Agreement on the Conservation of Albatrosses and Petrels

Fourth Meeting of the Seabird Bycatch Working Group

Guayaquil, Ecuador, 22 – 24 August 2011

A Draft Seabird Bycatch Conservation Measure for Tuna Commissions

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Introduction

To date, ACAP has provided advice to international tuna commissions on seabird bycatch mitigation options for the fisheries they manage in the form of reports or tables updating and summarizing the results of recent research on mitigation technologies (ACAP Seabird Bycatch Working Group 2010). The assumption is that this information will be crafted into a new or revised seabird conservation measure by tuna commission committees, working groups or staff with unknown technical expertise of seabird bycatch mitigation.

This paper proposes that, in addition to research summaries, ACAP also provide very specific advice to tuna commissions in the form of a draft conservation measure that details ACAPs advice on best practice mitigation to minimize seabird bycatch based on the most current research. We propose that an ACAP sanctioned Conservation Measure would ease the burden on tuna commissions and staff, lead to consistent conservation measures across tuna commissions, and provide unambiguous advice. This draft Conservation Measure for tuna fisheries in high risk areas of the upper latitudes of southern hemisphere oceans and is based on comprehensive testing of seabird bycatch mitigation techniques and practices in the South African tuna joint venture fishery (Melvin et al. 2010 and Melvin et al. 2010). We propose that this draft serve as a starting point for the Seabird Bycatch Working Group to finalize a recommended seabird bycatch conservation measure, which will serve as clear advice to tuna RFMOs from ACAP on seabird conservation in world tuna fisheries. A completed recommended Conservation Measure would address goals for seabird conservation, identify seabird bycatch hotspots, identify appropriate measures for large and small vessels, and identify appropriate mitigation measures for northern vs. southern hemisphere fisheries.

Proposed Measure

Longline fishing operations shall simultaneously weight all branchlines, deploy two streamer lines, and set all hooks exclusively at night while deploying longlines in high risk areas of the upper latitudes of southern hemisphere oceans to reduce the incidental morality to the lowest possible levels. Longline fishing operation should also manage bait and offal and deploy branchlines in such a way as to minimize seabird interactions.

Annex 1. Specifications for Mitigation

Night Setting

All longlines shall be set at night only (i.e. during the hours of darkness between the times of nautical twilight[1]). During longline fishing at night, only the minimum ship's lights necessary for safety shall be used.

Branchline Weighting

Fishing operations shall be conducted in such a way that baited hooks sink beyond the reach of seabirds as soon as possible after they are put in the water.

All branchlines shall be weighted. Options for the minimum total weight of materials added to all branchlines are the following:

- 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.

Streamer Lines

Two streamer lines with both long and short streamer throughout the aerial extent shall be deployed during longline setting to deter birds from approaching sinking baited hooks. Because there is the potential for line breakage and tangling, spare streamer lines shall be carried onboard to replace damaged lines and to ensure that fishing operations can continue without interruption. Streamer lines shall be deployed according to the following specifications:

- Streamer lines shall be deployed to port and starboard of sinking baited hooks prior to the first baited hook entering the water.
- The aerial extent (out of water) section with suspended streamers is the section of the streamer lines that scares birds from sinking baits. Vessels shall maintain the aerial extent of each streamer line at a minimum of 100 m. Aerial extent is defined as the length of streamer line from the stern to its average entry point into the water (Figure 1).
- As aerial extent is a function of the height of the attachment point to the vessel, weight and length of the aerial extent of the line, drag applied to the in-water extent of the line, and vessel speed, the following streamer line specification are required:
    - *Material*: streamer lines shall be the lightest practical strong fine line. Lines shall be attached to the vessel with a barrel swivel to minimize rotation of the line from torque created as it is dragged behind the vessel.
    - *Length*: each line shall be a minimum of 200 m long;

[1] The exact times of nautical twilight are set forth in the Nautical Almanac tables for the relevant latitude, local time and date. A copy of the algorithm for calculating these times is available from the Secretariat.

