# 2013 Bycatch Reduction Engineering Program Grant Awards by Region

## Alaska

***Project Title:*** Use of digital imaging technology in the reduction of released halibut mortality in Alaska's recreational fishery
***Applicant:*** Alaska Charter Association
***Location:*** Pending
***Description:*** Project objectives are to: 1) determine the relationship between certain features on the head of a halibut to its fork length; and 2) develop and field test a smartphone digital imaging application that will display the length and weight of a halibut after capturing the image of the halibut's head.

## Northeast

***Project Title:*** Modeling the dynamics of Baleen whale entanglements in fishing gear
***Applicant:*** BelleQuant Engineering
***Location:*** North Atlantic modeling (North Carolina Organization)
***Description:*** Project objectives include: 1) help "reverse engineer" past entanglement events by combining flow models, scarring data , and entanglement wrap illustrations and photos; 2) identify gear types and specifications that pose the greatest risk for producing severe entanglements; and 3) develop a gear design system that will allow researchers to test various gear scenarios for potential entanglement severity. Principal investigators will refine a computer model that simulates encounters between North Atlantic right and humpback whales and different types of fishing ropes used in lobster trap trawls and gillnets. The project proposes an innovative approach for understanding the consequences of existing fishing gear and potential gear modifications on baleen whale entanglements. The model fills a critical gap in that large whale entanglements have almost never been observed, and their rarity means we cannot conduct statistically robust experiments to test the impacts of different gear types.

***Project Title:*** Minimizing bottom habitat impacts in the otter trawl fishery with a light weight riser sweep
***Applicant:*** Integrity Fishing Corp.
***Location:*** North Atlantic
***Description:*** Project objectives include: 1) design and construct a light weight otter trawl sweep using High Density Poly Ethylene (HDPE) plastic; 2) collect and analyze catch composition of the experimental sweep versus a conventional otter trawl sweep; and 3) collect and analyze trawl mensuration data for the experimental sweep versus a conventional otter trawl sweep.

***Project Title:*** Optimization of gear size and post-release mortality reduction in the New Jersey summer flounder hook and line fishery
***Applicant:*** Fairleigh Dickinson University
***Location:*** Mid-Atlantic, New Jersey
***Description:*** The main objective of this project is to quantitatively determine the optimal hook sizes for anglers to land legal summer flounder, reduce the number of sub-legal flounder caught (discards), and reduce the incidence of deep hooking associated with catch and release. This technological research study has been designed to directly reduce the number of flounder discards and post-release mortality through optimization of gear size for both the commercial and recreational hook and line fisheries. These "optimal" size(s) will result in a lower number of discards and increase stock biomass through reduction of stress and potential mortality. These data will then be used to recommend selective gear regulations in order to reduce future discard mortality.

***Project Title:*** Enhanced bycatch avoidance communication network for river herring and butterfish
***Applicant:*** Cornell University
***Location:*** New England, North Atlantic
***Description:*** The main objective of this project is to expand and enhance the successful voluntary avoidance network to reduce butterfish and river herring bycatch encounters and increase fishing opportunities for a fleet that might be restricted once the bycatch of these species cause unwanted fishery closures. Specific goals are as follows: 1) create a real-time fleet communication system to identify, anticipate, and report "hot spots" of river herring and butterfish concentrations within the normal distribution of squid catches which could be avoided to reduce bycatch incidents; 2) enable more effective fishery conservation and management through collection and use of real-time catch data; and 3) enhance the current bycatch avoidance network with the collection of fisheries-dependent data including catch data, tow data, and related bottom temperature in the inshore and offshore fisheries to improve management practices in the squid fisheries.

***Project Title:*** Determination of the impacts of trap fishing on Mid-Atlantic benthic habitats, with emphasis on structure-forming invertebrates
***Applicant:*** University of Maryland Eastern Shore
***Location:*** Mid-Atlantic Bight
***Description:*** Black sea bass (BSB) is a federally managed species that supports important commercial and recreational fisheries in the Mid-Atlantic Bight, but data on its Essential Fish Habitat (EFH) are extremely limited. BSB traps are set almost exclusively in areas of hard bottom with live covering of anemones, corals, and other emergent epifauna. Setting and retrieval of traps, as well as movement of traps caused by storms, may damage the underlying epifauna which act as EFH for the fish and lobster species being targeted. The goals of the study will be to determine if fish/lobster traps set in open ocean waters cause damage to underlying epifauna while being set, retrieved, or dragged.

## Northwest

***Project Title:*** Reducing sablefish and rockfish bycatch in the U.S. West Coast groundfish bottom trawl directed flatfish fishery
***Applicant:*** Pacific States Marine Fisheries Commission
***Location:*** Off the coast of Oregon and/or Washington
***Description:*** The proposed project seeks to evaluate the efficacy of a flexible sorting grid excluder designed to reduce sablefish and rockfishes bycatch in the West Coast groundfish bottom trawl directed flatfish fishery. The concept of this design is that fish smaller than the grid openings (i.e., flatfishes) will pass through and move aft towards the codend, whereas fish larger than the grid openings (i.e., sablefish and rockfishes) will be excluded. Fish retention and escapement will be quantified using a recapture net. To examine the gear's size selectivity characteristics, length data will be collected on target and bycatch species of concern. Following Holst and Revill (2009) a generalized linear mixed model will be applied to examine if escapement is length-related. Percent retention by weight will be identified for all species. This research will occur over 12 days of fishing aboard a chartered fishing vessel.

