
Technical Assistance for Hawaii Pelagic Longline Vessels to Change Deck Design and Fishing Practices to Side Set

Executive Summary

January 2006

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Prepared for the Hawaii Longline Association,
U.S. NOAA Fisheries, and Western Pacific
Regional Fishery Management Council



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This report presents results of a project of converting vessels in the Hawaii pelagic longline tuna and swordfish fleet to set from the side instead of the conventional position at the stern to reduce seabird bycatch and provide operational benefits. The success of the technical assistance program was due to its timing with the completion of a research experiment, voluntary change to side setting by a portion of the fleet, and a proposed regulatory amendment. Within three months following a successful trial of side setting in the Hawaii longline fleet, which demonstrated side setting's effectiveness as a bird avoidance method and commercial viability, ten percent of the fleet voluntarily changed to side setting. This provided further evidence of the potential for side setting to be broadly adopted and assist the Hawaii longline fleet to minimize seabird mortality. This provided the impetus for the Hawaii Longline Association, U.S. NOAA Fisheries, Western Pacific Regional Fishery Management Council, and Blue Ocean Institute to collaborate to institute a technical assistance program for additional vessels in the Hawaii fleet to change to side set. The initiation of the assistance program coincided with a proposed amendment to government regulations on avoiding seabird bycatch to allow Hawaii longline vessels to side set in lieu of currently required seabird avoidance methods.

Mortality in longline fisheries is the most critical global threat to most albatross and large petrel species. Developing and mainstreaming the use of seabird avoidance methods that not only have the capacity to minimize bird interactions, but are also practical and provide crew with incentives to employ them effectively, is necessary to resolve this problem.

Incidental bycatch of Laysan (*Phoebastria immutabilis*) and Black-footed (*P. nigripes*) Albatrosses by Hawaii pelagic longline tuna and swordfish fisheries, and the risk of bycatch of the U.S. listed endangered Short-tailed Albatross (*P. albatrus*) are conservation and management concerns. Research and commercial demonstrations conducted from 2002-2003 assessed the effectiveness of three methods at avoiding incidental seabird capture and commercial viability in Hawaii pelagic longline fisheries. A seabird avoidance method called side-setting had the lowest mean seabird contact and capture rates of all treatments tested. Side setting reduces the incidence of seabird captures to close to zero, reducing bird captures by nearly 100% in longline tuna gear and over 87% in longline swordfish gear compared to controls. Side setting is a means by which setting longline gear is done from the side of the vessel rather than the conventional position at the stern (Fig. 1). When setting from the side crew set baited hooks close to the side of the vessel hull where seabirds, such as albatrosses, are unable or unwilling to pursue them. Ideally, when side setting with proper line weighting, by the time the stern passes, the hook has sunk beyond the reach of seabirds.

Because side-setting promises to also provide large operational benefits for longline vessels, broad industry uptake and voluntary compliance is realistic. Evidence of this is that over fifteen percent of the fleet converted to side set at their own instigation before managers formally considered including this strategy in regulations.

The potential exists for this to be the first seabird bycatch problem in a longline fleet to be reliably and permanently solved, entailing minimal expenditure for compliance. A significant contributing factor to this success is that already vessels in this fleet traditionally use branch lines that achieve a rapid bait sink rate: Branch lines are adequately weighted, with a lead swivel of between 45 g and 60 g placed within 0.5 m of the hook, achieving an average sink rate of about 1 s/m. Side setting is a seabird avoidance method that simply becomes an operational norm entailing no additional effort or diligence by operators.

Side setting provides large operational benefits, especially for vessels with an aft wheelhouse and main work deck forward of this. Instead of having two separate work areas as is necessary when line setting is carried out from the vessel stern, side setting permits a vessel to have a single work area. Side setting provides significantly more deck room on all vessels, even those with a forward wheelhouse. Side setting also allows for better supervision of fishing operations by the vessel captain on the bridge, providing safety and efficiency advantages. Other advantages reported already include preference by the crew to set off the side versus the stern, less bait lost and line tangles because side set gear does not contact the turbulent stern water as has traditionally been the case, and bird interactions almost never occur. Additionally, this method is a very attractive option by comparison to the regulatory alternatives available for the Hawaii fleet. Many of the Hawaii vessels characterized by forward wheelhouses and aft deck space can still take advantage of the change to side setting by now occupying the redundant aft most deck space with mainline spools and float storage compartments.

At the time of preparing this report and conducting the technical assistance project, fishery managers were in the process of amending regulations to allow Hawaii longline tuna and swordfish vessels to employ side setting as an alternative to currently required seabird avoidance methods, which includes a requirement to dye bait blue. Here again, side setting may provide substantial economic benefits as the process of dyeing fish bait, which requires thawing the bait, is thought to be extremely detrimental to bait retention on hooks. The amended regulations are expected to come into effect in early 2006.