- *Aerial Extent:* The aerial extent of each streamer line shall be maintained at a minimum of 100 m. Materials shall be attached to the in-water extent of the line to increase drag so that a minimum aerial extent of 100 m is achieved (see below);
- *Height*: Each streamer line shall be attached to the vessel as high as possible, so that the line is no less than 8 m above the water at the stern. A strong shocking-absorbing material placed where the streamer lines attach to the vessel reduces shock in heavy seas. A lazy line should be attached to the streamer line to aid retrieval of the line after the set is completed.
- *Placement*: If baited hooks are set outboard of the wake, the streamer line attachment point to the vessel shall be positioned a minimum of 4 m 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. If baits are deployed to port and starboard of the wake, then both lines shall be positioned a minimum of 4 m outboard of the vessel;
- *Bait Placement*: Baited hooks shall be deployed within the area bounded by the two streamer lines. Bait-casting machine shall be adjusted so as to land baited hooks within the area bounded by streamer lines. Casting branchlines into the wake should be avoided to maximize the sink rate of baited hooks.

Specifications for individual streamers are divided into three sections (Figure 1).

Aerial Extent One: 10 to 50 m astern

Long streamers serve to protect the areas where the streamer line is high above the water. Individual long streamers shall:

- Be spaced at a minimum of 5 m beginning at 10 m from the stern to 50 m from the stern. Short-branched streamers (a minimum of 0.3 m long) shall be placed at the midpoint between each long streamer;
- Extend to just clear of the water in the absence of wind, but at a minimum, range from 8 m to 1.5 m long;
- Be attached to the line with a swivel that prevents the steamer from rolling up on the line when the streamer line undergoes torque as it drags behind the vessel;
- Be made of UV protected synthetic rubber tubing or cord greater than or equal to greater than 3 mm in diameter
- Be of a conspicuous, bright safety colors such as orange or florescent green.

Aerial Extent Two: 51 to 100 m astern

Individual streamer shall be:

- Branched (two stands),
  A minimum of 1-m long, and
- Spaced 1-m apart.

In-Water Extent: 101 to 200 m astern.

Short streamers shall be tied into the line to bristle the line and create a bottlebrush like configuration to generate drag while minimizing the chance of fouling streamer lines on float lines. Clusters of three branched 0.3-m to 0.5-m long streamers made of stiff material (such as plastic packing straps) tied into the line every 1 to 5 m creates sufficient drag to achieve a 100 m aerial extent (Figure 1). Breakaways should be incorporated into the streamer line in-water extent to minimize safety and operational problems should a longline float foul or tangle with the in-water extent of a streamer line.

Bait and Offal Management

The practice of discarding retained or used baits, bait fragments and fish offal attracts birds to the vessel and can increase seabird interactions with longlining operations during the set and during the haul.

Discarding bait fragments or fish offal during line setting should be avoided to prevent attracting birds to the area where baited hooks are sinking from the surface.

Discarding baits retained on hooks during line hauling should be avoided. Used baits should be retained on the vessel and discarded prior to line setting in order to discourage birds from attending line hauling and to prevent possible bird hookings while branchlines are being hauled.

Where practical offal should be discarded in batches and on the side of the vessel opposite from which longlines are hauled.

Every effort should be made to ensure that birds captured alive during longlining are released alive and that, wherever possible, hooks are removed without jeopardizing the life of the bird concerned.

