Bycatch Reduction Engineering Program Grant Awards by Region

Alaska

Applicant: FishNext Research

Project Title: Enabling halibut bycatch reduction by Gulf of Alaska groundfish trawl fisheries: Tools for excluder testing and enhanced bycatch tracking

Description: To improve the ability of GOA trawlers and fishery managers to better track halibut bycatch, this project proposes to apply recently developed and improving electronic monitoring technology to provide accurate counts, lengths and time-on-deck for each halibut handled. This technology will be applied both in routine fisheries operations and a designed experiment to test trawl modifications to increase halibut escape during towing. By adapting and deploying this technology for the smaller trawlers of the Kodiak fleet, timely information on the amount of halibut bycatch will be provided and hence improve their ability to reduce such bycatch. Such reduction will be achieved by 1) enabling direct testing of excluder designs, 2) improved feedback to captains as they adjust fishing locations, gear rigging, or operations to reduce bycatch, 3) by facilitating implementation of catch share management, providing the incentive structure and flexibility needed to achieve effective bycatch reduction at the individual vessel level, and 4) reduced handling time to improve halibut mortality.

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Applicant: University of California, San Diego

Project Title: Continued Video, Acoustic, and Accelerometer Deployments on Pelagic and Demersal Longlines, for Observing Interactions with Bycatch Species

Description: This proposal extends work by two earlier BREP awards by continuing to deploy at least ten individual "TadPro" camera systems on both pelagic longlines off Hawaii and demersal longlines off Alaska, after extending their recording endurance. "TadPro" acoustic/video recorders will be expanded to incorporate accelerometer data logging, for mounting onto the mainline of a longline haul. Fishermen partners will deploy these instruments off the Alaskan coast on 15 sets of longline gear. The demonstration species addressed in this work will be target species like sablefish, grenadier, and halibut; various kinds of bycatch species like rockfish and potentially sharks and skates; and (opportunistically) sperm whale depredation. Longline interactions by all these species will be confirmed by video, and temporal features of both acoustic and accelerometer measurements will be made to determine whether a combination of acoustic/accelerometer measurements can be used to flag whether a particular species is present on a given hook, and whether multiple hooks could be monitored by a single sensor package.
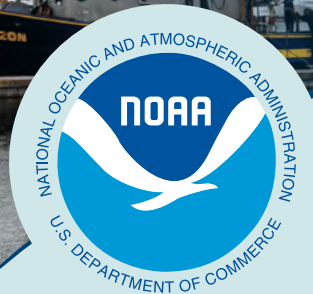
Greater Atlantic

Applicant: University of New England

Project Title: Quantifying and reducing post-release mortality for Dusky sharks discarded in the commercial pelagic longline fishery

Description: This project will evaluate the post-release mortality of dusky sharks captured by pelagic longline gear beginning January of 2016. Dusky sharks (n = 50) captured using standard pelagic longline fishing methods will be affixed with a high rate pop-up satellite archival tag prior to release to evaluate extended (~30 days) post-release mortality. Biological, physical, and capture variables including, but not limited to time on the hook (measured with hook timers), size, sex, hook location, water temperature, tissue damage and gangion length, will be recorded. Statistical analyses will incorporate the study variables and post-release mortality estimates to produce a model that identifies conditions (fishing practices) that minimize post-release mortality. These results will be used to produce a "best practice guidance" protocol to be disseminated to management sources and the pelagic longline fishery by various pathways.

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Applicant: The Research Foundation for the State University of New York (SUNY)

Project Title: Development of an Analytical Tool to Allow Fishermen to Reduce Bycatch of Short-Finned Pilot Whales in the Mid-Atlantic Bight

Description: The total annual estimated fishery related mortality and serious injury (M/SI) of shortfinned pilot whales (Globicephala macrorhynchus) in the pelagic longline fishery is expected to exceed the Potential Biological Removal (PBR) for this stock in 2015. The Pelagic Longline Take Reduction Team has been working to reduce M/SI in this fishery since 2005. Previous attempts to decrease the number of interactions, such as limiting mainline length or the use of acoustic deterrents, have proven to be unsuccessful. One largely unexplored alternative approach to this problem is to provide fishermen with information so that they can avoid these interactions in the first place. Recent telemetry studies suggest that short-finned pilot whale habitat is more spatially constrained than previously understood.

Preliminary analyses indicate that this habitat can be predicted using readily available oceanographic data such as bathymetry and sea surface temperature, suggesting that it would be feasible for fisherman to use this information to avoid pilot whale "hotspots". This project will rigorously quantify the spatial and temporal overlap between shortfinned pilot whales and pelagic longlines in the Mid-Atlantic Bight to identify areas and times of high risk for interactions between pilot whales and longline gear. Fishermen will then be able to use this information to make decisions concerning where and when to fish that reduce the likelihood of interacting with pilot whales.

