

**FY21 Appropriations: *Study interactions between the U.S. fishing fleet and false killer whales in the Western Pacific***

**Project Spend Plan Estimates**

**July 22, 2021**

**Project: Acoustic Monitoring**

**Goal:** Identify the vessel or gear-based source of sounds related to increased depredation by FKWs. Seek options to reduce or eliminate ‘dinner bell’ sounds.

**Further Description:** Continue acoustic monitoring of the longline fleet to identify and mitigate potential acoustic cues leading to false killer whale depredation. The ongoing study identified possible acoustic cues associated with longline vessels and found that depredation rates are higher on vessels where this noise is detected. This next phase of the study will seek to identify the source of those sounds on the vessel and measure their long distance propagation underwater, with the goal of finding strategies to reduce the sounds. Several vessels have volunteered to participate.

**Study Concept:** Deploy 4 underwater acoustic monitors to examine underwater propagation. Observer makes in-air recordings of various gear on deck to identify source of noise detected underwater. 20 observed trips are planned. Vessel can be monitored more than once to attempt mitigating identified noise source. Includes improvements to automated detection & classification to speed up analysis, development of noise metrics to describe and pair underwater/in-air sounds detected from the vessel/gear.

**Status:** First deployment underway as of June 2021

**Estimated Funding Amount:** \$350,000

**Lead Organization:** PIFSC Cetacean Research Program

**Partners:** PIRO Observer Program – Sustainable Fisheries Division; Saltwater Inc, Hawaii Longline Association

**Relation to FKWTRT Recommendations:** Continued work to reduce depredation.

**Project: Telemetry Deployments**

**Goal:** Collect movement data from pelagic FKWs to assess interaction rates, response to vessels, and FKW habitat. Data will also help with assessment of the pelagic stock range.

**Further Description:** Conduct telemetry deployments on pelagic false killer whales to examine interaction rates and response to longline vessels. To date telemetry data from pelagic false killer whales have been important for examining the range of the stock and also their response to fishing vessels.

**Study Concept:** Two vessel intensive survey and tag deployment effort off Kona over ~5 weeks. - Two weeks intensive field effort targeting offshore waters. Three weeks of on-call/good weather/fast-response field effort.

**Status:** Initial field effort April-May 2021; additional field effort summer/fall 2021

**Estimated Funding Amount:** \$223,000

**Lead Organization:** Cascadia Research

**Partners:** PIFSC Cetacean Research Program

**Relation to FKWTRT Recommendations:** Continued work to reduce depredation.

### **Project: Hook Corrosion & Breaking Strength**

**Goal:** Examine factors affecting breaking/bending/opening strength of hooks at various states of corrosion.

**Further Description:** Conduct analysis and reporting of hook corrosion rates and breaking strength. This project will build on a previous study that examined hook corrosion rates in a controlled environment and measured breaking strength at different phases of corrosion.

**Study Concept:** Hook corrosion rate and breaking strengths were assessed for hooks and hook configurations used in the Hawaii and AS longline fisheries. Hooks were soaked in a flume at HIMB with running seawater for one year. Weights and diameters were measured every month. Breaking strength was tested for hooks that were soaked for one year and when new.

**Status:** Funds primarily used for analysis of the already collected data.

**Estimated Funding Amount:** \$38,400

**Lead Organization:** PIFSC Fisheries Research and Monitoring Division

**Partners:** University of Hawaii, Hawaii Institute of Marine Biology

**Relation to FKWTRT Recommendations:** Assess post-hooking mortality and gear characteristics.

### **Project: Camera System Development**

**Goal:** Development and testing of a camera system to document and understand protected species bycatch.

**Further Description:** Develop and test a camera system to document how a whale is hooked. The concept for this project is a "mini-camera" that, once developed, would be distributed to observers, who could then attach and slide the camera down the line when a whale was hooked, to gain a better perspective of how the whale is hooked.

**Study Concept:** A miniature camera system that can be quickly deployed down the branchline can obtain high-resolution images to better document and assess injuries and will greatly aid in understanding the mechanisms of how protected species are hooked or entangled in fishing gear and help inform solutions to minimize bycatch. Several camera and lighting systems will be field tested in controlled environment. Refined candidate systems will be field tested on a longline vessel. 20 camera systems following best design will be provided to fishery observers for use in the fishery.

**Status:** Not yet begun as of June 2021

**Estimated Funding Amount:** \$160,000

**Lead Organization:** Cascadia Research

**Partners:** PIRO Observer Program

**Relation to FKWTRT Recommendations:** Assessment of post-hooking mortality; methods to reduce trailing gear; injury assessment

### **Project: Handling Tools**

**Goal:** Assess and develop tools for safer handling of hooked or entangled whales. For example, evaluate measures to assist in fly-back prevention.

**Study Concept:** Hire student in UH mechanical engineering department to model fly-back trajectories to improve handling recommendations and crew safety. Test how different weighting configurations may alter trajectories, and field test models.

**Status:** Scope of work and contracting in development

**Estimated Funding Amount:** \$132,000

**Lead Organization:** PIFSC Fisheries Research and Monitoring Division

**Partners:** University of Hawaii, Department of Engineering

**Relation to FKWTRT Recommendations:** Improve handling recommendations, reduce trailing gear, seriousness of injury.

### **Project: Electronic Monitoring of Empty Hooks**

**Goal:** Machine learning and artificial intelligence to assess longline depredation using video data collected by existing EM systems.

**Further Description:** Use electronic monitoring to examine rates of empty hooks per longline set. This effort will help to provide a more quantitative evaluation of bait depredation rates. The acoustic monitoring project will be striving to carry out at least a portion of the deployments on vessels with an EM system enabling broad use of this 'empty hook' data and other EM datasets for more comprehensive evaluation of the factors that impact depredation by false killer whales.

**Study Concept:** High rates of empty hooks in a set may be a sign of depredation, especially when coupled with evidence of catch depredation. Develop a photo library to detect catch (completed), bait and no bait or empty hook. Train computer algorithms to detect catch, bait and no bait and apply to archived EM video to characterize depredation.

**Status:** Video data annotation underway. Algorithm training forthcoming.

**Estimated Funding Amount:** \$50,000

**Lead Organization:** PIFSC Fisheries Research and Monitoring Division

**Partners:** Cooperative Institute for Marine and Atmospheric Research (CIMAR), University of Hawaii.

**Relation to FKWTRT Recommendations:** Continued work to reduce depredation