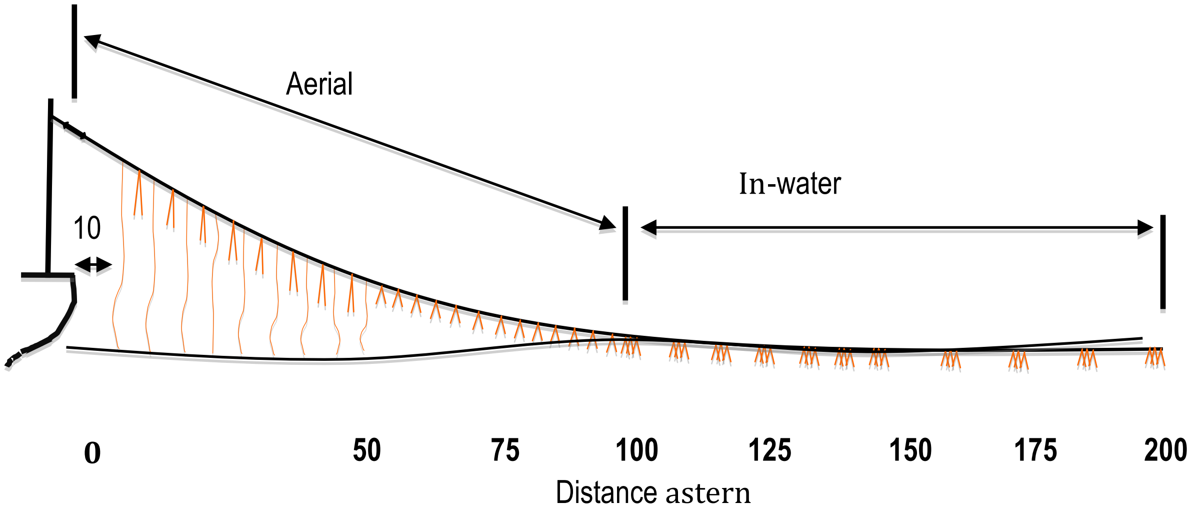

Figure 1. Streamer line with long and short streamers in the aerial extent and short streamers clumped in the in-water extent.

Other Considerations

Baited hooks and branchline coils should be deployed in still water in the zone outboard of the wake and inside the streamer line to enhance the rate at which baited hooks sink from the surface protected by streamer lines.

Annex 2. Troubleshooting Pelagic Streamer Lines: practical recommendations from lessons learned in the South Africa Japanese joint venture tuna fisheries.

Worldwide, the streamer line is one of the most commonly prescribed measures to prevent seabird mortalities and save baits as longlines are deployed. Selecting the right materials to build a streamer line, positioning the streamer line properly, and maintaining an appropriate aerial extent are essential to making it effective. Below we outline ways to prevent common streamer line problems and discuss the elements of an effective streamer line design. Specifications and performance notes are provided for streamer line designs developed in pelagic longline fisheries.

Description and Definitions

A streamer line is composed of series of streamers that are attached to a central line up to 200 m long, called the backbone. One end of the backbone is attached to a high point high on the vessel at the stern and the remainder is towed in the sea. As the vessel moves forward deploying longline gear, a section of the backbone is lifted into the air (the aerial extent) by the drag of the section trailing in the water (in-water extent). Streamers suspended along the backbone in the aerial extent are the main component that scares birds away from baited hooks (Figure 1).

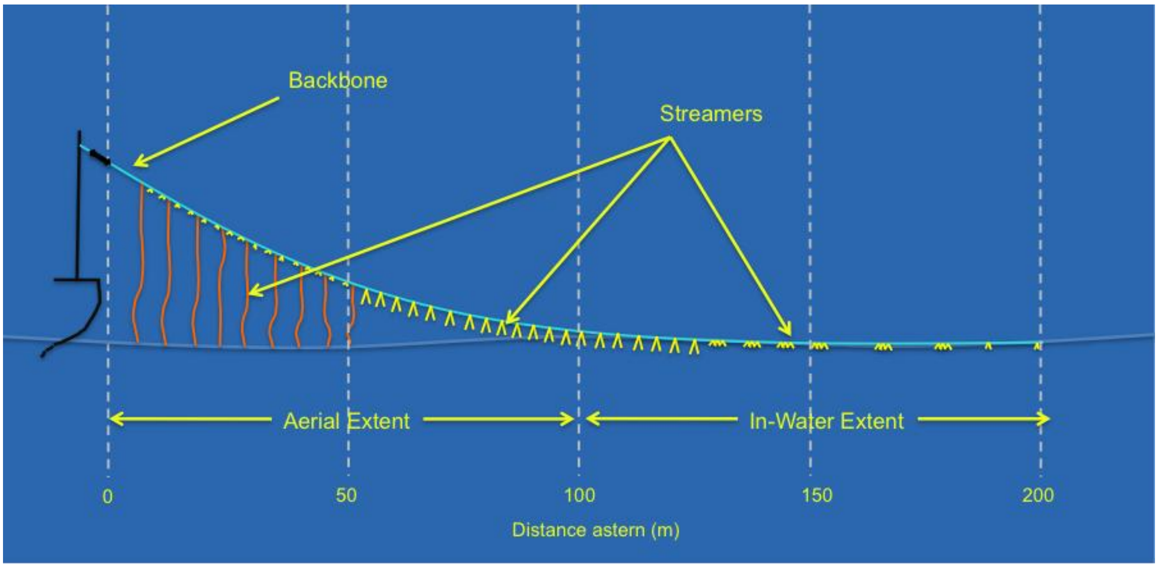

Figure 1. Main features of a streamer line used in pelagic longline fisheries.

