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BEST PRACTICE ADVICE TO REDUCE THE BYCATCH OF SEABIRDS IN THE CONVENTION AREA

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1. 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) and the BirdLife International's Global Seabird Programme (in particular the Albatross Task Force). The distribution of most albatrosses overlap with pelagic longline fisheries managed by the five tuna RFMOs and the adoption of best practice seabird conservation in these fisheries is a high priority. As an example of the potential impact on threatened seabird species it was estimated that at least 160,000 seabirds (upper range of 320,000 seabirds) are killed each year in global longline fisheries (Anderson *et al.* 2011). 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 can also 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 specifications and application of some will vary with local 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' gear configuration and methods in artisanal fleets. Seabird bycatch mitigation advice is under development for these fisheries.

The Inter-American Tropical Tuna Commission adopted in 2011 a Seabird Conservation Measure (Resolution C-11-02) to mitigate the impact on seabirds of fishing. Although the text of this Resolution followed at the time of adoption, and to some extent, best-practice recommendations for mitigating seabird bycatch in longline fisheries, recent research on the efficiency and applicability of bycatch mitigation measures has led to a revision of this best practice advice. The Seabird Bycatch Working Group (SBWG), a subsidiary body of the ACAP Advisory Committee, is responsible for reviewing mitigation research in order to provide the best technical advice on how to minimise seabird mortality in fisheries. The outcomes of recent reviews by the SBWG have been already considered by a number of other tuna Regional Fisheries Management Organisations (tRFMOs), who have revised their seabird conservation measures to reflect the latest best practice advice. In particular, the two column table (offering a range of options for mitigation) previously used in a number of tRFMO seabird conservation measures has been discarded following evidence showing that a number of mitigation measures contained in it are not effective. Consequently, most of these conservation measures have been revised and amended, and now chiefly rely on the use of three

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mitigation methods (line weighting, night setting and bird scaring lines used in combination) as these have proven to be the most effective in reducing seabird mortality in longline fisheries. The International Commission for the Conservation of Atlantic Tuna (ICCAT) revised its seabird measure in 2011 (ICCAT Supplemental Recommendation 11-09), the Western and Central Pacific Fisheries Commission (WCPFC) likewise did the same in 2012 (WCPFC Conservation and Management Measure 2012-071), as well as the Indian Ocean Tuna Commission (IOTC Resolution 12/06).

This document has been drafted to provide the IATTC Scientific Advisory Committee with the latest comprehensive review of the scientific literature addressing seabird bycatch in pelagic longline fisheries conducted in the most recent Seabird Bycatch Working Group meeting held in 2013 (see SBWG5 Final Report, http://www.acap.aq/index.php/en/documents/doc_download/2135-ac7-doc-14-rev-2-sbwg-report, and AC7 Final Report, http://www.acap.aq/index.php/en/documents/advisory-committee/doc_download/2142-ac7-report). This document also provides updated information on the distribution of seabirds at sea in the East Pacific Ocean, should the Scientific Advisory Committee wish to address the area of application in the current Resolution C-11-02.

2. REVIEW OF MITIGATION MEASURES IN RESOLUTION C-11-02

2.1. RECOMMENDED MITIGATION MEASURES

Currently, no single mitigation measure can reliably prevent the incidental mortality of seabirds in most pelagic longline fisheries. ACAP's best practice advice is that a combination of weighted branch lines, bird scaring lines and night setting are the most effective in mitigating seabird bycatch 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. Following is a summary of key information relevant to the application of each mitigation measure. For full description of mitigation methods see

http://www.acap.aq/index.php/resources/bycatch-mitigation/mitigation-advice.

2.1.1. Branchline weighting

Line weighting is arguably the most effective known mitigation measure (a primary measure) and has been demonstrated to be a key component to all successful reductions in seabird bycatch in pelagic longline fisheries. 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 (Jiménez *et al*. 2013; Robertson *et al*. 2013; Gianuca *et al*. 2013).

Line weighting 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). Current recommended minimum standard for branch line weighting configurations are weights:

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

Weighting 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 the 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).

2.1.2. 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. Night setting 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).

Night setting is less effective during full moon, under intensive deck lighting or in high latitude fisheries in summer. It is also less effective on nocturnal foragers like White-chinned Petrels (Brothers *et al.* 1999; Cherel *et al.* 1996). Night setting requires no modification of the fishing gear.

2.1.3. 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 sinking baited hooks.

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.

Streamer lines are the most commonly prescribed seabird bycatch mitigation measures for longline fisheries. To reduce bycatch to negligible levels they must be used in combination with branchline weighting and night setting. 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 meters and those less than 35 meters.

- *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. Hybrid tori lines (with long and short streamers) were more effective than short tori lines (only short streamers) in deterring diving seabirds (White-chinned Petrels) (Melvin *et al.* 2010; Melvin *et al.* 2011).

