn, is highly effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are inactive at night.

3. Bird scaring lines

Properly designed and deployed bird scaring lines deter birds from sinking baits, thus dramatically reducing seabird attacks and related mortalities. A bird scaring line is a line that

runs from a high point at the stern to a device or mechanism that creates drag at its terminus. As the vessel moves forward, drag lifts the section of line closest to the vessel from the water into the air. Brightly coloured streamers hanging from the aerial extent of the line scare birds from flying to and under the line preventing them from reaching the baited hooks. It is the aerial extent (out of water) section with suspended streamers that scares birds from the sinking baits.

Bird scaring lines should be the lightest practical strong fine line. Lines should be attached to the vessel with a barrel swivel to minimise rotation of the line from torque created as it is dragged behind the vessel.

Towed objects, applied to increase drag, and with it bird scaring line aerial extent, are prone to tangling with float lines leading to lost bird scaring lines, interruptions in vessel operations and in some cases lost fishing gear. Alternatives, such as adding short streamers to the in-water portion of the line, can enhance drag while minimising tangles with float lines. Weak links (breakaways) should be incorporated into the in-water portion of the line safety and operational problems should lines become tangled.

Given operational differences in pelagic longline fisheries due to vessel size and gear type, bird scaring lines specifications have been divided into recommendations for vessels greater than 35 metres and those less than 35 metres.

3. (a) Recommendations for vessels >35 m total length

Simultaneous use of two bird scaring lines, one on each side of the sinking longline, provide maximum protection from bird attacks under a variety of wind conditions and are recommended as best practice for larger vessels.

Bird scaring lines should include the following specifications:

Bird scaring lines should be deployed to maximise the aerial extent. Aerial extent is a function of vessel speed, height of the attachment point to the vessel, drag, and weight of bird scaring line materials.

Vessels should deploy bird scaring lines with a minimum aerial extent of 100 m. To achieve a minimum aerial extent bird scaring lines line should be attached to the vessel such that it is suspended from a point a minimum of about 8 m above the water at the stern.

Streamers should be: brightly coloured, a mix of long and short streamers, placed at intervals of no more than 5 m, and long streamers attached to the line with swivels that prevent streamers from wrapping around the line. All streamers should reach the sea-surface in calm conditions.

Baited hooks shall be deployed within the area bounded by the two bird scaring lines. Bait-casting machines shall be adjusted so as to land baited hooks within the area bounded by the bird scaring lines.

If large vessels use only one bird scaring line, the bird scaring line should be deployed windward of sinking baits. If baited hooks are set outboard of the wake, the bird scaring line attachment point to the vessel shall be positioned several meters outboard of the side of the vessel that baits are deployed. This position is best achieved using a purpose build davit (tori

pole) located as close to the stern and as far aft as practical. Proper outboard positioning also minimises the likelihood of bird scaring lines tangling on float lines.

3. (b) Recommendations for vessels <35 m total length

A single bird scaring line using either long and short streamers, or short streamers only, has been found effective on smaller vessels.

Streamers should be brightly coloured. Short streamers (>1 m) should be placed at 1 m intervals along the length of the aerial extent. Two designs have been shown to be effective: a mixed design that includes long streamers placed at 5 m intervals over the first 55 m of the bird scaring line and a design that does not include long streamers.

Vessels should deploy bird scaring lines with a minimum aerial extent 75 m. To achieve a minimum aerial extent bird scaring lines line should be attached to the vessel such that it is suspended from a point a minimum of about 7 m above the water at the stern.

Other Considerations

Area and seasonal closures: The temporary closure of important foraging areas (e.g. areas adjacent to important seabird colonies during the breeding season when large numbers of aggressively feeding seabirds are present) to fishing will eliminate incidental mortality of seabirds in that area.

Mainline tension: Setting mainline, branch lines and baited hooks into propeller turbulence (wake) slows sink rates and should be avoided.

Live vs. dead bait: Use of live bait should be avoided. Individual live baits can remain near the water surface for extended periods (e.g. up to 120 seconds), thus increasing the likelihood of seabird captures.

Bait hooking position: Baits hooked in either the head (fish), or tail (fish and squid), sink significantly faster than baits hooked in the mid-back or upper mantle (squid).

Offal and discard discharge management: Seabirds are attracted to discards, offal and used baits. Used baits should be retained during line hauling. Ideally offal and used baits should be discharged on the side of the vessel opposite of line hauling. Offal and discards should not be discharged during line setting. All hooks should be removed and retained on board before discards are discharged from the vessel.

New Technologies

New technologies that set or release baited hooks at depth (underwater setting device) or disarm hooks to specific depths, which have the potential to prevent seabird access to baits, are currently under development and undergoing sea trials.

MITIGATION TECHNOLOGIES THAT ARE NOT RECOMMENDED

Line shooters: There is no experimental evidence that line shooters reduce seabird bycatch in pelagic longline fisheries; therefore, they should not be considered a seabird bycatch mitigation option.

Olfactory deterrents: Olfactory deterrents (fish oils) have not been demonstrated to prevent or reduce seabird mortalities in pelagic longline fisheries.

Hook size and design: Changes to hook size and design may reduce the chance of seabird mortality in longline fisheries, but have not been sufficiently researched.

Side setting: Although side setting (defined as setting station a minimum of one metre forward of the stern and in combination with branch line weighting and a bird curtain) is being used in the Hawaiian surface longline fishery, it has not been tested in other fisheries, including southern hemisphere fisheries, consequently it cannot be recommended at this time.

Blue dyed bait: Blue dyed squid bait has been insufficiently researched and cannot be recommended.

Bait thaw status: In practical terms the thaw status of baits has no effect on the sink rate of baited hooks set on weighted lines.

ANNEX 4. ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR DEMERSAL LONGLINE FISHERIES

ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR DEMERSAL LONGLINE FISHERIES

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

This Annex summarises the results of studies that have been carried out to develop, test and improve seabird mitigation measures in demersal longline fisheries. A comprehensive range of technical and operational mitigation methods have been designed or adapted for use in demersal and semi-pelagic longline fisheries. These methods aim to reduce incidental mortality of seabirds by avoiding peak areas and periods of seabird foraging activity, reducing the time baited hooks are near the surface and thus available to birds, actively deterring birds from baited hooks, and making the vessel less attractive to birds and minimising the visibility of baited hooks. Apart from being technically effective at reducing seabird bycatch, mitigation methods need to be easy and safe to implement, cost effective, enforceable and should not reduce catch rates of target species. There is no single solution that will eliminate seabird bycatch; the most effective approach is to use a combination of measures. The suite of measures available may vary in their feasibility and effectiveness depending on the area, seabird assemblages involved, fishery and vessel type and gear configuration. Some of the mitigation methods are now well established and explicitly prescribed in longline fisheries. However, other measures are relatively recent and require further testing and refinements, and there is a need to ensure that the collaborative approach to research and monitoring that has characterised field of seabird bycatch mitigation continues.

BEST PRACTICE GUIDELINES	
1.	Night setting
2.	Area and seasonal closures
3.	Externally weighted lines: a) Spanish system
4.	Externally weighted lines: b) Chilean method (drop lines with nets)

5.	Externally weighted lines: c) Autoline
6.	Integrated weighting of lines
7.	Single bird scaring line
8.	Paired or multiple bird scaring lines
9.	Haul bird exclusion devices
OTHER CONSIDERATIONS	
10.	Side setting
11.	Underwater setting funnel/chute
12.	Line setter/shooter
13.	Thawing bait
14.	Olfactory deterrents
15.	Strategic management of offal discharge
16.	Blue-dyed bait
17.	Hook size and shape
MITIGATION MEASURES UNDER DEVELOPMENT	
18**.**	Kellian Line Setter

BEST PRACTICE GUIDELINES

1. Night setting

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Recommend combination with bird scaring lines and/or weighted lines, especially to reduce incidental mortality of birds that forage at night (Ashford *et al*. 1995; Cherel *et al*. 1996; Moreno *et al*. 1996; Barnes *et al*. 1997; Ashford & Croxall 1998; Klaer & Polacheck 1998; Weimerskirch *et al*. 2000; Belda & Sánchez 2001; Nel *et al*. 2002; Ryan & Watkins 2002; Sánchez & Belda 2003; Reid *et al*. 2004; Gómez Laich *et al.* 2006).

Minimum standards

Night defined as the period between the times of nautical twilight (nautical dark to nautical dawn).

Caveats /Notes

Bright moonlight and deck lights reduce the effectiveness of this mitigation measure. Not as effective for crepuscular/nocturnal foragers such as the White-chinned petrel but even for these species night setting is more effective than setting during the day. In order to maximise effectiveness of this mitigation measure, deck lights should be off or kept to an absolute minimum, and used in combination with additional mitigation measures, especially when setting in bright moonlight conditions. Night setting is not a practical option for fisheries operating at high latitudes during summer. Setting should be completed at least 3 hours before sunrise to avoid the predawn activity of White-chinned petrels.

Research needs

Effect of night setting on catch rates of target species for different fisheries.

Implementation monitoring

Via VMS and fishery observers.

2. Area and seasonal closures

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Must be combined with other measures, both in the specific areas when the fishing season is opened, and also in adjacent areas to ensure displacement of fishing effort does not merely lead to a spatial shift in the incidental mortality. A number of studies have reported marked seasonality in seabird bycatch rates, with the majority of deaths taking place during the breeding season (Moreno *et al.* 1996; Ryan *et al*. 1997; Ashford & Croxall 1998; Ryan & Purves 1998; Ryan & Watkins 1999; Ryan & Watkins 2000; Weimerskirch *et al*. 2000; Kock 2001; Nel *et al*. 2002; Ryan & Watkins 2002; Croxall & Nicol 2004; Reid *et al*. 2004; Delord *et al*. 2005). In some studies, mortality has been almost exclusively within the breeding season. Several studies have also shown that proximity to breeding colonies is an important determinant of seabird bycatch rates (Moreno *et al*. 1996; Nel *et al*. 2002). The much higher rate of seabird bycatch during the breeding period led to the temporal closure of the fishery in CCAMLR sub-area 48.3 from 1998, which contributed to a ten-fold reduction in seabird bycatch (Croxall & Nicol 2004). Movement of fishing effort away from the Prince Edward Islands coincided with a reduction in seabird bycatch in the sanctioned Prince Edward Island fishery.

