

Collaborative Research Paves Way for Improvements to Seabird Bycatch Reduction Measures

by Western Pacific Regional Fishery Management Council (WPRFMC)



Blue-dyed fish bait helps camouflage it in the water.

■ A collaborative effort by fishermen, scientists and fishery managers is paving the way for new and improved techniques to avoid seabird interactions in the Hawai'i deep-set longline fishery that targets bigeye tuna. Since 2001, federal regulations require the Hawai'i longline fishery to use measures to minimize accidental interactions (hookings, or entanglements) with sea birds. Among the measures is a requirement to dye the fish bait blue to camouflage it in the water. Fishermen using blue-dyed bait (typically mackerel-type species sourced from places like Florida, Japan and Taiwan) have to thaw and dye the bait on deck prior to each setting operation, which is messy and cumbersome. Small-scale research conducted in the late 1990s showed that blue-dyed bait was effective in deterring sea birds such as Laysan and black-footed albatrosses from baited hooks. However, those earlier tests were conducted on squid bait, while Hawai'i longline fishermen have used fish bait for 20 years. Fishermen have pointed out that over time blue-dyed bait is no longer effective.



Albatrosses observed flying near the tori line during the study. Photo courtesy of 'IKE Solutions.

The Western Pacific Regional Fishery Management Council (the Council) held a workshop in 2018 that highlighted the need to find an alternative mitigation measure to colored bait to improve the practicality of the requirements, and to address several years of higher black-footed albatross interactions observed in the Hawai'i fishery. Workshop participants, including experts from management, fisheries science and industry, identified tori lines (also known as streamer lines, or bird-scaring lines) as a potential alternative to blue-dyed bait. Tori lines typically consist of a towed line with streamers suspended above the area where fishing gear is entering the water, which creates a barrier that deters sea birds from accessing the baited hooks.

Tori lines were tested in the Hawai'i longline fishery in the late 1990s, which showed that the deterrents were effective in reducing seabird contact rates with bait and gear. However, they were not included in the required set of measures because these early studies also identified issues with practicality and crew safety resulting from tori line entanglement with gear.

Although tori lines have not been required in the Hawai'i longline fishery, the measure has been tested and implemented in a number of other fisheries in the United States and internationally. A Hawai'i longline vessel captain that attended the Council's 2018 workshop had experience using tori lines in Alaska fisheries and noted that the design used was easy to deploy. Another vessel captain at the workshop had voluntarily used a simple design of a tori line, constructed from readily available materials found on their vessel, in the deep-set longline fishery.

And so began the collaboration between the Council, the Hawaii Longline Association, NMFS Pacific Islands Fisheries Science Center and Pacific Islands Regional Office to test tori lines in the Hawai'i longline fishery. Launched in 2019, the initial phase of the project focused on developing a tori line design that is safe and practical to use, which led to lightweight and streamlined designs. After testing five different tori line prototypes on seven Hawai'i longline vessels, a "short streamer" design was selected for commercial trials.

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Seabird Bycatch Reduction ... continued

The design had a 50m aerial section using a light and durable material (Dyneema) backbone and a 55m in-water section made of 6mm blue steel. The first round of field trials was conducted from February to July 2020 on four longline vessels that made 18 total trips. Shortly after the field trials started, the COVID-19 pandemic arrived on Hawai'i's shores, but the project was able to continue thanks to the use of electronic monitoring video cameras for data collection.

Results from the 2020 field trials indicated that tori lines are effective in reducing albatross contacts on baited hooks when used in conjunction with blue-dyed bait and other existing seabird bycatch reduction measures. Specifically, albatrosses are at least two times less likely to make an attempt or make contact with longline gear or bait when fishermen use tori lines.

A second round of field trials was conducted from February to June 2021, this time to directly compare the efficacy of tori lines against blue-dyed bait in deterring sea birds. Similar to the first round, video cameras recorded the seabird attempts and contacts throughout the setting operations on seven total trips on three vessels.