***Project Title:*** Pot gear innovation for the West Coast groundfish trawl fishery
***Applicant:*** The Nature Conservancy
***Location:*** Off the coast of Oregon and/or Washington
***Description:*** Project objectives include: 1) test and perfect a lingcod pot that will minimize bycatch on overfished species (Pacific halibut, four rockfish); 2) refine the research fishing plan for subsequent years using year one experience and data; 3) complete processes for approval to test the new gear inside the Rockfish Conservation Area (RCA) off Washington's coast; and 4) prepare for scaled field trials in year two. This project will focus on testing three alternative designs and perfecting the most promising one. Data will be used to refine the research fishing plan for subsequent years and to apply for permission to test the gear inside the RCA.

***Project Title:*** Reducing ESA-listed eulachon bycatch in the ocean shrimp trawl fishery: can increasing the visibility of trawl components improve bycatch reduction?
***Applicant:*** Pacific States Marine Fisheries Commission
***Location:*** Off the coast of Oregon and/or Washington
***Description:*** The proposed study seeks to conduct two field experiments with ocean shrimp trawls to evaluate if simple enhancements to the visibility of the trawl components can be used to improve bycatch reduction for eulachon. First, to test whether making a rigid-grate bycatch reduction device (BRD) relatively more visible will improve exclusion efficiency for eulachon. Second, to test whether making the fishing line of an ocean shrimp trawl more visible will increase escapement of eulachon underneath the trawl through a "footrope window." A "footrope window" is a small section at the center of the trawl footrope from which the groundline has been removed to allow fish that are herded towards the center of the trawl footrope an opportunity to escape under the "fishing line" of the trawl. For each experiment, catches will be compared between two double-rigged shrimp trawls fished simultaneously, one incorporating the effect of interest and the other serving as a control. The effect of interest will be switched between the two nets in an ABBA pattern. To increase the visibility of the rigid-grate, Lindgren-Pitman LED Electralume® fishing lights will be used to illuminate the grate. To increase the visibility of the fishing line above the "footrope window," a series of 4-6 Electralume® fishing lights will be directly attached to the fishing line. Wildlife Computers TDR-MK9 archival tags will be used to

measure and compare light levels at the grate and on the fishing line of each trawl. A total of 10 days of fishing aboard a chartered ocean shrimp fishing vessel will be devoted to this research.

## Southeast and Caribbean

***Project Title:*** Testing an alternative method for the safe release of reef fishes caught on hook-and-line gear in the recreational fishery in the Gulf of Mexico
***Applicant:*** Florida Fish and Wildlife Conservation Commission
***Location:*** Gulf of Mexico
***Description:*** The primary objectives of this study are: 1) to assess whether rapid recompression for reef fishes in the Gulf of Mexico is a viable alternative to surface release when fish require venting and/or when venting is deemed unnecessary; 2) to determine an optimum depth range for recompression and reduced predation; and 3) to quantify potential reductions in post-release mortalities if new release methods are prescribed. Principal investigators will work cooperatively with the recreational for-hire industry to assess the practical application of recompression in the recreational fishery. Experimental treatments will compare the current practice, where fish are vented at the discretion of anglers and released at the surface, to an alternative method where fish are returned rapidly to depth and recompressed without the need for venting. The primary species of interest are red snapper, gag, and red grouper. Experiments will be conducted from recreational for-hire vessels in northern and central portions of the west coast of Florida during June through September, which is the period of highest stress and vulnerability for discarded reef fish. Experiments will be conducted in depths between 30 and 60 meters where recreational fishing takes place and barotrauma is a concern. Fish will be tagged and recapture rates among treatment groups will be compared to assess relative survival rates.

***Project Title:*** Further evaluation of a topless bottom trawl design with regard to excluding sea turtles
***Applicant:*** Gulf and South Atlantic Fisheries Foundation, Inc.
***Location:*** Coastal Georgia
***Description:*** The participants of a 2012 bottom trawl workshop suggested that NOAA Fisheries look at the feasibility of using a topless trawl to reduce sea turtle takes in the summer flounder bottom trawl fishery. This suggestion led to a collaboration of academics, industry fishermen and net builders, and NOAA Fisheries staff who worked together to develop the topless trawl design and sampling protocols. The results of the previous test show that the 160-foot headrope trawl was successful at not capturing sea turtles, but still captured finfish, skates, rays, and crabs at reasonable rates. The primary goal of this project will be to re-evaluate the ability of the modified topless trawl design with a 160-foot headrope to exclude sea turtles. Field work will commence off Brunswick, Georgia. All tows will be made in pairs with closed codends and standardized to a 30-minute duration to reduce the probability of drowning a sea turtle.