Caveats /Notes

It's difficult to separate the temporal closure from the increased uptake/implementation of other mitigation measures, but it is clearly an important and effective management response, especially for high risk areas, and when other measures prove ineffective. There is a risk that temporal/spatial closures could displace fishing effort into neighbouring or other areas which may not be as well regulated, thus leading to increased incidental mortality elsewhere.

Research needs

Further information about the seasonal variability in patterns of species abundance, and particularly how these interact with the spatial and temporal characteristics of fishing effort,

especially for high risk areas (e.g. adjacent to important breeding colonies). In some studies, incidental mortality has been greatest during the chick-rearing period (Nel et al. 2002; Delord et al. 2005), whereas others have reported highest mortality during the incubation period (Reid et al. 2004). This difference likely relates to where the birds are foraging in relation to fishing effort at the time, and highlights the importance of understanding this interaction. Research is also required to determine the regional impact of closures on catches of target species.

Minimum standards

Currently, the area around South Georgia (Islas Georgias del Sur)[1] (CCAMLR Subarea 48.3) is open from May 1st. to Aug. 31st or till established catch limit is reached, as provided for by CCAMLR Conservation Measures in force. (41-02/2007).

Implementation monitoring

Via VMS or fishery observers within national economic zones, and via aerial and at-sea surveillance if IUU fishing is suspected.

3. Externally weighted lines:

a) Spanish system

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Must be combined with other measures, especially effective bird scaring lines, judicious offal management and/or night setting (Agnew *et al.* 2000; Robertson 2000; Robertson *et. al*. 2008a; 2008b; Melvin *et al*. 2001; Moreno *et al*. 2006; Moreno *et al*. 2008).

Caveats /Notes

Spanish system longlines are buoyant and weights must be attached to sink gear to fishing depth. Longlines with externally added weights sink unevenly, faster at the weights than at the midpoint between weights. Although gear configuration and setting speed influence the sink profiles of the hook lines (Seco Pon *et al*. 2007), the principle determinants of sink rates are the mass of the weights and the distance between weights (Robertson *et al*. 2008a). It is critical that tension astern is eliminated to ensure the smooth flow of hooks from gear baskets. This can be done by ensuring the correct packing of lines and snoods in baskets, preventing hooks snagging on snood baskets and by ensuring that weights are released from the vessel before line tension occurs (Robertson *et al*. 2008a,b). Weights must be attached and removed for each set-haul cycle, which is onerous and potentially hazardous for crew members. Weights comprised of rocks enclosed in netting bags and concrete blocks deteriorate and require ongoing maintenance/replacement and monitoring to ensure weights are the required mass (Otley 2005); weights made of solid steel are preferred, in

[1] "A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur e Islas Sandwich del Sur) and the surrounding maritime areas".

terms of mass consistency, handling, minimal-to-no maintenance and compliance (Robertson *et al*. 2008b).

Research needs

Sink rates and profiles of line weighting regimes may vary according to vessel type, setting speed and deployment position in relation to propeller turbulence. It is important that the sink rate relationships of different line weighting regimes are understood for a particular fishery (or fishery method) and that the effectiveness of the line weighting regime and the sink profile in reducing seabird mortality is tested.

Minimum standards

Global minimum standards not established. Requirements vary by fishery and vessel type. For example, CCAMLR minimum requirements for vessels using the Spanish method of longline fishing are 8.5kg mass at 40m intervals (if rocks are used), 6kg mass at 20m intervals for traditional (concrete) weights, and 5kg weights at 40m intervals for solid steel weights.

Implementation monitoring

Fishing gear is deployed manually. Weights are attached by hand during line setting and removed during line hauling. Distance between weights and the mass of the weight used may vary in accordance with fishing strategy and for operational reasons. Observer presence on vessel is required to assess implementation.

4. Externally weighted lines:

b) Chilean method (trot line with nets)

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Although effectively prevents mortality as a sole measure, prudent to use in combination with a single bird scaring streamer line. This method (first tested on large longline vessels in 2005) is a variant of the traditional Spanish double line method of longlining and was developed in Chile to minimise depredation of Patagonian toothfish by toothed whales (Figure 1). This system makes use of net sleeves or ‘cachaloteras’ which envelop captured fish during hauling. Hooks are clustered on secondary lines to which weights are attached, resulting in very fast hook sink rates (mean: 0.8 m/s c.f. 0.15 m/s for the Spanish system) in the first 15-20 m (the length of the secondary lines) of water column. Has the capacity to reduce (or eliminate) seabird mortality to negligible levels (Moreno *et al*. 2006; Moreno *et al*. 2008; Robertson *et al*. 2008b). Because of its effectiveness in reducing impacts of toothed whales, this method is currently used in many longline fleets operating in South American waters (Moreno *et al*. 2008), as well as in the south west Atlantic.

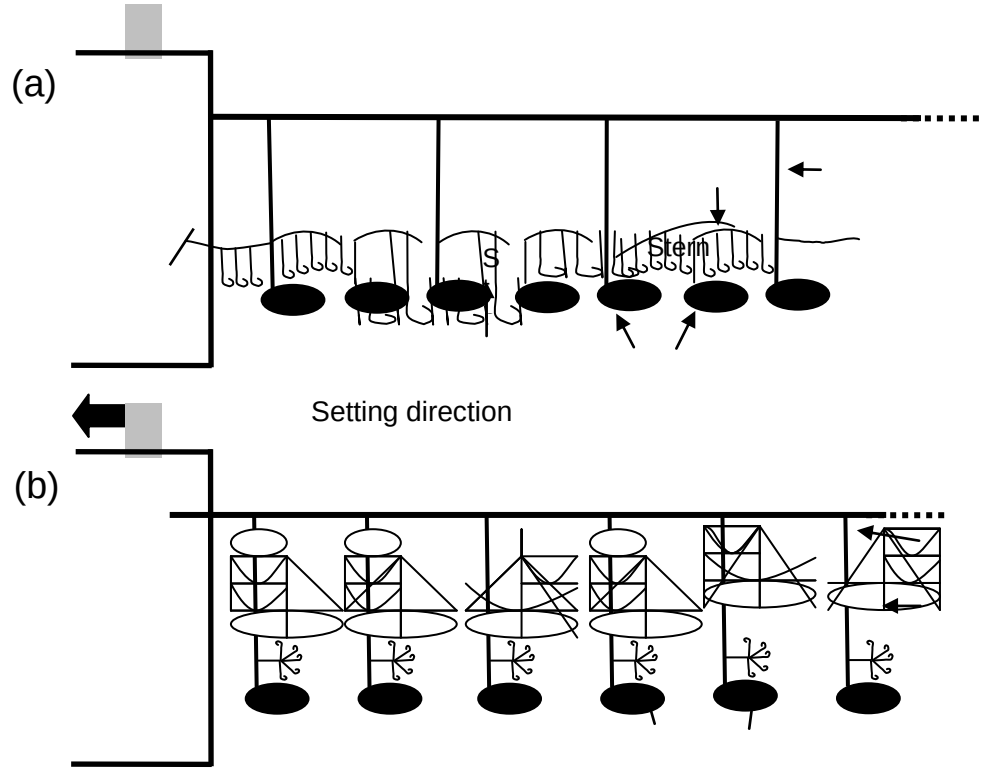

Figure 1. Typical configurations of the traditional Spanish double line system (a) and Chilean (trotline) system (b) showing differences in gear design and location of weights in relation to hooks. The open-ended secondary/connecting lines (not joined by a continuous hook line) and proximity of weights to hooks of the Chilean system enables hooks to sink rapidly and with a linear profile (no lofting in propeller turbulence) from the surface close to vessel sterns. Drawings not to scale.

Caveats /Notes

This is a relatively new system, is possibly still in the evolutionary stages, and should be monitored and possibly refined further. Concern has been raised about the excessive discarding of fish bycatch (e.g. grenadiers) with embedded hooks and the ingestion of these hooks by albatrosses following vessels (Phillips *et al*. 2010). The solution to this problem is to stop hooks from being discarded in the first place. This is best achieved by banning the discarding of hooks as part of the licence conditions, as is already done in many fisheries, and also increasing awareness amongst fishers, observers and operators to facilitate compliance with such a ban. Another concern is that vessels can switch between Spanish method and Chilean method within fishing trips and even within sets of the longline; this is a key reason why further monitoring is required.

Research needs

Effective as a solitary measure against albatrosses and most likely effective against *Procellaria* sp petrels due to the very rapid sink rates to depths beyond the known dive range

of this group of seabirds. Research is required to determine effectiveness against *Puffinus* sp shearwaters.

This is a relatively new fishing method and may be in the process of refinement. It is important to monitor changes to gear design, especially those likely to affect the sink rates of baited hooks.

Minimum standards

No global standards yet.

Implementation monitoring

Hook-bearing secondary lines require weights be attached in order to sink. However, alternating between this fishing method and the traditional Spanish method within fishing trips is problematic. While this capacity exists the requirements for the Spanish system should apply (see “a”, above).

5. Externally weighted lines:

c) Autoline

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Must be used in combination with an effective bird scaring streamer line. In the Southern Hemisphere evidence pertains to effect of added external weights on longline sink rates, not effectiveness in deterring seabirds. Attachment of 5 kg weights at no more than 40 m intervals increased mean sink rate from 0.1 m/s (unweighted gear) to 0.3 m/s on the section of longline mid-way between line weights (Robertson 2000). This rate exceeds that of integrated with longlines, which have been thoroughly tested against seabirds (see below). Attachment of external weighs necessary in Antarctic toothfish fisheries to comply with the minimum sink rate (0.3 m/s) required by CCAMLR operating in high latitude areas in summer, where it was not possible to set lines at night.

Caveats /Notes

As for the Spanish system it is important that external weights be released from vessels in a manner that avoids tension astern (tension astern may lift sections of the longline already deployed out of the water).