Common Problems

Common problems with streamer lines include the following:

- the lateral position of the streamer lines is too far from the sinking baits;
- the aerial extent is too short to protect baited hooks until they sink to a depth beyond which birds can reach baits;
- long streamers roll up on the backbone;

- the streamer line fouls with the fishing gear.

These problems can make streamer lines ineffective and lead to bait loss and seabird mortality.

Lateral Placement

In the Japanese style typical of high-seas tuna longline fishing, the mainline is set slack into the wake via a line shooter and baited hooks and branchlines are deployed into still water outside the wake from the port side of the vessel. A dedicated pole (tori pole) positions the port streamer line outboard typically by 2 to 4 meters to port. This creates a narrow strip of still water between the wake and the streamers hanging from the aerial extent, the “in” zone (Figure 2). Baited hooks are tossed into this zone via a bait casting machine while the coiled branchline (up to 35 m) is tossed by hand.

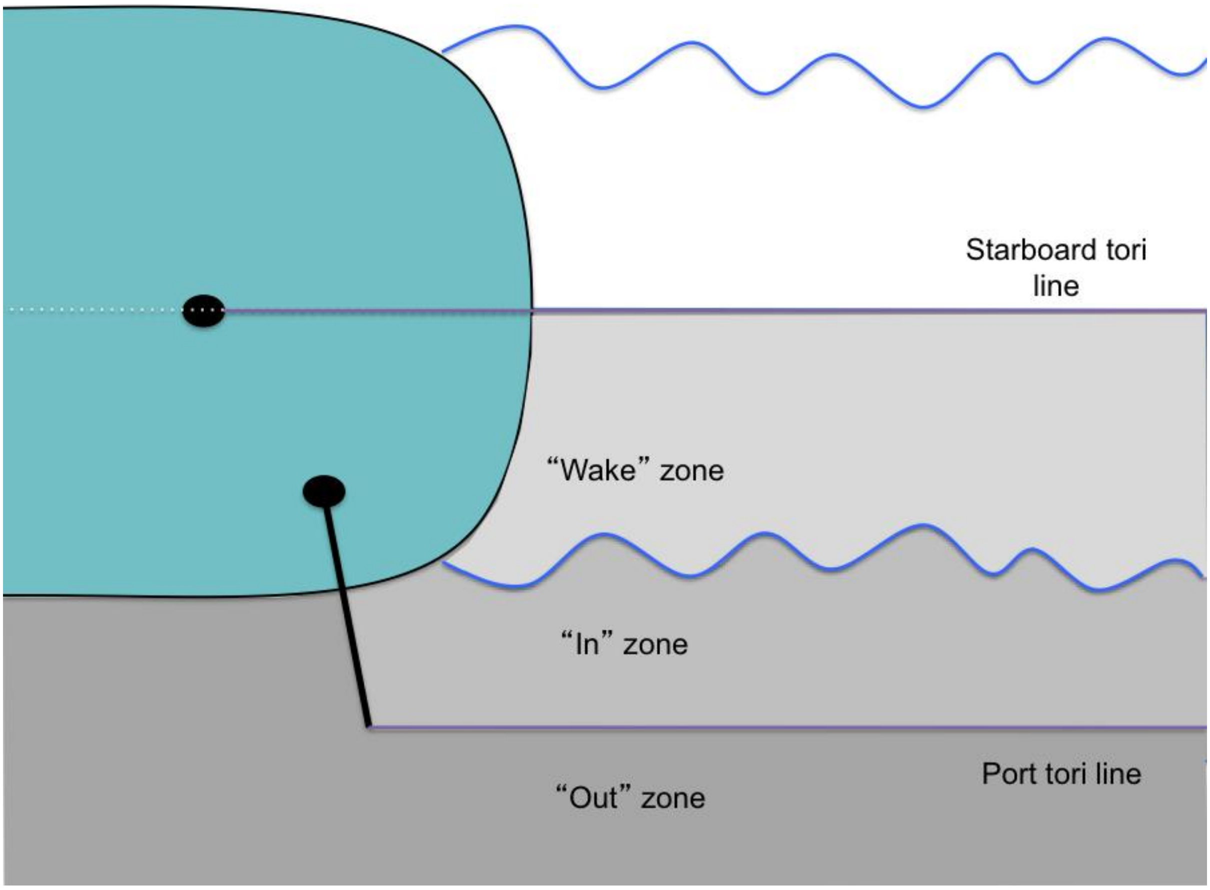

Figure 2. The ideal “still water” target zone for baits deployed off the port side of the vessels stern.