Bird scaring lines should be deployed to maximise the aerial extent, which 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. Long 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.

- *Recommendations for vessels <35 m total length*

A single bird scaring line (used in combination with night setting and appropriate line weighting) has been found effective on smaller vessels (Albatross Task Force 2011; Domingo *et al.* 2011, Gianuca *et al.* 2013).

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 with swivels placed at 5 m intervals over the first 55 m of the bird scaring line (and reaching the sea-surface in calm conditions), 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.

2.2. MITIGATION METHODS THAT ARE NOT RECOMMENDED

In this section mitigation measures that are present in Resolution C-11-02 and not recommended as best practice advice are described. The complete review of mitigation measures can be found at http://www.acap.aq/index.php/resources/bycatch-mitigation/mitigation-advice

2.2.1. Side setting with line weighting and bird curtain

This mitigation method has not been tested in Southern Hemisphere fisheries where greater assemblages of diving seabirds are found, hence it is considered unproven and not recommended (Brothers & Gilman 2006; Yokota & Kiyota 2006). It can only be considered effective if hooks are weighted sufficiently so they are below the surface by the time they reach the stern of the vessel and they are protected by a bird curtain. In Hawaii, side-setting trials were conducted with a bird curtain and 45-60 g weighted swivels placed within 0.5 m of hooks. Japanese research concludes that this mitigation measure must be used with other measures (Yokota & Kiyota 2006).

A clear definition of side setting is required. In Hawaiian fisheries it is a minimum of 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.

2.2.2. Blue dyed bait

There is not sufficient scientific evidence for the effectiveness of this method in pelagic fisheries, hence it is not recommended (Boggs 2001; Brothers 1991; Gilman et al. 2003a; Minami & Kiyota 2001; Minami & Kiyota 2004; Lydon & Starr 2005; Cocking *et al.* 2008). Data suggests only effective with squid bait (Cocking *et al*. 2008) but results are inconsistent across studies.

2.2.3. Line shooter

Scientific evidence for effectiveness of this method is unproven, hence not recommended. 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.

2.2.4. Underwater setting chute

Scientific evidence for effectiveness of this method is unproven, hence not recommended (Brothers 1991; Boggs 2001; Gilman *et al.* 2003a; Gilman *et al.* 2003b; Sakai *et al.* 2004; Lawrence *et al.* 2006). 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

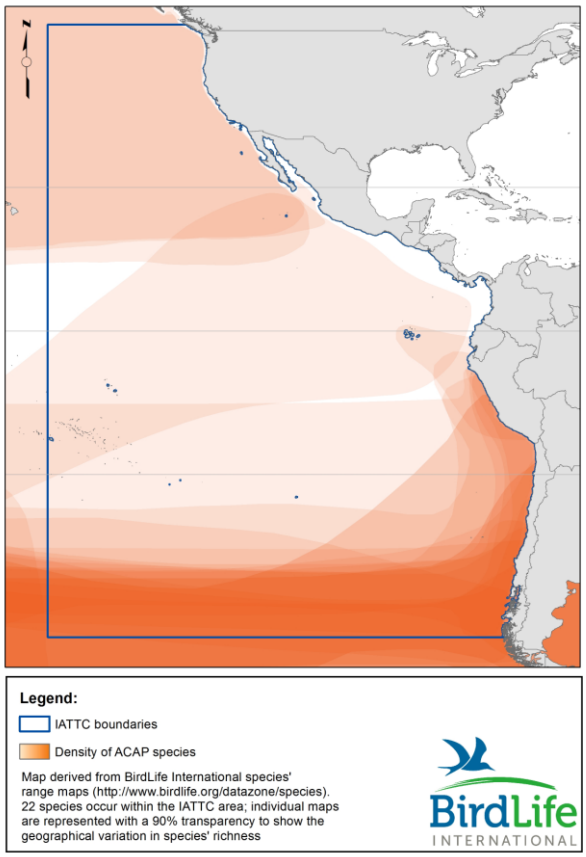
trials cited in Baker & Wise 2005).