Research needs

Likely to be effective in deterring albatrosses and *Procellaria* sp seabirds. Evidence is lacking for effectiveness against *Puffinus* sp shearwaters.

Minimum standards

CCAMLR requires as a minimum 5 kg mass at intervals no more than 40 m. It is also required that weights be released before line tension occurs. In the New Zealand fisheries, a minimum of 4 kg (metal weight) or 5 kg (non-metal weight) be attached every 60 m if the hook bearing line is 3.5 mm or greater in diameter, and a minimum of 0.7 kg of weight every

60m when the line is less than 3.5 mm diameter. The New Zealand minimum standards also include requirements relating to the use of floats.

Implementation monitoring

Weights are attached to longlines manually. Observer presence on-board vessel is required to assess implementation.

6. Integrated weighting of lines

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Should be used in combination with bird scaring lines, judicious offal management and/or night setting. Apart from the practical advantages of integrated weight (IW) longlines – superior handling qualities and practically inviolable – the IW longlines sink more quickly and uniformly out of reach of most seabirds compared with externally weighted lines. IW longlines have been shown to reduce substantially mortality rates of surface foragers and diving seabirds, while not affecting catch rates of target species (Robertson *et al.* 2002; Robertson *et al*. 2003; Robertson *et al.* 2006; Dietrich *et al*. 2008).

Caveats /Notes

Restricted to autoline vessels. The sink rate of IW longlines can vary depending on vessel type, setting speed and deployment of line relative to propeller wash (Melvin & Wainstein 2006; Dietrich *et al.* 2008). Setting speed influences the extent of the seabird access window – the area in which most seabirds are still able to access the baited hooks in the absence of bird scaring lines (Dietrich *et al*. 2008). Use of IW lines is likely to increase the portion of the line on the seafloor, and may lead to increases in the bycatch of vulnerable fish, shark and ray species. This may be mitigated by placing a weight and a float on a 10 m line at the point of the dropper line attachment, thus ensuring the line sinks rapidly to 10 m, out of reach of vulnerable seabirds, but remains off the seabed (Petersen 2008).

Research needs

The relationship between line-weighting regime, setting speed, sink rates/profiles and the seabird access window should be investigated for other fisheries (i.e. those that haven't already been tested –Bering Sea, Alaska, and New Zealand ling fishery) including with additional mitigation measures (particularly bird scaring lines); these investigations would be useful in determining the necessary aerial extent of the bird scaring lines.

Minimum standards

Global minimum standards not in place. CCAMLR currently require as a minimum IW lines with a lead core of 50g/m, which is also required in the New Zealand demersal longline fishery.

Implementation monitoring

Weight (lead core) integrated into fabric of longline, so compliance is intrinsic in this measure. It is expensive and time consuming to alter longline when at sea, including for

vessels with long transit times to fishing grounds (e.g. Antarctic and sub Antarctic fisheries). Port inspection of all longline on board prior to embarkation on fishing trips considered adequate for assessment of compliance.

7. Single bird scaring line

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Effectiveness is increased when using multiple bird scaring lines and when used in combination with other measures – e.g. night setting, appropriate weighting of line and judicious offal management. The use of a single bird scaring line has been shown to be an effective mitigation measure in a range of demersal longline fisheries, especially when used properly (Moreno *et al.* 1996; Løkkeborg 1998, 2001; Melvin *et al.* 2001; Smith 2001; Løkkeborg & Robertson 2002; Løkkeborg 2003).

Caveats /Notes

Effective only when streamers are positioned over sinking hooks. Single bird scaring lines can be less effective in strong crosswinds (Løkkeborg 1998; Brothers *et al.* 1999; Agnew *et al.* 2000; Melvin *et al.* 2001; Melvin *et al.* 2004). In the event of strong crosswinds, bird scaring lines should be deployed from the windward side. This problem can also be overcome by using paired bird scaring lines (see below).The effectiveness of the bird scaring lines is also dependent on the design, the aerial coverage of the bird scaring line, seabird species present during line setting (proficient divers being more difficult to deter from baits than surface feeding birds) and the proper use of the bird scaring line. The aerial coverage and the position of the bird scaring line relative to the sinking hooks are the most important factors influencing their performance. There have been a few incidents of birds becoming entangled in bird scaring lines (Otley *et al*. 2007). However it must be stressed that the numbers are minuscule, especially when compared with the number of mortalities recorded in the absence of bird scaring lines. Bird scaring lines remain a highly effective mitigation measure, and efforts should be directed to improving further their design and use so that their effectiveness can be improved further.

Research needs

The use and specifications/performance standards are fairly well established in demersal longline fisheries. However, there is scope to improve further the effectiveness and practical use of bird scaring lines on individual vessels or vessel type.

Minimum standards

Current minimum standards vary. CCAMLR was the first conservation body that required all longline vessels in its area of application to use bird scaring lines (Conservation Measure 29/X adopted in 1991). The bird scaring line has gone on to become the most commonly applied mitigation measure in longline fisheries worldwide (Melvin et al. 2004). CCAMLR currently prescribes a range of specifications relating to the design and use of bird scaring lines. These include the minimum length of the line (150m), the height of the attachment point on the vessel (7m above the water), and details about streamer lengths and intervals between streamers. Other fisheries have adapted these measures. Some, such as those in

New Zealand and Alaska have set explicit standards for the aerial coverage of the bird scaring lines, which varies according to the size of the vessel.

Implementation monitoring

Bird scaring lines are usually deployed and retrieved on a set-by-set basis (they are not a fixed part of fishing gear/operations). Requires fisheries observers, video surveillance or at-sea surveillance (e.g. patrol boats or aerial over-flights).

8. Paired or multiple bird scaring lines

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED. Effectiveness is increased when used in combination with other measures – e.g. night setting, appropriate weighting of line and judicious offal management. Several studies have shown that the use of two or more streamer lines is more effective at deterring birds from baited hooks than streamer line (Melvin *et al.* 2001; Sullivan & Reid 2002; Melvin 2003; Melvin *et al.* 2004; Reid *et al.* 2004). The combination of paired streamer lines and IW longlines is considered the most effective mitigation measure in demersal longline fisheries using autoline systems (Dietrich *et al.* 2008).

Caveats /Notes

Potentially increased likelihood of entanglement with other gear. Use of an effective towed device that keeps lines from crossing surface gear essential to improve adoption and compliance. See also above comment about bird entanglements in bird scaring lines. Manually attached and operated paired or multiple bird scaring lines requires some effort to operate (a 150m double line takes about 8-10 men to retrieve). One way of overcoming this is to make use of electronic winches.

Research needs

Further trialling in fisheries which currently only use single streamer lines.

Minimum standards

Paired streamer lines required in Alaskan fisheries and encouraged/recommended by CCAMLR, except in the French exclusive economic zone (CCAMLR Subarea 58.6 and Division 58.5.1), where paired streamer lines have been compulsory since 2005. Paired streamer lines have also been required in the Australian longline fisheries off Heard Island since 2003 (Dietrich *et al*. 2008)

Implementation monitoring

Bird scaring lines are usually deployed and retrieved on a set-by-set basis (they are not a fixed part of fishing gear/operations).Requires fisheries observers, video surveillance or at-sea surveillance (e.g. patrol boats or aerial over-flights.

9. Haul bird exclusion devices

Scientific evidence for effectiveness in demersal fisheries

PROVEN AND RECOMMENDED AS A HAUL MITIGATION MEASURE. Must be used in combination with other mitigation measures – bird scaring lines at setting, line weighting, night setting and judicious offal management. The use of a bird exclusion device such as a Brickle curtain can effectively reduce the incidence of birds becoming foul hooked when the line is being hauled (Brothers *et al.* 1999; Sullivan 2004; Otley *et al*. 2007; Reid *et al*. 2010, Snell *et al.* in prep.).

Caveats /Notes

Some species, such as the Black-browed Albatross and Cape Petrel, can become habituated to the curtain, so it is important to use it strategically – when there are high densities of birds around the hauling bay (Sullivan 2004).

Minimum standards

A device designed to discourage birds from accessing baits during hauling operations is required in high risk CCAMLR areas (exact design not specified, but it is required that they fulfil two operational characteristics: 1) deter birds from flying into the area where the line is being hauled, and 2) prevents birds that are sitting on the surface from swimming into the hauling bay area). Also required in the Falkland Islands (Islas Malvinas)[1] longline fishery, where the Brickle Curtain is recommended (Snell *et al*. in prep).

Implementation monitoring

Bird exclusion devices are usually deployed and retrieved on a haul-by-haul basis (they are not a fixed part of fishing gear/operations. Requires fisheries observers, video surveillance or at-sea surveillance.

OTHER CONSIDERATIONS

10. Side setting

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AT THIS TIME. Must be used in combination with other mitigation measures, especially the use of a bird curtain (Gilman *et al*. 2007), and bird scaring lines. Has not been widely tested in demersal longline fisheries. In trials in the New Zealand ling fishery, side setting appeared to reduce seabird bycatch; however, the results were not convincing and there were practical/operational difficulties, with the line becoming entangled in the propeller (Bull 2007). Sullivan (2004) reported that side setting has been used in some demersal fisheries (e.g. shark fisheries) which have experienced negligible incidental mortality.

Caveats /Notes

Practical difficulties, especially in difficult weather/sea conditions. In many cases it may be difficult and expensive converting the vessel's deck design to employ a side setting system.

Research needs

Largely untested in the demersal fisheries, especially in the Southern Ocean, where the seabird assemblages include proficient diving seabirds. Research urgently needed.

Minimum standards

Only in Hawaii for the pelagic longline fisheries, where it is used in conjunction with a bird curtain and weighted branch lines (45g within 1m of hook); side setting is defined as a minimum of 1m forward of the stern.

Implementation monitoring

Requires longline be set with the aid of a device(s) (e.g., autobaiter; line shooter) from a fixed position on vessels that is crucial to the operational effectiveness of line setting. Port inspection of line deployment set-up considered to be adequate to assess implementation.

11. Underwater setting funnel/chute

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AT THIS TIME. Must be used in conjunction with other mitigation measures – bird scaring lines, weighted lines, night setting and judicious offal management. An underwater setting funnel has been tested in demersal longline fisheries in Alaska, Norway and South Africa, with all studies showing a reduction in the mortality rate, although the extent of the reduction varied between studies (Løkkeborg 1998, 2001; Melvin *et al*. 2001; Ryan & Watkins 2002).