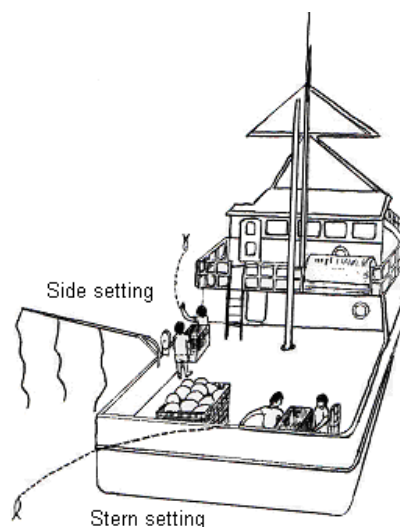


Fig. 1. Illustration showing a port side setting position with bird curtain and position of conventional stern setting.

Developing the side setting method and proving its worth in the Hawaii longline fleet has the potential to provide longline fishing worldwide with an incentive for adoption, as there are no reasons why this method cannot be employed by all longline fleets.

We provided technical support to the Hawaii pelagic longline fleet to facilitate efficient, cost-effective, and optimum conversions as well as advice on how to optimize side setting performance. Dockside technical assistance was provided to convert 28 vessel deck designs to side set and fabricate and install a bird curtain, which further enhances the security against seabird interaction during side setting. Of these vessels, seven target swordfish exclusively or part of the year. Hawaii longline swordfish vessels have had a higher seabird capture rate than Hawaii longline tuna vessels, in part, due to the location of fishing grounds and differences in fishing gear and methods.

Deck changes involved identifying a position for gear deployment from the side on individual vessels as all vessels in the Hawaii fleet are somewhat different, through considering how to maximize operational benefits and effectiveness at avoiding seabird capture, and fabricating and installing a bird curtain. Considerations included selecting locations for main line shooter, hydraulic lines, mainline spools, buoy racks, and the new route for mainline travel off the spool through the shooter. Advice was also provided to captains and crew on setting from the new position, including timing for clipping branch lines to the main line, and practices for baited hook throwing. The importance of this cannot be overstated as incorrect branch line deployment and timing is potentially very dangerous, perhaps more so if done incorrectly when side setting. Section 3 provides information on two types of line shooter mountings both to accommodate the need to safeguard the shooter from damage in its side mounted position. Section 3 also provides details on the design and specifications for the two types of bird curtains installed.

Each vessel participating in the project received \$1000 towards covering costs for the deck conversion, and received a free bird curtain. Total cost for materials for a bird curtain and for welding services for mounting is about \$200.

In addition, for all vessels converted and including about 15 others that had previously converted, we documented aspects of each vessel, its fishing equipment, and line setting characteristics that are considered relevant for subsequent performance evaluation and the rectifying of any problems that may emerge.

Following each vessel's first fishing trip after initial conversion to side setting, the opinion of the captain and crew was sought on the change and details of any problems that they encountered. Table 2 summarizes this information. Of the 28 vessels converted, six had completed one or more fishing trips after conversion at the time of writing this report. Of these, none of the vessels encountered any substantial operational problems or had a negative attitude to side setting.

Recommended Next Steps for Side Setting in the Hawaii Longline Fleet

- **Incentives Program:** Extend the duration of the technical assistance incentives program to capitalize on the current momentum and willing participation by the Hawaii longline industry to assist with all remaining vessels in the fleet that wish to switch to side set.
- **Observer Data Collection Protocols:** Ensure observer data protocols include the collect of information to assess possible causes for differences in bird avoidance effectiveness of side setting vessels. This includes adopting a consistent and replicable method to observe average albatross abundance during entire sets, practices of crew setting baited hooks (where are the baited hooks thrown, how far forward is their setting position), vessel setting speed, propeller direction, and gear weighting configuration. Because many vessels employ a variety of weighing configurations throughout their branch lines, this necessitates that observers collect information on each occasion a seabird is captured. This will enable scientists to assess each side-setting vessel to identify design and operational differences, and determine if there is a correlation between vessels having relatively low seabird bycatch rates normalized for albatross abundance and specific fishing gear, vessel design, or fishing methods. Similar data are required also for non side-setting vessels, including the position of the line shooter in relation to the stern and starboard corners.
- **Side Setting Lessons Learned:** Continue to document lessons learned by vessels in the Hawaii fleet that have switched to side set to maximize the efficacy of side setting deck designs and fishing methods at reducing seabird bycatch and maximize operational benefits. Document subsequent modifications made to the vessel designs and fishing practices to improve side setting performance and bird avoidance efficacy.
- **Trends in Side vs. Stern Setting:** Assess the durability of conversions with time: is there a trend for vessels that switched to side setting to switch back to stern setting, or do vessels that try side setting tend to stick with the new setting position?
- **Comparison of Bird Bycatch Avoidance Efficacy:** Compare seabird bycatch rates, normalized for albatross abundance, of vessels in the Hawaii fleet that are side-setting versus employing other methods to avoid seabird capture. This can be conducted through analysis of the onboard observer database.
- **Bird Curtain:** Assess the extent that use of a bird curtain contributes to the performance of side setting to reduce seabird bycatch.
- **Export Lessons Learned:** Broadly disseminate to other longline fleets the benefits learned in the Hawaii fleet of the seabird avoidance and operational benefits of side setting.