Greater Atlantic (continued)

Applicant: New England Aquarium Corporation

Project Title: Identifying bottom trawl bycatch hotspots and capture-and-handling practices to reduce the incidental mortality of an overfished Species of Concern -- the Thorny Skate -- in the Gulf of Maine

Description: Existing fisheries-dependent and independent data will be mined to identify locations and times where the likelihood of thorny skate bycatch is high (bycatch hotspots) within the Gulf of Maine (GOM). Next, working with a commercial fisherman, evaluation of the vitality and condition of trawl-caught thorny skates will be conducted and a subsample tagged with PSAT tags to monitor PRM for up to 30 days. Results from each component will be integrated to develop practical bycatch avoidance strategies for thorny skates in the GOM (e.g., geographic areas that should be avoided in space and time) and to provide clear recommendations on best-practice fishing and handling methods (e.g., maximum tow times, handling methods, optimal time on deck) for reducing PRM in trawl-caught thorny skates.

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Applicant: University of New England

Project Title: Determining the post-release mortality rate and -- best capture-and-handling -- methods for Atlantic cod (Gadus morhua) discarded in Gulf of Maine lobster industry

Description: During the 2016 fishing season, This project will evaluate the physical injury of Gulf of Maine (GOM) Atlantic cod immediately following capture by standard lobster gear during dedicated research trips conducted under fishery-dependent conditions. Prior to release, acoustic transmitters with depth sensors will be affixed to a subsample (n = 100) of assessed cod, which will be continuously monitored in their natural environment by an array of 30 acoustic receivers to evaluate acute and delayed mortality. These mortality data will subsequently be applied to the broader sample of assessed cod to derive robust discard mortality rates applicable at the fishery-wide scale. In addition, best practice recommendations will be determined to enhance survival of cod captured in lobster gear by examining injury and fishing-related factors contributing to mortality. By disseminating results to fishery stakeholders via various outreach networks, this study will provide accurate discard mortality data for GOM cod captured via lobster gear and relevant information for promoting survival of released individuals.

Southeast & Caribbean

Applicant: The University of Mississippi

Project Title: Reducing Shark Bycatch in Commercial and Recreational Fisheries

Description: The overall objective of this project is to develop an auto-release leader(s) (ARL) that would allow by-captured sharks to break the fishing line while retaining target species (tuna, swordfish, redfish, seatrout). Effectiveness of the ARL gear as compared to standard gear would be tested on longlines and using rod-and-reel, primarily during the spring/summer months of 2016. Modifications to the ARL design would be made as necessary until maximum performance is achieved. The specific objectives are to: 1) develop two different ARL's for potential use in the commercial and recreational fisheries, 2) evaluate both ultra high molecular weight polyethylene and monofilament line for use with the ARL, 3) partnered with NMFS personnel, conduct tests of the ARL during longlining in the Gulf of Mexico, 4) determine the most effective ARL design and analyze its potential effectiveness for use in commercial and recreational fisheries, and 5) inform stakeholders such as commercial and recreational fishers and local and regional management bodies, as to the effectiveness of the ARL system to increase knowledge and effect broader use of the gear.

Applicant: North Carolina Dept. of Environment and Natural Resources

Project Title: Technical Solutions to Reduce Bycatch in the North Carolina Otter Trawl Shrimp Fishery

Description: The proposed project will build on the results from a current Conservation Fund and National Fish and Wildlife Fund (NFWF) grants and will address the NC Marine Fisheries Conservation request by continuing an industry work group, conducting two formal workshops prior to industry-led testing (in conjunction with the NFWF project meetings), evaluating Bycatch Reduction Devices (BRDs) aboard three commercial trawlers in the summer brown shrimp fishery, and conducting an outreach workshop following testing to communicate to industry the most promising configurations. Should optimal BRDs be identified in this process, fishery managers and the commercial industry will have further tools to better manage and maintain this economically critical fishery. While data will be gathered from comparative testing aboard commercial shrimp trawlers in North Carolina, the technology identified in this process can be transferred throughout all southeast Atlantic and Gulf of Mexico commercial trawl fisheries where finfish bycatch is also an issue.

Pacific Islands

Applicant: Cascadia Research Collective

Project Title: False killer whale movements in relation to longline fishing activity: assessment of interactions using satellite tag and fisheries data to develop best practices to reduce bycatch

Description: The primary goal of this research is to examine the relationship between movements of satellite-tagged FKWs and longline fishing effort to inform fishing best practices to reduce bycatch. Analyses to address this goal are currently being undertaken with existing data, and this project would allow for additional field efforts to increase the sample size of tag data which will also contribute greatly to future research beyond the scope of this project.

West Coast

Applicant: Pfleger Institute of Environmental Research

Project Title: Strategic deep-setting for swordfish: Developing an alternative for the CA drift gillnet fishery

Description: This work will couple successful depth-based targeting techniques developed under NOAA funding (Sepulveda et al., 2014; 2015) with cooperative fisher knowledge and field experiments to design a hybrid gear type that is specific to the west coast. This work is centered on developing and identifying a low-impact alternative that can be used by the CA DGN fleet. The project hypothesizes that the design will (1) selectively target swordfish at depth, (2) provide an increase in gear performance relative to artisanal fisheries, (3) have minimal non-target impacts, and (4) offer larger vessels a west coast-specific gear option that can be used to supplement or substitute the DGN gear type. This work will also continue to build upon an extensive outreach campaign that has focused on bycatch reduction and innovation in west coast swordfish fishery development.