Caveats /Notes

Present design is mainly for a single line system. Results from studies to date have been inconsistent, likely due to the depth at which the device delivers the baited hooks and the diving ability of the seabirds in the fishing area studied. The pitch angles of the vessel, which are influenced by the loading of weight and sea conditions, affect the performance of the funnel (Løkkeborg 2001).

Research needs

Need to investigate improvements to the current design to increase the depth at which the line is set, especially during rough seas. Should also be tested with integrated weight lines to determine whether this improves bycatch reduction. Also need to investigate optimal use of device together with other mitigation measures (bird scaring lines and weighted lines).

Minimum standards

Not yet established.

Implementation monitoring

On-board monitoring, such as full-time observer coverage, video surveillance or at-sea inspection is recommended to monitor implementation..

12. Line setter/shooter

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AT THIS TIME. Must be combined with other measures, such as bird scaring lines, night setting, weighted lines and judicious offal management. Less used in demersal longline fisheries; variation in the precise method of operation is cause of variation in efficacy. In Norway, no statistical differences were detected in catch rates of northern fulmars between sets with and without a line shooter (Løkkeborg & Robertson 2002; Løkkeborg 2003). In Alaska, use of a line shooter increased seabird bycatch (Melvin *et. al*. 2001). However, the reasons for this finding are unclear.

Caveats /Notes

Robertson *et al.* (2008c) found no significant difference between the sink rates of integrated weight longlines of autoline vessels that were set with and without a line setter in the Ross Sea, and were doubtful that the use of line setters would lead to substantial reductions in interactions between seabirds and longlines. Unequivocal evidence of effectiveness in reducing seabird bycatch is lacking. In need of further refinement.

Research needs

Need to investigate whether refinement/modification of the device will be able to overcome the problem of propeller wash and ensure consistently rapid sink rates and significantly reduced seabird mortality. Not considered a mitigation measure at this time.

Minimum standards

Not considered a mitigation measure at this time.

13. Thawing bait

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AS A PRIMARY MITIGATION MEASURE. Not as much of an issue compared with pelagic longlining. For autoliners, the bait must be at least partially thawed before they can be sliced by the automated baiting system; in the Spanish system, the interval between manually baiting the hooks and setting the lines is sufficiently long to allow for thawing (except in very low ambient temperatures); and the line weighting regime overcomes most of the problems with frozen bait (Brothers *et al.* 1999).

Caveats /Notes

Effect is likely to be very minor. Not a primary measure.

Research needs

No priority research needs.

14. Olfactory deterrents

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AS A MITIGATION MEASURE AT THIS TIME. Must be used in combination with other mitigation measures – bird scaring lines at setting, line weighting, night setting and judicious offal management – especially until further testing has been conducted. Dripping shark liver oil on the sea surface behind vessels has been shown to effectively reduce the number of seabirds (restricted to burrow-nesting birds) attending vessels and diving for bait in New Zealand (Pierre & Norden 2006; Norden & Pierre 2007).

Caveats /Notes

The shark liver oil did not deter albatrosses, giant petrels, or Cape petrels from boats (Norden & Pierre 2007). The potential impact of releasing large amounts of concentrated fish oil into the marine environment is unknown, as is the potential for contaminating seabirds attending vessels and the potential of seabirds to become habituated to the deterrent (Pierre & Norden 2006).

Research needs

Testing should be extended to candidate/suitable species of conservation concern, such as White-chinned petrels and Sooty shearwaters. Research is also required to identify the key ingredients in the shark oil that are responsible for deterring seabirds, and the mechanism by which the birds are deterred. The potential “pollution” effects also need to be investigated.

Minimum standards

None yet.

Implementation monitoring

Monitoring of line setting operations by observer placement or video surveillance is required to assess implementation.

15. Strategic management of offal discharge

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AS A PRIMARY MITIGATION MEASURE. Must be used in combination with other mitigation measures – bird scaring lines. line weighting, and night setting. Some studies have shown that dumping homogenised offal (which is generally more easily available and thus attractive to seabirds than bait) during setting attracts birds away from the baited line to the side of the vessel where the offal is being discharged, and thus reduces bycatch of seabirds on the baited hooks (Cherel *et al*. 1996; Weimerskirch et al. 2000).

Caveats /Notes

Although strategic offal discharge has been shown to be effective at reducing seabird bycatch around Kerguelen Island, there are many risks associated with the practice. Offal discharge needs to be continued throughout the setting operation so as to ensure the birds do not move on to the baited hooks. This will only be possible in fisheries where line setting is short, and there is sufficient offal to sustain the line-setting period. This measure also has the potential to foul hook birds if offal is discharged with hooks. It is crucial, then, that all offal is checked for hooks before being discharged. Given these risks, and the fact that the presence of offal is a critical factor affecting seabird numbers attending vessels, most fisheries management regimes require that no offal can be discharged during line setting, and that if discarding is necessary at other times it should take place on the side of the vessel opposite to where the lines are being hauled.

Research needs

Further information needed on opportunities to manage offal more effectively – considering both practical aspects and seabird bycatch mitigation – in the short and long term.

Minimum standards

In CCAMLR demersal fisheries, discharge of offal is prohibited during line setting. During line hauling, storage of waste is encouraged, and if discharged must be discharged on the opposite side of the vessel to the hauling bay. A system to remove fish hooks from offal and fish heads prior to discharge is required. Similar requirements are prescribed by other demersal longline fisheries (e.g. Falkland Islands[1] (Islas Malvinas), South Africa and New Zealand).

Implementation monitoring

Requires offal discharge practices and events to be monitored by fisheries observers or video surveillance.

16. Blue-dyed bait

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AS A PRIMARY MEASURE AT THIS TIME. Must be used in combination with other mitigation measures – bird scaring lines. line weighting, night setting and judicious offal management The performance of this measure has only been tested in the pelagic longline fishery (Boggs 2001; Minami & Kiyota 2004; Gilman *et al.* 2007; Cocking *et al.* 2008), and with mixed success.

Caveats /Notes

New data suggests that this measure is only effective with squid bait (Cocking *et al.* 2008). It has not been tested in demersal fisheries, possibly due to larger number of hooks deployed and thus the need for considerably more bait (Bull 2007). There is no commercially available dye. Onboard dyeing is practically onerous, especially in inclement weather. In the long-term birds may become habituated to blue-dyed bait.

Research needs

Need for tests of efficacy and practical feasibility in demersal longline fisheries, especially in the Southern Ocean to determine its effectiveness as a long-term mitigation measure. Research would also need to determine the effect of dyed bait on catches of target species.

Minimum standards

Mix to standardized colour placard or specify (e.g. use 'Brilliant Blue' food dye (Colour Index 42090, also known as food additive number E133) mixed at 0.5% for a minimum of 20 minutes).

Implementation monitoring

The current practice of dyeing bait on board vessels at sea requires observer presence or video surveillance to assess monitor implementation. Assessment of implementation in the absence of on-board observers or video surveillance requires baits to be dyed on land and monitored through port inspection of all bait on vessels prior to departure on fishing trips.

17. Hook size and shape

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AS A PRIMARY MITIGATION MEASURE. Must be used in combination with other mitigation measures – bird scaring lines. line weighting, night setting and judicious offal management Hook size was found to be an important determinant in seabird bycatch rates of Argentinean and Chilean longline vessels fishing in Subarea 48.3 in the 1995 season, with smaller hooks killing significantly more seabirds than larger hooks (Moreno *et al.* 1996).

Caveats /Notes

Other than the finding in Moreno *et al.* (1996), little or no work has been conducted to investigate the impact of hood design and shape on seabird bycatch levels.

Research needs

Determine impact on seabird bycatch and on catch of target species.

Minimum standards

No global standard

Implementation monitoring

Port inspection of all hooks on board considered adequate for monitoring implementation.

MITIGATION MEASURES UNDER DEVELOPMENT

18. Kellian Line Setter

Scientific evidence for effectiveness in demersal fisheries

NOT RECOMMENDED AT THIS TIME. The Kellian Line Setter was identified as a potential mitigation device in New Zealand inshore bottom longline fisheries, (Goad 2011). The Kellian Line Setter is an underwater setting device and involves running the mainline through a set of rollers towed behind the vessel at depth.

Caveats /Notes

An initial prototype had been developed through a series of at-sea trials which were conducted during 2011. While these trials were encouraging, the issue of weights and floats fouling on the rollers required resolution (Goad 2011). A new prototype has been developed and refined in a flume tank (Baker and Frost 2013) for application in a range of demersal longline operations.

Research needs

Resolution of mainline loss issues under flume tank conditions prior to further evaluation in at-sea trials.

Minimum standards

Not considered a mitigation measure at this time.

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ANNEX 5. ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF DEMERSAL LONGLINES ON SEABIRDS

ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF DEMERSAL LONGLINES ON SEABIRDS

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

SUMMARY

The most effective measures to reduce incidental take of seabirds in demersal longline fisheries are:

- use of an appropriate line weighting regime to maximise hook sink rates close to vessel sterns to reduce the availability of baits to seabirds.
- actively deterring birds from baited hooks by means of bird scaring lines, and
- setting by night.

Further measures include bird deterrent curtains at the hauling bay, responsible offal management and avoiding peak areas and periods of seabird foraging activity. Current knowledge indicates the Chilean, or trotline, system with appropriate line weighting and branch line length will prevent albatross and petrel mortality and is is considered best practice mitigation for demersal longline fishing..

With other demersal longline fishing methods, it is important to note that there is no single solution to reduce or avoid incidental mortality of seabirds, and that the most effective approach is to use the measures listed above in combination.