If the tori pole positions the streamer line too close to the vessel, the strip of still water is narrow leading to hooks being set outside and beyond the protection of the streamer line. In these conditions, baited hooks soon drift outside the protection of streamer line with the currents. Ideally, the supporting pole should position the streamer line at least four to five meters outboard to provide a wide target for the hook and coil to land in still water and be protected. Aligning the landing location may require adjusting the bait-casting machine, instructing the crew to hand throw the bait in the proper location, and/or repositioning the streamer line(s).

In some fisheries use of a second streamer line is common. It is deployed from either the center mast or from a pole on the starboard side, the opposite side of the vessel from where the baited hooks and coils are deployed. Two streamer lines create a fence bracketing the sinking longline and protect the sinking hooks from depredation regardless of wind direction. We recommend strongly that two streamer lines always be used. Where the second pole should be positioned is a function of currents, prevailing winds and available infrastructure.

Maximizing Aerial Extent

There are several things to consider when maximizing the aerial extent of a streamer line: the height of the attachment point, the weight of the line and streamers in the aerial extent, and addition of materials to the in-water extent to increase drag. The streamer line should be placed as high as possible (> 7m) and as close to the stern as possible. To minimize weight in the aerial extent, the lightest practical line should be used for the backbone. We also recommend using single stranded streamers (as opposed to branched or forked streamers) as this can cut the weight of the aerial extent in half. Minimizing weight in the aerial extent reduces the amount of drag needed to maximize the aerial extent distance.

If the maximum achievable aerial extent falls short of the distance astern the birds can access baited hooks, it is unlikely that streamer lines will be effective at preventing bird mortalities. In this case, weighting branchlines is necessary to match the sink profile of baited hooks to the protection afforded by the streamer line aerial extent.

Streamers Rolling Up on the Backbone

The helical weave of stranded line (three or more strands twisted together) and materials attached to the in-water extent to create drag can cause the backbone to rotate as it is towed in the sea. This rotation, particularly when coupled with bad weather, can cause individual long streamers to roll up on the backbone rendering the streamer line ineffective. This problem can be addressed in several ways.

The most reliable and cost effective method of preventing streamer roll-up is to attach long streamers using hardware that “rings” the backbone allowing the backbone to rotate with no effect on the streamers (Figure 3, Inset D). To make this style of streamer attachment point, slip the backbone through one eye of a double-eye swivel and position it on the backbone by using stops on either side of the eye. The long streamer is then attached to the second eye.

Additional methods to help reduce problems due to line rotation include using swivels at the attachment point to the vessel and in the backbone near the end of the aerial extent. Braided line, also called plaited line (multiple small fibers woven together in opposing directions) is rotationally neutral when towed through the water and should be used in place of stranded line.

Streamer Lines Fouling With Fishing Floats

While increasing drag on the in-water extent of the backbone can greatly increase the aerial extent, it can also increase the incidence of surface floats fouling with the streamer line. This can be a problem in pelagic fisheries where hundreds of surface floats are deployed each set. Surface floats can flip over the streamer line in crosscurrents or rough weather causing the float line to foul with the backbone. If drag is applied in subtle ways, the surface float lines tend to slide away freely without breaking the fishing gear or the streamer line. Large objects like cones and buoys often used successfully in demersal fisheries can quickly foul with surface floats.

Two ways to increase drag subtly are to increase the length of the in-water extent of the backbone and/or to add plastic packing strap to “bristle” the line – make the line more of a bottle brush (Figure 3, Inset B and F). Care should be taken to weave the straps into the backbone without creating a bulky knot. We also recommend choosing a hard lay, or stiff backbone line to help float lines slide away freely when contact is made with the streamer lines.