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Applicant: Pacific States Marine Fisheries Commission

Project Title: Examining the use of artificial illumination to reduce rockfish bycatch in the west coast groundfish bottom trawl flatfish fishery

Description: The objective of this study is to evaluate if simple enhancements to the visibility of a selective flatfish trawl headrope can improve bycatch reduction for darkblotched and other slope rockfishes. A low-rise selective flatfish trawl will be used in this study. To increase the trawls visibility, a series of 10 WESMAR Electronic Bait green LED lights will be attached across the headrope length. A randomized block design will be used to determine the order in which the trawl is fished with and without LED lights. Light levels will be recorded using Wildlife Computers TDR-MK9 archival tags. Fish catches will be analyzed using ANOVA and GLMM tests. This work will occur aboard a commercial fishing vessel of 14 fishing days.

West Coast (continued)

Applicant: Pacific States Marine Fisheries Commission

Project Title: Modifying trawl selectivity to reduce Chinook salmon bycatch in the Pacific hake fishery

Description: The objective of this study is to test a flexible sorting grid BRD designed to reduce Chinook salmon bycatch and evaluate its efficacy in the Pacific hake fishery. This research will occur over 12 days of gear testing aboard a chartered Pacific hake fishing vessel. Trawling will be conducted using a commercial-sized midwater trawl and outfitted with the identified flexible sorting grid BRD. Retention and escapement rates will be quantified using a recapture net. Video camera systems will be used periodically to gather information on fish behavior in the vicinity of the BRD. A GLMM will be used to compare the proportion of fish catch at length to determine if retention is length-related.

Applicant: Hanan and Associates, Inc.

Project Title: Testing potential bycatch reduction from deep-set compared to shallow-set pelagic longline fishing targeting swordfish in the California Current

Description: This project was set up to utilize fishermen's knowledge of where and how to fish swordfish sustainably within the west coast EEZ. The project intends to use techniques developed in the Hawaiian longline fishery proven to reduce bycatch off the US west coast. To perform the project, one or two commercial fishing vessels with experienced longline captains collaborating with NMFS scientists regarding fishing locations likely to produce swordfish with reduced bycatch of marine mammals and sea turtles will be utilized. The project intends to test shallow set longlines (<100m) versus deep set longlines (>100m) and test for significant differences in targeted catch and bycatch. Shallow sets will be fished during the night and deep sets fished during the day. If using one vessel we will alternate between gear types from one set to the next in the same general location. If using two vessels we will have one vessel perform shallow sets and the other do deep sets. In the second year we would have vessels use the gear type not used the first year. All trips and each set will be monitored by NMFS approved and trained observers. All observer data form will be collected by the PI after each trip.

International

Applicant: Fisheries and Marine Institute, Memorial University

Project Title: Should shrimp trawls lighten up? Investigating the effectiveness of LEDs at reducing bycatch of small-bodied fish in Atlantic shrimp fisheries

Description: Technological innovation has reduced bycatch rates in bottom trawl fisheries, but problems still exist in the area of bycatch of small-bodied fishes. In this study, the effectiveness of artificial lighting will be tested at reducing capture rates of small-bodied fish in shrimp trawls. Field experiments will be conducted comparing the effectiveness of five commercially-available light colors at improving selectivity of shrimp trawls in Atlantic waters. Species-specific responses will be examined across colors, and the use of underwater cameras utilized to directly observe fish response in situ to each configuration. The goal is to determine whether lighting can serve as a conservation tool in Atlantic fisheries, and how best to use lights to minimize bycatch.

Applicant: Pro Delphinus

Project Title: Assessing the effectiveness of net illumination as a multi-taxa bycatch reduction solution

Description: Illumination tests with paired control/treatment nets will be conducted through at-sea trials with cooperating vessels and under true fishery conditions. Experiments will be conducted in small-scale fisheries based in the ports of 1) Salaverry and 2) Tambo de Mora, locations selected for their respectively high catch rates of small cetaceans and leatherback turtles.

Applicant: Ocean Discovery Institute

Project Title: Testing acoustic deterrent devices to reduce bycatch of sea turtles in commercial gillnet fisheries

Description: Previous work has resulted in the successful development and testing of multiple visual deterrents to reduce sea turtle bycatch. Field trials demonstrated that illuminating nets with multiple wavelengths of light (green, ultraviolet, and orange) can reduce sea turtle interaction rates in gillnets with no negative effects on target fish catch or fishery revenue. Much of the project's success is due to the unique and productive research platform in Baja California, MX. This platform provides both high turtle interaction rates for quick and efficient testing of new technologies as well as access to a commercial gillnet fishery and strong relationships with engaged fisherman partners and government officials. Work using this platform has produced multiple BRTs that are available for use by U.S. fisheries. This project will work with an acoustic deterrent device engineering company (such as Loggerhead Instruments) to develop a new acoustic deterrent device (ADD) prototype with the following improvements: reduced size, improved waterproofing, and simpler method of attachment to nets. This objective is critical so that devices can be deployed on bottom-set gillnets by fishermen without assistance from project staff.