INTRODUCTION

The incidental mortality of seabirds, mostly albatrosses and petrels, in longline fisheries has been of growing global concern. This was a major reason for the establishment of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). A large number of mitigation methods to reduce and eliminate seabird bycatch has been developed and tested

over the last 10 to 15 years, especially for demersal longline fisheries. Within demersal longlining, there are different systems – the autoline system, the Spanish double line system, and more recently the Chilean (trotline) system. Although most mitigation measures will be broadly applicable, the feasibility, design and effectiveness of some measures will be influenced by the type of longlining method and gear configuration used. In particular it should be noted that most scientific literature relates to fleets of larger vessels, with longline usage from artisanal fleets receiving less attention. Some of this advice may need to be modified for smaller vessels. ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in demersal fisheries and this document is a distillation of the review (AC6 Final Report ANNEX17).

Best practice mitigation measures for demersal longline fisheries are listed below; the first recommendation is a general measure followed by those for line setting and line hauling.

1. BEST PRACTICE MEASURES - GENERAL

1.1 Area and seasonal closures

The temporary closure of important foraging areas (e.g. areas adjacent to important seabird colonies during the breeding season when large numbers of aggressively feeding seabirds are present) has been a very effective way to reduce incidental mortality of seabirds in fisheries in those areas.

2. BEST PRACTICE MEASURES - LINE SETTING

2.1. Line weighting

Lines should be weighted to get the baited hooks rapidly out of the range of feeding seabirds. Weights should be deployed before line tension occurs to ensure that the line sinks rapidly out of reach of seabirds.

2.2. Weighted lines for Spanish gear

Steel weights are considered best practice. The mass should be a minimum of 5kg at 40m intervals.

Where steel weights are not used, longlines should be set with a minimum of 8.5kg at 40m intervals when using rocks, and a minimum of 6kg at 20m intervals when using concrete weights.

2.3. Weighted lines for Chilean (trotline with nets) system gear

Line weights should conform to those for the Spanish system (see above).

2.4. Weighted lines for autoline gear

Integrated weight longlines (IWL) are designed with lead core of 50g/m. Their key characteristic is that they sink with a near-linear profile from the surface (minimal lofting in propeller turbulence) and are effective at sinking quickly out of reach of foraging seabirds. IWL should average ≥ 0.24 to 10 m depth.

Where it is practical to use IWL gear in a fishery, IWL is preferred over externally weighted

alternatives because of its linear sink profile from the surface and consistent ability to achieve the minimum sink rate.

When using external weights on non-IWL autoline gear, the minimum average sink rate should be 0.3 m/s to 10 m depth. A faster sink rate is necessary with this configuration to minimise the lofting of sections of line between line weights in propeller turbulence. The sink rate can be achieved with a minimum of 5kg at no more than 40m intervals.

2.5. Night setting

Setting longlines at night (between the times of the end of nautical twilight and before nautical dawn) is effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are diurnal foragers.

2.6. Bird scaring lines

Bird scaring lines are designed to provide a physical deterrent over the area where baited hooks are sinking.

Two bird scaring lines should be used.

The design of the bird scaring lines should include the following specifications:

The attachment height should be at least 7m above sea level.

The lines should be at least 150m long to ensure the maximum possible aerial extent.

Streamers should be brightly coloured and reach the sea-surface in calm conditions, and placed at intervals of no more than 5m.

A suitable towed device should be used to provide drag, maximise aerial extent and maintain the line directly behind the vessel during crosswinds.

2.7. Offal and discard discharge management

Seabirds are attracted to offal that is discharged from vessels. Ideally offal should be retained onboard but if that is not possible, offal and discards should not be discharged while setting lines.

3. BEST PRACTICE MEASURES - LINE HAULING

3.1. Bird exclusion device (BED)/Brickle curtain

During hauling operations birds can accidentally become hooked as gear is retrieved. A BED consists of a horizontal support several metres above the water that encircles the entire line hauling bay. Vertical streamers are positioned between the support and water surface. The seabird deterrent effectiveness of this streamer line configuration can be increased by deploying a line of floats on the water surface and connecting this line of floats to the support with downlines. This configuration is the most effective method to prevent birds entering the area around the hauling bay, either by swimming or by flying.

3.2. Offal and discard discharge management

Ideally offal should be retained onboard, but if that is not possible offal and discards should be either, preferably, retained on board during hauling or released on the opposite side of

the vessel to the hauling bay.

All hooks should be removed and retained on board before discards are discharged from the vessel.

4. OTHER CONSIDERATIONS

4.1. Chilean method

The Chilean method of longline fishing was designed to prevent toothed whale depredations of fish. Because weights are deployed directly below the hooks, and because hook-bearing lines sink with a vertical profile in the seabird foraging depths (not horizontally, as in the traditional Spanish method), lines sink rapidly, making it an effective method for avoiding bycatch of foraging seabirds.

To eliminate the ingestion of hooks by seabirds during line hauling operations, care must be taken to retain all hooks onboard and not discard them overboard, either as unwanted hooks or as hooks embedded in discarded fish.

5. NOT RECOMMENDED

The following mitigation options are **NOT** recommended best practice:

Hook design – insufficiently researched

Olfactory deterrents – insufficiently researched

Underwater setting chutes - insufficiently researched.

Side setting - insufficiently researched and operational difficulties.

Blue-dyed bait, thawed bait - not relevant in demersal longline gear

Use of a line setter - not relevant in demersal longline gear.

ANNEX 6. ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR TRAWL FISHERIES

Agreement on the Conservation of Albatrosses and Petrels

ACAP REVIEW OF SEABIRD BYCATCH MITIGATION MEASURES FOR TRAWL FISHERIES

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

To monitor implementation of all trawl mitigation measures the presence of fisheries observers and/or electronic monitoring is recommended.

1. Nets

1.1. Net binding

Scientific evidence for effectiveness in trawl fisheries

Shown to be a highly effective mitigation measure in CCAMLR icefish trawl fishery, reducing seabird bycatch to minimal levels (Sullivan 2010 submitted).

Caveats /Notes

Sisal string has been used to bind the sections of the net which pose the greatest threat seabirds prior to shooting (Sullivan et al. 2004). Bindings are simply tied onto the net to prevent the net from lofting and the mesh opening as the tension created by the vessel speed of between 1-3 knots is lost due to waves and swell action. Once shot-away the net remains bound on the surface until it sinks. Once the trawl doors are paid away and the net has sunk beyond the diving depth of seabirds the force of the water moving the doors apart is sufficient to break the bindings and the net spreads into its standard operational position.

Need for combination

Recommend combination with net cleaning and net weights to minimise the time the net is on the surface (Sullivan *et al*. 2010 submitted)

Research needs

Not needed.

Minimum standards / Recommendation

Recommended for reducing bycatch when shooting gear in pelagic gear.

3–ply sisal string (typical breaking strength of c.110 kg), or a similar inorganic material should be applied to the net on the deck, at intervals of approximately 5 m to prevent net from spreading and lofting at the surface. Net binding should be applied to mesh ranging from 120–800 mm as these are known to cause the majority of seabird entanglements (Sullivan et al 2010). When applying string, tie an end to the net to prevent string from slipping down the net and ensure it can be removed when net is hauled.

1.2. Net weights

Scientific evidence for effectiveness in trawl fisheries

Evidence suggests net weighting on or near the cod end increases the angle of ascent of the net during hauling operations, thus reducing the time the net is on the water's surface. All attempts should be made to retrieve the net as quickly as possible. Good deck practices to minimise the time that the net is on the water's surface have been the key factors in reducing seabird entanglements during hauling in South Atlantic trawl fisheries (Hooper *et al.* 2003; Sullivan 2010 submitted).

Caveats /Notes

None identified.

Need for combination

Recommend combination with net binding and net cleaning to minimise the time the net is on the water's surface during both setting and hauling (Sullivan 2010 submitted).

Research needs

Development of minimum standards for amount and placement of weight (cod end, wings, footrope, mouth, belly), to build on work to date in CCAMLR trawl fisheries (Sullivan *et al*. 2010 submitted).

Minimum standards / Recommendation

None established.

Recommended for reducing bycatch during both shooting and hauling of gear (Sullivan *et al*. 2010).

Suitable for both pelagic and demersal gear.

1.3. Net cleaning

Scientific evidence for effectiveness in trawl fisheries

Removal from nets of all fish 'stickers' and other material is a critical step to reducing net entanglement during shooting (Hooper *et al*. 2003; Sullivan *et al.* 2010 submitted).

Caveats /Notes

None identified.

Need for combination

Recommend combination with net binding and net weights to minimise the time net is on water's surface during both setting and hauling (Sullivan 2010 submitted).

Research needs

None identified.

Minimum standards / Recommendation

Remove all stickers from net prior to shooting gear.

Recommended for reducing bycatch during both shooting and hauling of gear.

Suitable for both pelagic and demersal gear.

1.4. Reduced mesh size

Scientific evidence for effectiveness in trawl fisheries

Roe (2005) reported on the use of reduced mesh size from 200 to 140 mm in the pelagic icefish fishery in CCAMLR waters, but did not quantify effectiveness of the measure.

Caveats /Notes

Measure may be impractical. Reduced mesh size was believed to have caused severe damage to the net because of increased water pressure during trawling (Roe 2005), although the use of chain weights in the net may also have been influential.

Need for combination

None identified.

Research needs

Thorough testing in a range of fisheries required if measure is practical.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure, although theoretically should be effective in reducing seabird entanglement in nets.

1.5. Net jackets

Scientific evidence for effectiveness in trawl fisheries

Free-floating panels of net attached to the most dangerous mesh sizes have been trialled in CCAMLR's icefish trawl fishery, with efficacy uncertain (Sullivan *et al*. 2010 submitted).

Caveats /Notes

Found to cause serious drag and subsequent damage to the net. Drag also slows vessel speed and increases fuel consumption (Sullivan *et al*. 2010 submitted).

Need for combination

None identified.

Research needs

Efficacy of measure not quantified.

Minimum standards / Recommendation

Not recommended.

Currently detrimental to fishing efficiency and mitigation efficacy uncertain.

1.6. Acoustics

Scientific evidence for effectiveness in trawl fisheries

The use of acoustic 'scaring' devices on nine vessels in CCAMLR trawl fisheries indicated that loud noises (bells and flares/fireworks) had limited effect and birds quickly became habituated to the sound, no longer causing an aversion response (Sullivan *et al*. 2010).