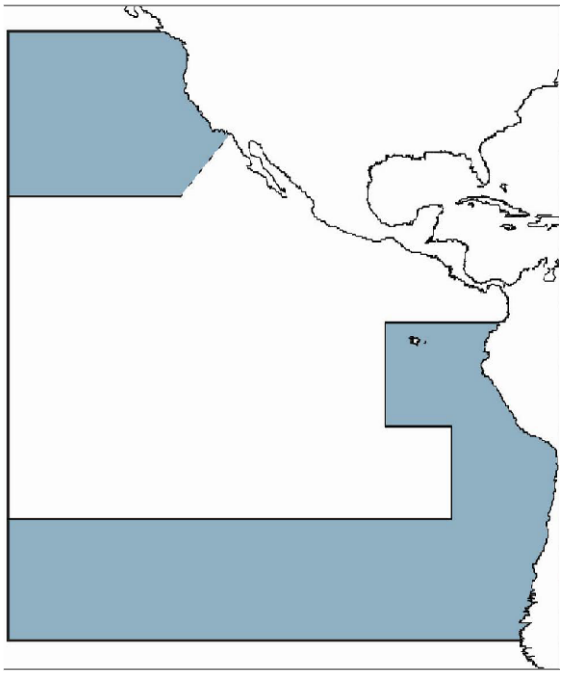
2.2.5. Management of offal discharge

Scientific evidence for effectiveness of this method is unproven (McNamara *et al*. 1999; Cherel *et al*. 1996). Offal attracts birds to vessels and where practical should be eliminated or restricted to discharge when not setting or hauling. Discharge during line setting can increase interactions and should be discouraged. Offal retention and/or incineration may be impractical on small vessels.

3. DISTRIBUTION OF SEABIRDS IN THE EAST PACIFIC OCEAN

The area of application of current IATTC Resolution C-11-02 was defined according with information on at-sea distribution of seabirds available until 2011. The map below shows an updated general picture of albatrosses and petrels (as a threatened seabird group of most concern) distribution in the East Pacific Ocean. Although in general terms high-density areas for seabirds are covered by the application area in the South Pacific, there are important waters in the North Pacific not covered by the Resolution. The Scientific Advisory Committee might analyse the merits of revising these boundaries in view of latest information provided.





Area within the East Pacific Ocean in which the use of mitigation measures for reducing seabird bycatch is required (source: IATTC Resolution C-11-02).

4. REFERENCES

Anderson, O., Small, C., Croxall, J., Dunn, E., Sullivan, B., Yates, O., and Black, A. 2011. Global seabird bycatch in longline fisheries. Endangered Species Research 14:91-106.

Anderson, S. and McArdle, B., 2002. Sink rate of baited hooks during deployment of a pelagic longline from a New Zealand fishing vessel. New Zealand Journal of Marine and Freshwater Research, 36: 185–195.

Albatross Task Force 2011. Developments in experimental mitigation research – Pelagic longline fisheries in Brazil, South Africa and Uruguay. Sixth Meeting of Advisory Committee. Guayaquil, Ecuador, 29 August – 2 September 2011.

Baker, G.B., and Wise, B.S. 2005. The impact of pelagic longline fishing on the flesh-footed shearwater Puffinus carneipes in Eastern Australia. Biological Conservation, 126: 306–316.

Boggs, C.H., 2001. Deterring albatrosses from contacting baits during swordfish longline sets. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, pp. 79–94.

Brothers, N. and Gilman, E. 2006. Technical assistance for Hawaii-based pelagic longline vessels to modify deck design and fishing practices to side set. Prepared for the National marine Fisheries Service Pacific Islands Regional Office. Blue Ocean Institute, September 2006.

Brothers, N.P. 1991. Approaches to reducing albatross mortality and associated bait loss in the Japanese long-line fishery. Biological Conservation, 55: 255–268.

Brothers, N., Gales, R. and Reid, T. 1999. The influence of environmental variables and mitigation measures on seabird catch rates in the Japanese tuna longline fishery within the Australian Fishing Zone 1991-1995. Biological Conservation, 88: 85–101.

Brothers, N., Gales, R., and Reid, T., 2001. The effect of line weighting on the sink rate of pelagic tuna longline hooks, and its potential for minimising seabird mortalities. CCSBT-ERS/0111/53.

Cherel, Y., Weimerskirch, H. and Duhamel., G 1996. Interactions between longline vessels and seabirds in Kerguelen Waters and a method to reduce seabird mortality. Biological Conservation, 75: 63–70.

Cocking, L.J., Double, M.C., Milburn, P.J. and Brando, V.E. 2008. Seabird bycatch mitigation and blue-dyed bait: A spectral and experimental assessment. Biological Conservation, 14: 1354–1364.

Domingo, A., Jiménez, S., Abreu, M., Forselledo, R., and Pons, M. 2011. Effectiveness of tori-line use to reduce seabird bycatch in the Uruguayan pelagic longline fleet. Sixth Meeting of Advisory Committee. Guayaquil, Ecuador, 29 August – 2 September 2011.

Duckworth, K., 1995. Analysis of factors which influence seabird bycatch in the Japanese southern bluefin tuna longline fishery in New Zealand waters, 1989–1993. New Zealand Fisheries Assessment Research Document 95/26.

Gales, R., Brothers, N. and Reid, T. 1998. Seabird mortality in the Japanese tuna longline fishery around Australia, 1988-1995. Biological Conservation, 86: 37–56.