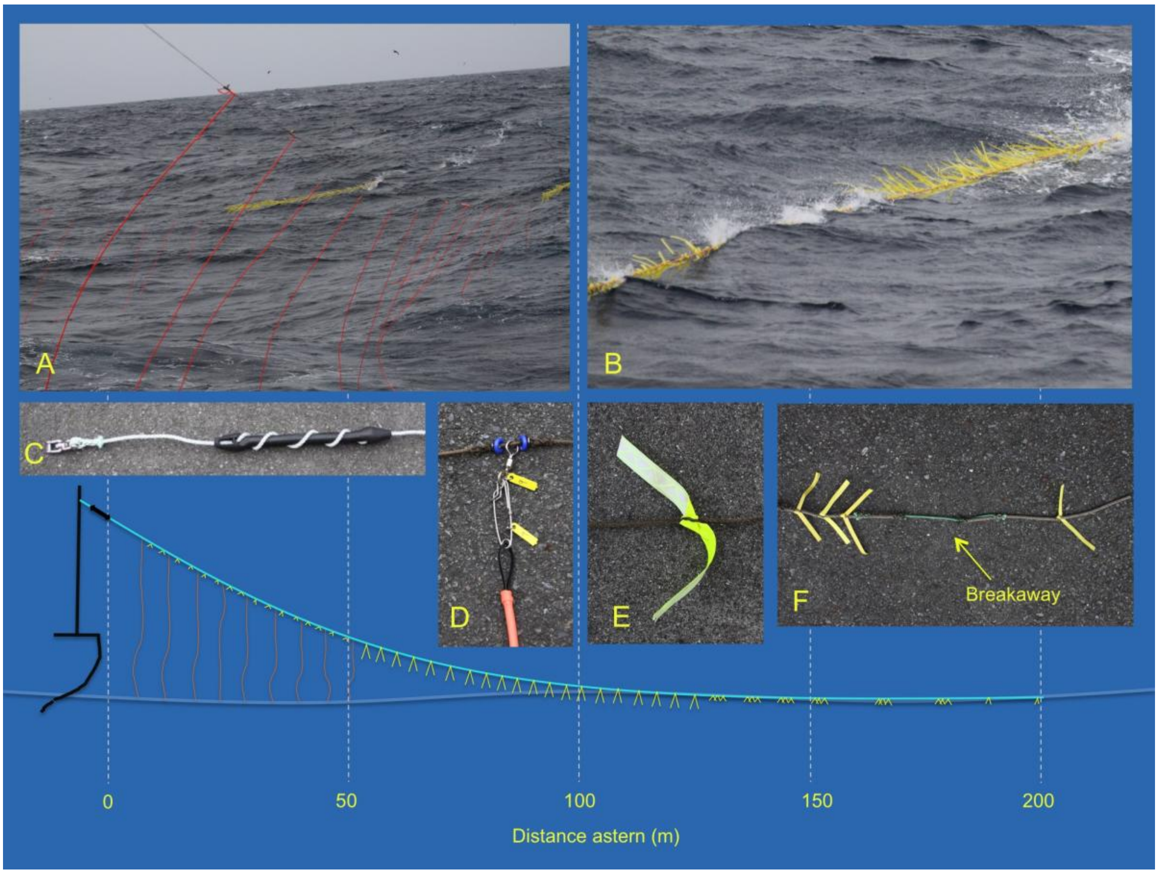

Figure 3. Elements of a streamer line – (A) long tubing streamers, (B) short strap streamers, (C) mooring snubber, (D) double-eye swivel and stops, (E) reflective strap to mark target aerial extent, (F) clusters of short packing strap used to create drag and minimize snags with fishing floats.

Elements of Streamer Line Design

Long Tubing Streamers

Long streamers are flexible, UV protected, bright orange tubing and serve to protect the areas where the backbone is high above the water line. They are heavy enough to hang near vertically in strong winds. Specifically we favor bright orange 1 cm diameter Kraton ® tubing weighing 39 g/m that is used successfully Alaskan and Antarctic fisheries (Figure 3, Inset A).