Caveats /Notes

May be a useful back-up measure for circumstances when another measure is needed immediately (Sullivan *et al*. 2010 submitted).

Need for combination

None identified.

Research needs

None identified.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure.

1.7. Net restrictor

Scientific evidence for effectiveness in trawl fisheries

The net restrictor was identified as a potential mitigation device in response to observed net captures in the New Zealand scampi trawl fishery, where multiple nets are deployed adjacently (Pierre et al 2013). The net restrictor acts to restrict the opening of the net on haul when captures were observed.

Caveats /Notes

May be a useful in demersal trawl fisheries where multiple nets are deployed adjacently, and nets (particularly the middle net) are liable to billow open at or near the surface on haul.

Need for combination

None identified.

Research needs

At-sea testing required to determine effectiveness.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure at present.

2. Cables

2.1. Offal discharge[1] and fish discard management

The most important factor influencing contacts between seabirds and warp cables is the presence of discharge (Wienecke & Robertson 2002; Sullivan *et al.* 2006a). Methods used to reduce the attractiveness of vessels to seabirds through management of offal discharge and fish discards include mealing (the conversion of waste into fish meal waste reducing discharge to sump water), mincing waste to a nominal maximum particle size of 25 mm diameter prior to discharge, batching (storage or controlling release of discards / discharge during fishing operations). Where practicable the full retention of all waste material is recommended.

2.1.1. Mealing

Scientific evidence for effectiveness in trawl fisheries

Mealing resulted in significant reduction in the number of seabirds species feeding behind vessels, relevant to the discharge of unprocessed fish waste (Abraham *et al.* 2009; Wienecke & Robertson 2002; Favero *et al*. 2010) or minced waste (Melvin *et al.* 2010).

[1] Offal discharge refers to the disposal at sea of any fish waste resulting from processing, including heads, guts and frames. Fish discards refers to any unwanted whole fish (and or benthic material)

Caveats /Notes

Good evidence in global fisheries that fish meal processing and reducing discharge to stick / sump water is highly effective in reducing seabird bycatch.

Need for combination

None identified.

Research needs

None.

Minimum standards / Recommendation

Suitable for both pelagic and demersal trawl gear.

2.1.2. Mincing

Scientific evidence for effectiveness in trawl fisheries

Mincing reduced the number of large albatrosses (*Diomedea* spp) attending vessels but had no effect on other groups of seabirds (Abraham *et al*. 2009; Abraham 2010).

Caveats /Notes

Bottom trawled material, such as rocks, may impact the feasibility of mincing.

Need for combination

Should be used in combination with other mitigation methods.

Research needs

At present only demonstrated to be effective against large *Diomedea* spp albatrosses. Efficacy with *Thalassarche* spp albatrosses needs to be proven before measure can be recommended (Abraham *et al*. 2009).

Minimum standards / Recommendation

Insufficient evidence to recommend this as a primary measure at present, although reduced bird abundance should reduce cable impacts and mortality for larger albatross species.

2.1.3. Batching

Scientific evidence for effectiveness in trawl fisheries

Batching (storage or controlling release of discards / discharge during) has been trialed in New Zealand and was shown to significantly reduce the number of seabirds associated with vessels (Pierre *et al*. 2010; SBWG-4 Doc 14 Rev1).

Caveats /Notes

Effectiveness of batching relies on efficient (fast) dumping of batched material.

Need for combination

Should be used in combination with other mitigation methods.

Research needs

Robust trialling to investigate the extent to which reduced seabird abundance affects seabird interaction rates.

Minimum standards / Recommendation

Recommended when full retention or mealing not possible. Batch waste for at least 2 hours, preferably 4 hours or longer.

2.1.4. Full retention

Scientific evidence for effectiveness in trawl fisheries

Repeated studies have shown in the absence of offal discharge / fish discards seabird interactions and mortality levels are negligible (Sullivan *et al*. 2006; Watkins *et al*. 2008; Melvin *et al*. 2010; SBWG-3 Doc 14 Rev 1; Abraham & Thompson 2009)**.** Storage of all fish discard and offal, either for processing or for controlled release when cables are not in the water, resulted in a significant reduction in the attendance of all groups of seabirds (Abraham et al 2009).

Caveats /Notes

None.

Need for combination

None identified.

Research needs

None identified.

Minimum standards / Recommendation

Suitable for both Pelagic and Demersal trawl gear.

2.2. Bird Scaring Lines (BSL) for warp cables

Scientific evidence for effectiveness in trawl fisheries

Attachment of a Bird Scaring Line to both the port and starboard sides of a vessel, above and outside of the warp blocks, greatly reduces the access of birds to the danger zone where warps enter the water (Watkins *et al.* 2006; Reid & Edwards 2005; Melvin *et al*. 2010). An off-setting towed device has been demonstrated to improve BSL performance (BirdLife 2010).

Caveats /Notes

Effectiveness reduced in strong cross winds and rough seas, when BSLs are deflected away from warps (Sullivan & Reid 2003; Crofts 2006a, 2006b). This can be alleviated in part by towing a buoy or cone attached to the end of lines to create tension and keep lines straight (Sullivan *et al*. 2006a; Cleal et al 2013). Hard wearing and non-tangling materials and design can improve performance (Cleal et al 2013), including the use of semi rigid streamers, particularly those constructed from Kraton,

Need for combination

None identified.

Research needs

Further research is required on the effectiveness on the design and performance of an off-setting towed device under operational conditions.

Minimum standards / Recommendation

BSL are recommended even when appropriate offal discharge and fish discard management practices in place (Melvin *et al*. 2010).

Suitable for both pelagic and demersal trawl gear.

It is recommended that for every metre of block height 5 m of backbone be deployed and 1.2 kg of terminal object drag weight be used.

2.3. Warp scarers

Scientific evidence for effectiveness in trawl fisheries

Warp scarers (weighted devices attached to each warp with clips or hooks, allowing the device to slide up and down the warp freely and stay aligned with each warp) create a protective area around the warp (see Bull 2009, Fig.2; Sullivan *et al*. 2006a).

Warp scarers have been shown to reduce contact rates but not to significant levels, and were not as effective as BSLs (Sullivan *et al*. 2006b, Abraham *et al*., cited in Bull 2009).

Caveats /Notes

Attachment to the warp eliminates problems associated with crosswinds as the mitigation devices do not behave independently of warps. Warp scarers cannot be deployed while the warp cable is being set, or remain in place during hauling, leaving periods when warps are not protected.

Concerns have been raised regarding associated practicality and safety issues (Sullivan *et al.* 2006a; Abraham *et al.*, cited in Bull 2009).

Need for combination

None identified.

Research needs

None identified.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure.

2.4. Bird bafflers

Scientific evidence for effectiveness in trawl fisheries

Bird bafflers comprise two booms attached to both stern quarters of a vessel. Two of these booms extend out from the sides of the vessel and the other two extend backwards from the stern. Dropper lines are attached to the booms, to create a curtain to deter seabirds from the warp–sea interface zone (see Bull 2009, Fig.3; Sullivan *et al.* 2006a).

Generally bird bafflers are not regarded as providing as much protection to the warp cables as BSLs or warp scarers (Sullivan *et al.* 2006a).

Caveats /Notes

Various designs exist including the Brady Baffler, the Burka and a modified Burka design or "curtain baffler" (Cleal et al 2013).

While bafflers where designed to minimise warp interactions, the Brady Baffler has been used (inappropriately) within CCAMLR Icefish fisheries to mitigate net entanglements where they have been found to be consistently ineffective (Sullivan *et al*. 2010).

The great variability in the design and deployment of bird bafflers may influence their overall effectiveness.

Need for combination

None identified.

Research needs

The full range of baffler designs have not been experimentally tested. Trials should be conducted in a range of fisheries and areas to demonstrate efficacy.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure.

2.5. Cones on warp cables

Scientific evidence for effectiveness in trawl fisheries

A plastic cone attached to each warp cable reduced the number of birds entering the warp/water interface in Argentine Hake Trawl Fishery by 89% and no seabirds were killed while cones were attached to the warp (Gonzalez-Zevallos *et al.* 2007).

Caveats /Notes

Applicable for small vessels.

Need for combination

None identified.

Research needs

Needs to be trialled in a range of fisheries and areas to demonstrate efficacy.

Minimum standards / Recommendation

None. Insufficient evidence to recommend this measure.

2.6. Warp boom

Scientific evidence for effectiveness in trawl fisheries

A boom with streamers extending to the water forward of the stern can divert birds feeding on offal away from the warps (Melvin *et al.* 2010).

Caveats /Notes

Results did not identify a statistically significant reduction is seabird interactions with the warp.

Need for combination

None identified.

Research needs

Longer-term studies required to identify effectiveness including work to identify suitable configuration and materials.

Minimum standards / Recommendation

None.

2.7. Snatch block

Scientific evidence for effectiveness in trawl fisheries

A snatch block, placed on stern of a vessel to draw the third-wire close to the water to reduce its aerial extent, reduced seabird strikes, although performance varied by vessel (Melvin *et al*. 2010).

Caveats /Notes

Melvin *et al.* (2010) were confident that third-wires can be pulled closer to the water or submerged at the stern to make this measure highly effective, but noted that, as third-wires are fragile and expensive, any snatch block-like system should aim to minimise cable wear.

Need for combination

Should be used in combination with other mitigation methods.

Research needs

Needs to be trialled in a range of fisheries and areas to further demonstrate efficacy.

Development of technical specification required.

Minimum standards / Recommendation

None.

Recommended on the basis that shortening aerial extent of monitoring cables will, intuitively, reduce seabird strikes.

3. General measures

3.1. Area closures

Scientific evidence for effectiveness in trawl fisheries

Avoiding fishing at peak areas and during periods of intense foraging activity has been used effectively to reduce bycatch in longline fisheries. The principles are directly transferrable to trawl and other net fisheries.

In some studies, longline-associated mortality has been almost exclusively within the breeding season of seabirds. Several studies have also shown that proximity to breeding colonies is an important determinant of seabird bycatch rates (Moreno *et al.* 1996; Nel *et al*. 2002) and temporal closures around breeding areas contributed to a substantial reduction in seabird bycatch (Croxall & Nicol 2004).