Gianuca, D., Peppes, F.V., César, J.H., Sant'Ana, R., and Neves, T. 2013. Do leaded swivels close to hooks affect the catch rate of target species in pelagic longline? A preliminary study of southern Brazilian fleet. Agreement on the Conservation of Albatrosses and Petrels, Fifth Meeting of the Seabird Bycatch Working Group. La Rochelle, France, 1-3 May 2013, SBWG5 Doc 33.

Gilman, E., Brothers, N., Kobayashi, D. R., Martin, S., Cook, J., Ray, J., Ching, G., and Woods, B. 2003a. Performance assessment of underwater setting chutes, side setting, and blue-dyed bait to minimise seabird mortality in Hawaii longline tuna and swordfish fisheries. Final report. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii, USA. 42pp.

Gilman, E., Boggs, C. and Brothers, N. 2003b. Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery. Ocean and Coastal Management, 46: 985–1010.

Gilman, E., Brothers, N. and Kobayashi, D. 2005. Principles and approaches to abate seabird bycatch in longline fisheries. Fish and Fisheries, 6: 35–49.

Hu, F., Shiga, M., Yokota, K., Shiode, D., Tokai, T., Sakai, H., and Arimoto, T. 2005. Effects of specifications of branch line on sinking characteristics of hooks in Japanese tuna longline. Nippon Suisan Gakkaishi 71: 33–38.

Jiménez S., Domingo A., Abreu M., Forselledo R., and Pons M. 2013. Effect of reduced distance between the hook and weight in pelagic longline branchlines on seabird attack and bycatch rates and on the catch of target species. Agreement on the Conservation of Albatrosses and Petrels, Fifth Meeting of the Seabird Bycatch Working Group. La Rochelle, France, 1-3 May 2013, SBWG5 Doc 49.

Jiménez S, Domingo A, and Brazeiro A. 2009. Seabird bycatch in the Southwest Atlantic: interaction with the Uruguayan pelagic longline fishery. Polar Biology, 32: 187–196.

Klaer, N. and Polacheck, T. 1998. The influence of environmental factors and mitigation measures on by-catch rates of seabirds by Japanese longline fishing vessels in the Australian region. Emu, 98: 305–16.

Lawrence, E., Wise, B., Bromhead, D., Hindmarsh, S., Barry, S., Bensley, N. and Findlay, J. 2006. Analyses of AFMA seabird mitigation trials – 2001 to 2004. Bureau of Rural Sciences. Canberra.

Lydon, G. and Starr, P., 2005. Effect of blue dyed bait on incidental seabird mortalities and fish catch rates on a commercial longliner fishing off East Cape, New Zealand. Unpublished Conservation Services Programme Report, Department of Conservation, New Zealand. 12p.

McNamara B, Torre L, and Kaaialii G. Hawaii longline seabird mortality mitigation project. Honolulu, HI, USA: Western Pacific Regional Fishery Management Council, 1999.

Melvin, E. F., Guy, T. J. and Reid, L. B. In Press. Reducing seabird bycatch in the South African joint venture tuna fishery using bird-scaring lines, branch line weighting and nighttime setting of hooks. Fisheries Research.

Melvin, E. F., Guy, T. J. and Reid, L. B. 2011. Preliminary report of 2010 weighted branch line trials in the tuna joint venture fishery in the South African EEZ. Agreement on the Conservation of Albatrosses and Petrels, Fourth Meeting of the Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 – 24 August 2011, SBWG-4 Doc 07.

Melvin, E. F., Guy, T. J. and Reid, L. B. 2010. Shrink and Defend: A Comparison of Two Streamer Line designs in the 2009 South Africa Tuna Fishery. Third Meeting of the Seabird Bycatch Working Group, ACAP, SBWG-3 Doc 13.rev1.

Melvin, E. F., Sullivan, B., Robertson, G. and Wienecke, B. 2004. A review of the effectiveness of streamer lines as a seabird bycatch mitigation technique in longline fisheries and CCAMLR streamer line requirements. CCAMLR Science, 11: 189–201.

Minami, H. and Kiyota, M. 2001. Effect of blue-dyed bait on reducing incidental take of seabirds. CCSBT-ERS/0111/61. 7pp.

Minami, H. and Kiyota, M., 2004 . Effect of blue-dyed bait and tori-pole streamer on reduction of incidental take of seabirds in the Japanese southern bluefin tuna longline fisheries. CCSBT-ERS/0402/08.

Robertson, G., Candy, S. G. and Hall, S. 2013. New branch line weighting regimes to reduce the risk of seabird mortality in pelagic longline fisheries without affecting fish catch. Aquatic Conservation: Marine and Freshwater Ecosystems. doi: 10.1002/aqc.2346.