A single long tubing-streamer – the sweeper – is positioned near the stern, just forward of the intended bait landing location, to thwart birds approaching from the bow in a following wind. We recommend placing the streamer 2 m forward of the bait landing location. Without the sweeper the back door is left open – birds can fly along the hull of the vessel into the wind and attack baits as they land without encountering a streamer.

Short Streamers

The short, light streamers are brightly colored stiff plastic straps typically used for binding cardboard boxes. Short streamers are typically made from a single strap that is attached at the middle to create a paired strap of equal lengths (Figure 3, Inset B, F). They are used to protect the area below the backbone that is close to, and at times, in the water as the aerial extent varies with each swell. We found that strap-streamers strategically placed into the in-water extent of the backbone are the best way to safely increase drag. In general, widely spaced, short straps clear floats if contact is made with the in-water extent of the backbone.

Breakaways

For the safety of the crew and to save fishing gear, short lengths of lower tensile strength line are placed in the backbone at intervals acceptable to the fishing masters (Figure 3, Inset F). Breakaways prevent the loss of fishing gear by enabling a segment of the streamer line to break free if the backbone fouls on a surface float. Lost segments are often recovered when the fishing gear is retrieved.

Snubbers

A strong shocking-absorbing rubber mooring snubber placed where the streamer lines attach to the vessel reduces shock in heavy seas (Figure 3, Inset C).

Other Considerations

An aerial extent of 100 m or greater should be maintained in pelagic longline fisheries. An aerial extent of 100 m has been successfully achieved using a variety of configurations during our research. Further refinements may yield aerial extents greater than 100 m.

Avoid casting baits and branchlines into the wake. The wake turbulence slows sinking and can extend access to bait beyond the aerial extent of a streamer line.

Aerial extent can be monitored in the dark with a flashlight by attaching a section of reflective tape material to the backbone at the target aerial extent (Figure 3, Inset E). Monitoring the aerial extent allows the crew to detect problems encountered at night and correct them.

Short lengths of reflective tape can be used as strap-streamers between long tubing-streamers. At night this tape reflects ambient deck light or moonlight. Glow in the dark tubing may also be effective when used as long streamers.

Spare streamer lines should be carried onboard in the event a streamer line is lost or broken.

Specification and Design Contrast

Based upon streamer line research in 2009, minimum specifications for a pelagic streamer line were written in the 2010 South Africa Tuna Longline Permit Conditions (Annexure 5, p 23-25). Subsequently, two designs expanding upon the basic permit specifications (SA) emerged and were used in 2010 research - Washington Sea Grant 2010 (WSG) design and a native Fukuseki Maru # 5 (FM) design (Figure 4).