Caveats /Notes

An important and effective management response, especially for high risk areas, and when other measures prove ineffective. There is a risk that temporal/spatial closures could displace fishing effort into neighbouring or other areas which may not be as well regulated, thus leading to increased incidental mortality elsewhere.

Need for combination

Must be combined with other measures, both in the specific areas when the fishing season is opened, and also in adjacent areas to ensure displacement of fishing effort does not merely lead to a spatial shift in the incidental mortality.

Research needs

Further information about the seasonal variability in patterns of species abundance around trawl fisheries.

Minimum standards / Recommendation

No work done but highly recommended.

4. Measures under development

4.1. Tamini Tabla off-setting towed device

In order to improve the performance of Bird Scaring Lines, an off-setting towed device (Tamini Table) is under development in Argentina. This device is attached to the terminal end of the BSL and has a buoyant upper board with three 45° vertical keels, which are weighted for stability. Under forward motion of the vessel, the keels cause the device to move outward of the trawl cables and therefore maintain the BSL from entangling with trawl cables.

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ANNEX 7. ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF PELAGIC AND DEMERSAL TRAWL GEAR ON SEABIRDS

Agreement on the Conservation of Albatrosses and Petrels

ACAP SUMMARY ADVICE FOR REDUCING IMPACT OF PELAGIC AND DEMERSAL TRAWL GEAR ON SEABIRDS

Reviewed at the Seventh Meeting of the Advisory Committee

La Rochelle, France, 6 – 10 May 2013

The causes of mortality in trawl fisheries are varied and dependent on the nature of the fishery (pelagic or demersal), the species targeted and fishing area. Mortalities may be categorised into two broad types: (1) cable-related mortality, including collisions with net-monitoring cables, warp cables and paravanes; and (2) net-related mortality, which includes deaths caused by net entanglements. Seabird interactions have been demonstrated to be significantly reduced by the use of mitigation measures that include protecting the warp cable, managing offal discharge and discards, and reducing the time the net is exposed on the surface of the water. The following measures have been demonstrated to be effective at reducing seabird bycatch in trawl fisheries and are recommended:

Cable strike

1. Deploy bird scaring lines while fishing to deter birds away from warp cables and net monitoring cable.

2. Install a snatch block at the stern of a vessel to draw the net monitoring cable close to the water to reduce its aerial extent.

Net entanglement

1. Clean nets after every shot to remove entangled fish (“stickers”) and benthic material to discourage bird attendance during gear shooting;

2. Minimise the time the net is on the water surface during hauling through proper maintenance of winches and good deck practices; and

3. For pelagic trawl gear, apply net binding to large meshes in the wings (120–800 mm), together with a minimum of 400-kg weight incorporated into the net belly prior to setting.

In all cases the presence of offal and discards is the most important factor attracting seabirds to the stern of trawl vessels, where they are at risk of cable and net interactions. Managing offal discharge and discards while fishing gear is deployed has been shown to reduce seabird attendance. The following management measures are recommended:

1. Avoid any discharge during shooting and hauling;

2. Where possible and appropriate, convert offal into fish meal and retain all waste material with any discharge restricted to liquid discharge / sump water to reduce the number of birds attracted to a minimum; and

3. Where meal production from offal and full retention are not feasible, batching waste (preferably for two hours or longer) has been shown to reduce seabird attendance at the stern of the vessel. Mincing of waste has also been shown to reduce the attendance of large albatross species.

Further measures include avoiding peak areas and periods of seabird foraging activity. It is important to note that there is no single solution to reduce or avoid incidental mortality of seabirds in trawl fisheries, and that the most effective approach is to use the measures listed above in combination. Net entanglements during the haul remain the most difficult interactions to mitigate.

Context

The FAO Best Practice Guidelines for IPOA/NPOA-Seabirds were recently amended to include trawl fisheries in addition to longline fisheries (FAO 2009), demonstrating increased serious concern and awareness of seabird mortality on global trawl fisheries.

ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in trawl fisheries and this document is a distillation of the review (AC6 Final Report ANNEX 15).

ANNEX 8. BYCATCH DATA ASSESSMENT TYPES

Types of approaches possible in assessing the impact of fisheries on seabird bycatch depending on the spatial/temporal resolution of the data available. The purpose of this information is to provide an indication of how the available data influence the type of assessments that can be carried out.

Assessment Type 1: Fleet footprint data only

- Summaries of change in the fishing footprint over time.
- Low quality risk assessment (possible only if seabird distribution information is available).
- Possible with currently provided data.

Assessment Type 2: Fleet wide effort data only

- Annual summaries of fishery effort.
- Provides a good indicator of trends in fishing effort only if the fishery is stable by season and area through time (which is normally not the case). Determining the impact on seabirds requires data on seabird bycatch (and distribution of that bycatch).
- Possible with current provided data.

Assessment Type 3: Spatial and temporal effort data (e.g. 5x5 degrees, quarterly)

- Annual spatial and temporal summaries of fishery effort data.
- Improved description of fishery effort that accounts for major spatial and/or temporal shifts common in fisheries.
- Impact on seabirds requires data on seabird bycatch (and distribution of that bycatch).
- Not possible with currently provided data.

Assessment Type 4: Spatial and temporal effort data + spatial foraging distributions of interacting birds by species

- An overlap index could be calculated and tracked over time.
- While not providing a direct measure of bycatch, an overlap index could give a relative indication of potential interaction. For example, if a fishery relocated to another area beyond the normal range of previously impacted seabirds, the level of bycatch as well as the overlap index would be expected to decline.
- Not possible with currently provided data

Assessment Type 5: Bycatch rate data for fleet only

- Annual trends in bycatch rate for fleets could be tracked.
- Integration of fleets not examined.
- Possible with currently provided data.

Assessment Type 6: Bycatch rate analysis + spatial and temporal effort data available

- Matching corresponding (in space and time) bycatch rates with effort, allowing an estimate of total bycatch (total and by area, time and fleet).
- Not possible with currently provided data
- This is what is recommended for ACAP

Assessment Type 7: Bycatch rate analysis with seabird species composition + spatial and temporal effort data available

- As above but by species/population.
- Not possible with currently provided data.

Assessment Type 8: Bycatch rate analysis by seabird species + spatial and temporal effort data available + demography parameters

- A population level impact assessment could be conducted; this would enable the estimated bycatch totals (e.g. from 7 above) to be related to the consequent population impact. This can be important as tracking bycatch totals alone may not be giving an indication of population impact.
- Not possible with currently provided data.

In order to understand where these eight types of assessment fit in to the Tiers identified in Table 1 of SBWG5 Doc 16, a revised version of this table is provided below.

The data available and potential methods (with examples in the literature) for assessing fisheries impacts on seabirds. The quality and quantity of data, and certainty, increases progressively from Tier 1 to Tier 4.

	INFORMATION			
TIER LEVEL	BIRD	FISHERY	ASSESSMENT	REFERENCES
1	Regular census and monitoring. Biological and distribution studies exist. Observer data (Shot by shot).	Shot by shot, fine-scale data	a) Bird population impact studies. b) Mitigation effectiveness studies	Assessment type 8
2	Snapshot census and monitoring. Coarse-scale distribution data (5x5 degrees, monthly or quarterly). Observer data (5x5 degrees, Monthly or quarterly)	Coarse scale effort data (5x5 degrees, monthly)	a) Some population modeling. Population trend analyses. b) Bycatch trend analyses	Assessment type 6 & 7
3	Basic biology. Broad bird distribution (limited spatial and temporal resolution) Totals of observer data (annual bycatch and observer effort)	Fishery-wide totals of effort (annual totals, broad spatial footprint)	a) Risk assessment approaches (e.g. PSA[1]). b) PBR[2]	Assessment types 2-5
4	No abundance data. Broad bird distribution. No observer data	Fishery-wide effort footprint. No knowledge of magnitude of effort.	Very basic risk assessment (e.g. PSA[1]) ERA SAFE Methods[3].	Assessment type 1

1. PSA – Productivity and Susceptibility Analysis, 2. PBR – Potential Biological Removal, 3. ERA SAFE – Sustainability Assessment for Fishing Effects

ANNEX 9. SBWG WORK PROGRAMME 2013 – 2015
(from AC7 Doc 15)

Seabird Bycatch							
	Topic/Task	**Responsible group**	**Timeframe**	**Resources**			**Action detail**
				Time	**Funds for AC**	**Grant/ core**	
3.1	Continue to implement the RFMO interaction plan for ACAP (AC5 Doc 29) and relevant Parties to engage and assist RFMOs and other relevant international bodies in assessing and minimising bycatch of albatrosses and petrels	Individual RFMO co-ordinators, Secretariat, SBWG and AC	2013-2015	a) 18 weeks p.a. b) 18 week p.a. c) 2 week p.a.	a+b) AUD 30,000 each pa AUD 0	Core	a) Travel etc costs for attendance at selected RFMO meetings (less if Party can contribute directly) b) RFMO co-ordinator activities c) Review of process and recommend changes (SBWG)
3.2	Update analysis of overlaps of distributions and albatrosses and petrels with fisheries managed by RFMOs	BirdLife / ACAP	2013	4 weeks	AUD 20,000	Grant	
3.3	Continue to develop materials (both generic and specific) to assist RFMOs and other relevant international and national bodies in reducing seabird bycatch and to maximise effective participation and consideration of issues relevant to ACAP	SBWG Convenor with other SBWG consultation to review needs (Secretariat)	2013-2015	1) *1 week* p.a. 2) 8 weeks	<more detail needed>	Grant/ Core	*1) Observer programme designs including protocols for the collection of seabird bycatch data, with consideration of analytical methods for assessing seabird bycatch to be examined first.* ID guide for drowned birds, including protocol for photographing dead birds Guidance on handling of hooked live birds – may be available from non-ACAP sources