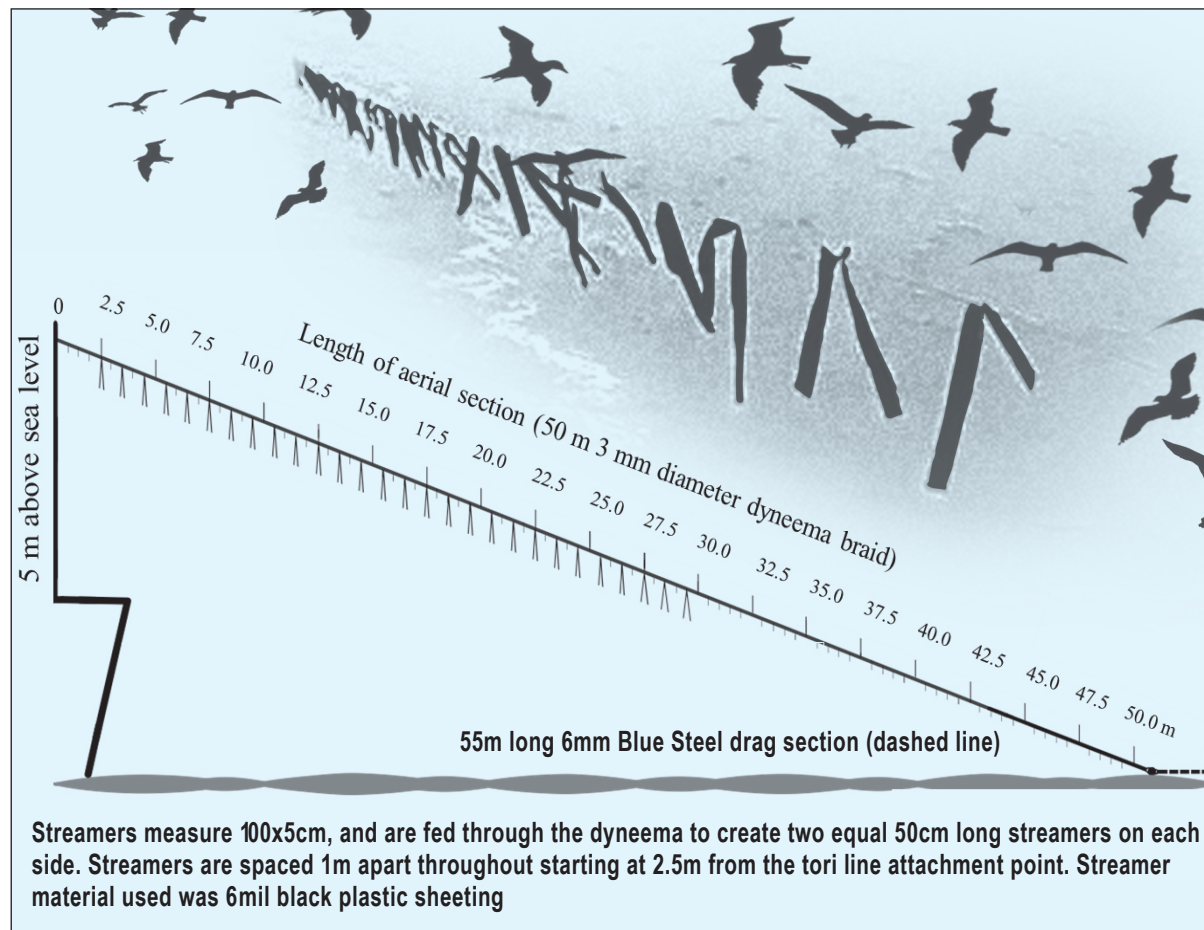
Results showed that Laysan and black-footed albatrosses were one and a half times less likely to attempt to attack, and four times less likely to contact baited hooks when fishermen set tori lines versus when using blue-dyed bait. In other words, tori lines were found to be far more effective than blue-dyed fish bait for seabird bycatch mitigation.

The collaboration with industry representatives and fishermen throughout the process also paid off in addressing the long-standing concern that tori lines can pose a safety hazard for fishermen. In the two years of trials, there was only one case of a tori line getting entangled with longline gear, at the very start of the first round. All of the captains who participated in the study found the new design easy and safe to use, with some who were skeptical at the beginning becoming strong supporters of the final version.

With the successful study results in hand, at its September 2021 meeting, the Council took the first step in recommending modifications to the regulatory requirements for the Hawai'i deep-set longline fishery and supported the use of tori lines in lieu of blue-dyed bait. The Council will consider a full analysis to make a final decision at its December 2021 meeting.

Read more about the two tori line studies on the Council website at <https://www.wpcouncil.org/2021torilinereport>, and check our calendar for meeting updates at <https://www.wpcouncil.org/meetings-calendars>.

... the Council



FISH AGGREGATING DEVICES (FADs)

Help Find the Missing State FADs:

Maui - Q, CC, DD, JJ, FF, N, NL

Hawai'i - XX, KH, HK, F, D

O'ahu - S, R, U, V, T, CO, BO, J, and II

Kaua'i - PP, KK, BB, DK, Z, WK

Discontinued:

Maui - LA; **Hawai'i** - QQ

The State of Hawaii has placed Fish Aggregating Devices (FADs) in the waters surrounding the main Hawaiian Islands. These buoys attract schools of tuna and other important pelagic fishes, such as dolphinfish (mahimahi), wahoo (ono), and billfish. FADs allow fishermen to easily locate and catch these species. The State of Hawaii FAD program is operated by Hawaii Institute of Marine Biology (HIMB), SOEST, University of Hawaii in cooperation with the State of Hawai'i's Division of Aquatic Resources (DAR). Principle funding for the system is derived from the Dingle-Johnson Federal Funds, disbursed through DAR.