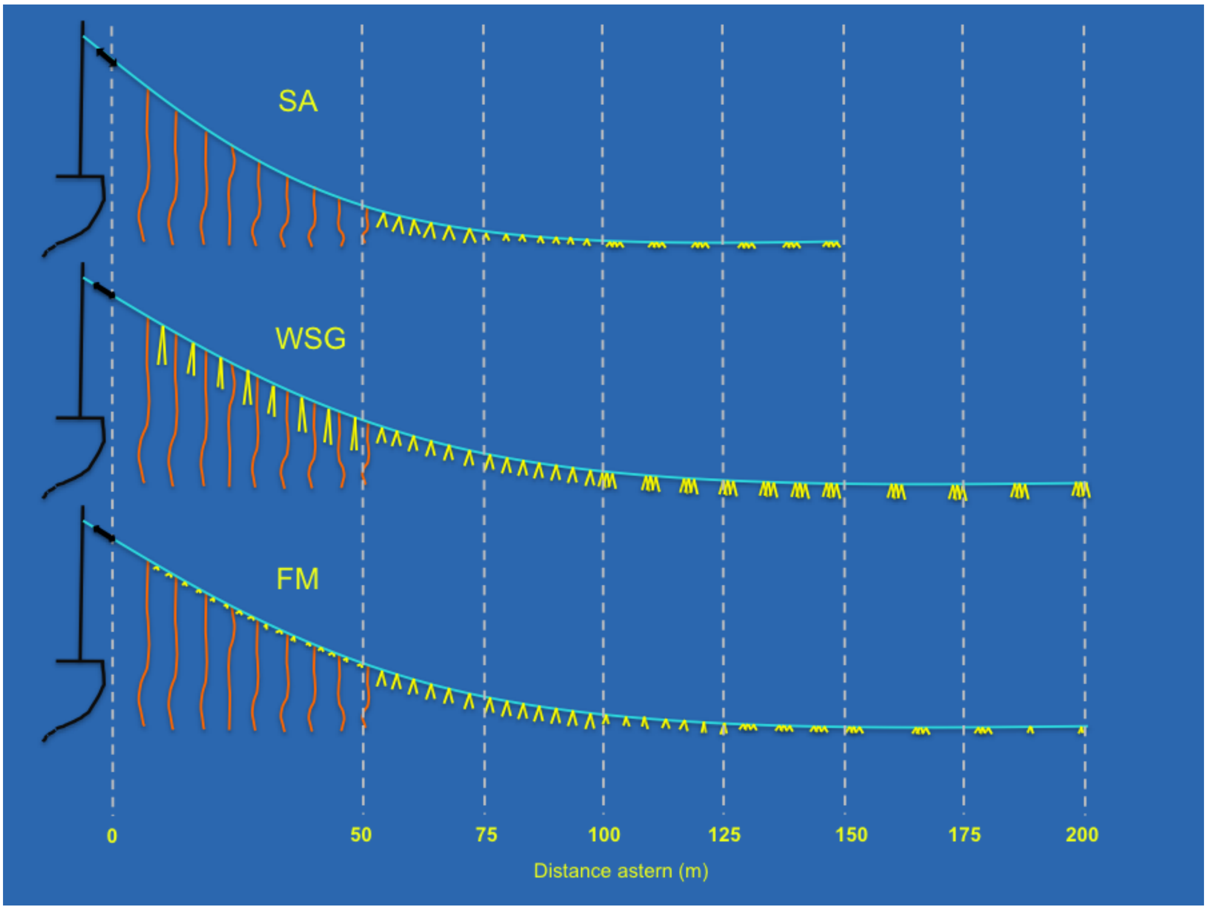

Figure 4. Three streamer line designs resulting from research in South Africa – tuna longline permit design (SA), the 2010 Washington Sea Grant research design (WSG), and the Fukuseki Maru No. 5 design (FM).

Both the WSG and FM designs met the basic requirements of the SA design, but exceeded the SA design in total length (200m) and used variable streamer lengths in some sections (Table 1). FM design used lighter backbone material and shorter strap streamers between the long tubing streamers. This reduction in weight permitted the FM design to have shorter and fewer strap streamers in the in-water extent while maintaining an aerial extent of 100m. We switched to the FM design on the Fukuseki Maru No. 5 to mitigate against fouling because qualitative evidence suggests that less material attached to the backbone in the in-water extent helped to avoid fouling and break-offs when fishing floats come in contact with the line.

Table 1. Streamer line specifications for the South African tuna longline permit condition design (SA), the 2010 Washington Sea Grant design (WSG) and the Fukuseki Maru No. 5 design (FM). Streamer notation includes long tubing streamers (LTS), strap streamers (SS), and clusters of 3 strap streamers (CS).

Line Type	Streamer Attribute	Distance Astern (m)						
		50*	75	100	125	150	175	200
SA	Length Type Spacing	Base	1m SS 1m	0.5m SS 1m	0.5m CS 5m	0.5m CS 5m		
WSG	Length Type Spacing	2m SS 2.5m	1m SS 1m	1m SS 1m	1m CS 5m	1m CS 5m	1m CS 10m	1m CS 10m
FM	Length Type Spacing	0.3m SS 1.25m	1m SS 1m	1m SS 1m	0.5m SS 1m	0.3m CS 5m	0.3m CS 5m	0.3m SS 5m

*WSG and FM 50m section is in addtion to the "Base" - nine long tubing streamers (LTS) spaced every 5m with the first attached 10m from the stern.

The second vessel used in our research, the Koei Maru No. 88, had very little fouling using the WSG design exclusively. The only noted difference between the two vessels was the Koei is a more modern design that includes a ballast stabilizer. This difference in fouling rate led the fishing masters to believe that the fewer fouling’s on the Koei were due to mitigating effect of the stabilizers on the pitch and roll of the vessel in rough weather. This difference highlights the importance of understanding the vessel attributes when evaluating streamer lines.

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