3.4	Continue to review and utilise available information on foraging distribution, fisheries and seabird bycatch to aid prioritisation of actions to reduce the risk of fishing operations to ACAP species in waters subject to national jurisdiction.	SBWG and Parties	2013-2015	1) 8 weeks 2) 2 weeks	AUD 0	-	1) Commission initial report on knowledge of fisheries, status of any bycatch mitigation, knowledge of relevant seabird distribution for AC5. Note overlap with 4.4. NPOA seabirds also can be used. (AUD $0) 2) Assess needs for waters subject to national jurisdiction and any capacity building requirements
3.5	Maintain bibliography of relevant bycatch information	BirdLife/SBWG Science Officer	2013-2015	1 week pa	AUD 0	-	Includes both published and unpublished literature
3.6	Based on new information, update ACAP/BirdLife fact sheets on mitigation measures for fishing methods known to impact albatrosses and petrels (trawl, pelagic longline, demersal longline)	SBWG/BirdLife	2013-2015	1 week per fact sheet	AUD 5,000	(Grant)	Costs are for translation. Leads - Trawl: New Zealand Pelagic longline: Australia Demersal longline: UK General: BirdLife
3.7	*Produce report on lessons from mitigation success stories in commercial fisheries*	*BirdLife/ Australia/ Convenor SBWG/WWF*	*2010-2012*	*3 weeks*	*AUD 0*	-	*Should be completed within current triennium – target audience is fisheries managers*

3.8	*Prepare review of knowledge on deliberate take/killing of ACAP species at sea*	*Australia/ ~~Brazil~~/ New Zealand/ Peru/ UK/ WWF/ SBWG*	*2010*	*4 weeks*	*AUD 0*	-	*Review to describe current knowledge (much from unpublished literature) and causes of any deliberate take and to consider possible take reduction strategies. Should be completed within current triennium using secondee [to Secretariat]*
3.9	Review results of any research on seabird bycatch issues, particularly that funded by ACAP	SBWG	2013-2015	2 weeks pa	AUD 0	-	Draw conclusions and make recommendations to AC as appropriate
3.10	Maintain review of research needs and priorities for bycatch research and mitigation development	SBWG	2013-2015	2 weeks	AUD 0	-	
3.11	Provide recommendations to the AC on measures to address at-sea threats identified as conservation priorities	SBWG	2013-2015	1 week	AUD 0	-	
3.12	Review and update the prioritisation framework for at-sea threats	SBWG	2014 Ideally immediately prior to AC8	1 week	AUD 10,000	Core	One workshop and some analysis and update of data relating to threats and mitigation
3.13	Review and consider seabird bycatch issues as they relate to smaller vessels (including issues of defining “smaller vessels”)	SBWG	at SBWG-5(6)	1 week	AUD 0	-	

3.14	Consider which data would be appropriate as baselines for assessing trends in bycatch levels and rates and formulate suitable indicators	SBWG, BirdLife	2012-2013	1 week	AUD 0	-	Data is described in the global review of seabird bycatch in longline fisheries (AC6 Doc 30)
3.15	Estimate mortality in previously unobserved fisheries in range of Waved albatross	Ecuador and Peru, BirdLife, AC, American Bird Conservancy	2013-2015	4 weeks	AUD 30,000 over triennium	Grant	Part of implementation from Waved Albatross Action Plan. (Page: 108 Longline has been well investigated but data for other gear types such as gillnets, purse seine etc. have not been addressed and funds are required. The exact amount can be reduced but the item should remain).
3.16	Improve access to relevant data (e.g. from observers) held by others	SBWG	2013-2015			Grant	Need compilation of meta-data e.g. observer data Will be included in the bycatch data reporting process
3.17	Analyse bycatch data in collaboration with Japanese researchers	SBWG	2013-2015	6 months	AUD 50,000	Grant	Might be best done by an appropriate experienced secondee. Costings difficult to estimate accurately
3.18	Analyse bycatch data from other fishing nations as information becomes available	SBWG	2013-2015	6 months	AUD 50,000	Grant	This is a contingency cost; we are not yet sure how much and when data might become available

~~3.19~~	~~Identify hot spots for temporal/spatial management~~	~~RFMO coordinators/ Canada/ BirdLife/ SBWG~~	~~2013-2014~~	~~Post-doctorate for 2 years~~	~~AUD 10,000 + AUD 50,000~~	~~Grant~~	~~AUD $10,000 is a contribution to a potential Canadian/BirdLife/ACAP project in the North Pacific that could be done in the 2010-12 triennium. A total global cost might be in the order of AUD $50,000~~
3.20	Provide draft advice on suitable analyses of bycatch data	SBWG	2013-2015	3 months	AUD 20,000	Grant?	Statistical advice may be required Have provided advice at SBWG5
3.21	Provide reports on activities to AC meetings	SBWG and AC	2013-2015	1 week	AUD 0		
3.xx	Review the definition of, and legislation pertinent to, artisanal and small-scale fisheries	SBWG	2014-15	3 months	?	Grant	Might be suitable for a secondee
3.xx	Further develop de-hooking and seabird id guides	SBWG	2014		AUD 0	Grant	Discuss where this belongs with PCSWG; Propose inter-sessional group from SBWG (task sits near 3.6)
3.xx	Assemble and review all evidence on line-weighting in pelagic long-line fisheries,	SBWG	2014-15	3 months		Grant	Would be suitable for a secondee
3.xx	Improve estimates of bycatch of ACAP species in trawl fisheries through research	SBWG	2014-15			Grant	One study has indicated higher rates of trawl warp collision than previously thought; further studies would help understanding of the scale of trawl bycatch

3.xx	Work with Marine Stewardship Council processes to ensure that ACAP best practice standards are adopted into MSC assessments	SBWG (and Secretariat?)	2013-15	3 weeks	AUD	Core	This provides another route to gain recognition and uptake of ACAP's work
3.xx	Engage in processes that are developing electronic monitoring of catch/bycatch to ensure that the needs to monitor seabird bycatch are taken into account	SBWG	2013-15		AUD 10,000 [further funding after AC8]	Core	Contribution to ISSF research proposal for testing of e-monitoring in tuna pelagic longline fisheries
	Assemble and review evidence of injuries sustained by fishers in the course of using weighted lines in pelagic longline fisheries	SBWG	2014/2015			Grant	Possible secondee
	Provide guidance to RFMOs for the identification of minimum elements and appropriate methods and indicators to review the effectiveness of seabird bycatch mitigation measures	SBWG	2014				Work will be advanced by a small intersessional WG

Change to indicator target should go to Section 5.1 to 5.4 of AC work plan (AC7 Doc 15)

ANNEX 10. ARGENTINA STATEMENT

La Delegación Argentina a la Séptima Reunión del Comité Asesor del Acuerdo sobre la Conservación de Albatros y Petreles (ACAP) presenta sus atentos saludos a la Secretaría del Acuerdo y en relación a los documentos presentados por el Reino Unido SBWG5 Doc 07 y Doc 08 y PCSWG1 Doc 14, se recuerda que la República Argentina al ratificar el Acuerdo sobre Albatros y Petreles rechazó la pretendida extensión territorial del mismo efectuada por el Reino Unido a las Islas Malvinas, Georgias del Sur y Sandwich del Sur por constituir dichas islas y los espacios marítimos circundantes parte integrante del territorio nacional argentino.

El Gobierno argentino rechaza las referencias a pretendidas autoridades de las Islas Malvinas, Georgias del Sur y Sandwich del Sur y que se presente a los mencionados archipiélagos detentando un status internacional que no poseen.

La presencia británica en dichos archipiélagos y sus espacios marítimos circundantes constituye una ocupación ilegítima y es rechazada por la República Argentina, al igual que cualquier acto unilateral emanado de aquélla.

El Gobierno argentino también rechaza toda referencia a los mencionados archipiélagos, y los sitios geográficos en ellos contenidos, con una toponimia que la Argentina no reconoce.

La República Argentina reafirma sus derechos de soberanía sobre las Islas Malvinas, Georgias del Sur y Sandwich del Sur y los espacios marítimos circundantes, que son parte integrante del territorio nacional argentino y que, estando ilegítimamente ocupadas por el Reino Unido, las mismas son objeto de una disputa de soberanía entre ambos países, que ha sido reconocida por las Naciones Unidas.

La Delegación Argentina a la Séptima Reunión del Comité Asesor del Acuerdo sobre la Conservación de Albatros y Petreles (ACAP) reitera a la Secretaría del Acuerdo las expresiones de su consideración más distinguida.

La Rochelle, 29 de abril de 2013.

ANNEX 11. UNITED KINGDOM STATEMENT

The UK Delegation to the Seventh Meeting of the Advisory Committee for Agreement on the Conservation of Albatrosses and Petrels (ACAP) presents its compliments to the Agreement Secretariat. In response to the intervention from the Republic of Argentina, the United Kingdom has no doubt about its sovereignty over the Falkland Islands and South Georgia and the South Sandwich Islands and the surrounding maritime areas of both Territories.

The Republic of Argentina continues to extend the geographical area under dispute to include South Georgia and South Sandwich Islands (SGSSI). The United Nations has never issued any resolutions referencing a sovereignty dispute over SGSSI. The Government of the United Kingdom and Northern Ireland attaches great importance to the principle of self-determination as set out in Article 1.2 of the Charter of the United Nations and Article 1 of the International Covenant on Civil and Political Rights. That fundamental principle underlies our position on the Falkland Islands – it is a universal right for all peoples. There can be no negotiations on the sovereignty of the Falkland Islands unless and until such time as the islanders so wish. The recent result of the Falkland Islands referendum on their political status has clearly expressed to the international community the wishes of the people who live there to maintain their relationship with the United Kingdom as a British Overseas Territory.

The democratically elected representatives of the Falkland Islands continue to express their own views at the United Nations, most recently immediately following the referendum result in March this year. At a session of the UN Decolonisation Committee in June 2012 they asked the Committee to recognise that they, like any other people, were entitled to exercise the right of self-determination. They reiterated the historical facts that the Falkland Islands had no indigenous people, and that rather than representing an ‘illegal occupation’ no civilian population was removed prior to the decedents of the current population settling on the islands over eight generations ago. They confirmed that they are and have been the only people of the Falkland Islands and they did not wish for any change in their status.

Furthermore, the United Kingdom rejects any use or application of toponymy other than that applied to the Falkland Islands by the people and Government of the Falkland Islands.