***Project Title:*** Commercial fishing gear modifications to reduce Atlantic sturgeon interactions in North Carolina and Mid-Atlantic gillnet fisheries
***Applicant:*** Cardno ENTRIX
***Location:*** North Carolina and Virginia gillnet fisheries
***Description:*** The proposed goal of this project is to reduce Atlantic surgeon interactions in anchored gillnet gear without significantly reducing target catch. The specific objectives are to: 1) evaluate the effectiveness of reducing Atlantic sturgeon interactions by modifying gillnet gear in the striped bass (Virginia) and southern flounder (North Carolina) fisheries; 2) evaluate the catch rates of striped bass and southern flounder in modified gear; 3) expand sturgeon tagging programs and gather additional information on movements of animals within and between estuaries; 4) collect genetic samples for further delineating and understanding Atlantic surgeon distinct population segments; 5) document seasonal distribution and identify essential habitat; 6) evaluate and assess the environmental conditions associated with Atlantic sturgeon interactions; and 7) partner and build relationships for improving the exchange and access of available information on sturgeon movements.

## Southwest

***Project Title:*** Facilitating the development and future implementation of a deep-set buoy gear fishery off the California Coast
***Applicant:*** Pfleger Institute of Environmental Research (PIER)
***Location:*** Ocean waters off California
***Description:*** Proposed project objectives are to: 1) quantify catch and bycatch rates in the Southern California Bight (SCB) using the deep-set buoy gear (DSBG) configuration developed under the 2012-2013 Bycatch Reduction Engineering Program (BREP) program award; 2) launch a robust outreach platform that informs stakeholders, markets and consumers on the need for innovative solutions to bycatch issues in domestic swordfish operations; and 3) provide the Pacific Fishery Management Council with the quantitative information necessary for the initiation of an experimental fishery permit for DSBG in Southern California. Collectively, the proposed work will delineate and execute the required steps for transitioning this research project to full implementation in California. The proposed study entails the use of multiple vessels conducting field trials to evaluate catch and bycatch rates using DSBG in the SCB. The deep-set configuration used in the trials will be based on the design developed with BREP funds. This study will also entail a diverse outreach platform that integrates and informs key stakeholders including swordfish buyers and retail markets.

***Project Title:*** Examining environmental effects on rockfish catch-and-release survival: does low oxygen contribute to mortality following barotrauma?
***Applicant:*** University of California, San Diego (Scripps Oceanographic Institution)
***Location:*** Ocean waters off California
***Description:*** This project seeks to determine the effects of low levels of dissolved oxygen on rockfish recovery from barotrauma following catch and release. Specifically this will include: 1) determination of oxygen

concentrations typically experienced by rockfish in the wild using oxygen sensing acoustic transmitters; 2) determination of rockfish voluntary movements in relation to changing oxygen concentrations using acoustic transmitters and a three-dimensional positioning system; 3) determination of rockfish resting metabolic rates and the critical oxygen concentration at which aerobic demands cannot be met both prior to and while recovering from barotrauma; and, 4) examination of rockfish survival and recovery at varying dissolved oxygen levels following barotrauma. Field and laboratory studies will be implemented to understand the effects of low levels of dissolved oxygen on rockfish recovery from barotrauma. Fieldwork will involve a tagging study to examine rockfish sensitivity and movements in relation to dissolved oxygen in vivo. Laboratory studies will include determination of rockfish oxygen demands and the critical oxygen concentration causing stress following simulated capture using a hyperbaric chamber.

## Atlantic Highly Migratory Species

***Project Title:*** Novel technology to assess mortality from bycatch in large coastal sharks
***Applicant:*** MOTE Marine Laboratory
***Location:*** Florida
***Description:*** The proposed study will be the first to quantify post-release mortality and behavioral effects on large coastal or protected shark species caught in the Florida commercial shark fishery. It will integrate conventional and novel techniques to revolutionize the study of post-release mortality in coastal animals. By working with Florida commercial shark fishermen to draw blood and tag animals with acceleration data loggers (ADLs), the principal investigators will determine post-release mortality and effects, and then correlate these with at-vessel measures. ADLs record animal movements and body posture at sub-second intervals, providing higher-resolution information about mortality, swimming abnormalities, and recovery time than traditional satellite tags at a fraction of the cost. Additionally, hook timers will be used to quantify the effect of hooked time on physiology and post-release behavior in these important commercial species.

## International

***Project Title:*** Training of U.S. longline fishermen and fishery observers to increase post-release survival of accidentally captured sea turtles and other protected species
***Applicant:*** SUBMON
***Location:*** Pacific Islands, Gulf of Mexico, Mid-Atlantic
***Description:*** The general objective of this project is to reduce sea turtle mortality after interaction with trained U.S. longline fisheries by 30- 50 percent, depending on practices currently used by fishermen. This will be achieved through the improvement of the handling and hook-removal techniques of accidentally captured turtles by fishermen, removing some especially harmful procedures. This improvement in knowledge will decrease the damage suffered by captured turtles, and therefore increase their probabilities for post-release survival.