

2017 BREP Abstracts

Pfleger Institute of Environmental Research

Developing radio and satellite smart buoys for bycatch mitigation

This project will address bycatch in the West Coast swordfish fishery by developing technological improvements to deep-set buoy gear. The gear selectively targets swordfish, but requires continuous observation, which is not always possible under adverse conditions. To address this problem, the project will investigate approaches for integrating satellite and radio-based technology into surface floats to (1) provide fisheries with an enhanced ability to monitor gear and detect fishery interactions, (2) minimize the potential for lost gear, and (3) enhance post-release survivorship of non-target species (e.g., marine mammals) that interact with fishing gear. While this work is specific to the West Coast deep-set buoy gear fishery, it may have general application to several domestic and international fishery operations where daily operations include the use of buoys (i.e., trap fisheries, longline, net fisheries).

Gettysburg College

Developing and testing a multisensory bycatch reduction strategy to reduce sea turtle bycatch in gillnet and pound net fisheries

Bycatch of sea turtles in some fisheries in the U.S. and around the globe is a significant threat to the recovery of some sea turtle populations. Developing mitigating measures to reduce sea turtle bycatch is a priority for their conservation. Previous studies have shown that the presence of lights and low-frequency acoustic deterrent devices on fishing nets reduce mean catch rates of green sea turtles by up to 65%, while maintaining catch and revenue of target species. This project will investigate the effectiveness of combining these visual and auditory bycatch reduction technologies to reduce sea turtle interactions with coastal fisheries in fisheries in Baja California, Mexico and North Carolina.

University of Hawaii

Assessing the efficacy of current and potential conservation and management measures for reducing mortality in a threatened shark species

This study will use satellite tags to assess the efficacy of no-retention management measures for the oceanic whitetip shark. Current measures require most longline fisheries to cut the line from caught sharks, which can result in different quantities and types of trailing gear left attached to each animal. The effects of different leader materials (wire versus monofilament) may have significant impacts on an animal's long-term survival rate. In this study, researchers will assess the impact of two different types of leader materials on the survival of oceanic white tipped shark using long-term satellite tags in the American Samoa tuna fishery and the Hawaii tuna longline fishery.

Habitat use, movement behavior and residency of oceanic whitetip sharks, *Carcharhinus longimanus* found in association with Fish Aggregating Devices in Hawaii: Identifying strategies to reduce mortality to a threatened species

Oceanic whitetip sharks can be found around anchored fish aggregating devices (FADs) used in Hawaii's tuna and billfish commercial troll and handline fisheries. The objective of this study is to provide insight into the FAD-associated behavior of oceanic whitetip sharks, and identify practical bycatch mitigation

measures based on spatial, temporal, and sociocultural patterns in the Kona fishing community. Researchers will 1) hold workshops and charter vessels to inform resource users of project objectives and to train fishers in tagging techniques. 2) Conduct interviews and social surveys to assess fisher attitudes and knowledge, and evaluate the nature, frequency, and mortality rate of oceanic whitetip shark interactions in the Kona troll and handline fisheries. 3) Install and maintain an acoustic monitoring array to elucidate FAD-associative behavior. 4) Analyze telemetry data to identify potential spatial or temporal bycatch mitigation strategies for both the FAD-associated purse seine fishery and local Hawaii troll and handline fishers. 5) Develop outreach strategies based on social data and patterns of information sharing. 6) Communicate our findings widely, through newsletters, social media, fishers forums, RFMO information papers, public presentations and publication in magazines and peer reviewed journals.

Coonamessett Farm Foundation

Testing Selectivity and Raised Webbing Gillnets on Target and Non-Target Species in the Northeast Haddock Fishery

This project will evaluate gillnet gear modifications designed to (1) improve access to abundant year classes of Gulf of Maine and Georges Bank haddock, and (2) reduce bycatch by testing the effect of raised webbing and reduced mesh size of gillnets on target and non-target species. This study has the potential to increase both the efficiency and environmental performance of gillnet gear and provide valuable data to both resource managers and fishermen. With the addition of video and temperature-depth data, researchers hope to gain insight on direct and indirect mortality of all target and non-target species and better understand other factors that influence gillnet selectivity and efficiency.

Improving the Understanding of Sea Turtle Entanglement in Vertical Lines

This project will investigate sea turtle entanglements in vertical lines from fishing gear within the near shore waters adjacent to Cape Cod, MA. Researchers plan to use a series of monitoring methods, including aerial surveys, remotely operative vehicles, and underwater cameras. To improve bycatch estimates and gain industry knowledge regarding potential engineering solutions, this project also includes a plan to conduct anonymous surveys of pot fishermen. Improving understanding of the interactions between vertical lines and sea turtles is essential for the development of adaptive resource management strategies.

A Modified Foot Sweep for Bycatch Reduction in the LA Scallop Fishery

The Atlantic sea scallop fishery catches other fish such as yellowtail and windowpane flounder, which have low catch limits. The sea scallop fishery could increase its catch if bycatch of yellowtail and windowpane flounder could be reduced. The goal of this project is to test the effect on catch and bycatch of a gear modification to the scallop dredge to allow flounder to escape more readily. Researchers will collaborate with a commercial vessel and film dredge operations to monitor fish avoidance behavior and the effectiveness of the gear. If the gear modification is successful, future testing could expand to other vessels.

Pacific States Marine Fisheries Commission

Minimizing seafloor and benthic macroinvertebrate impacts: An evaluation of elevated sweeps on a west coast groundfish bottom trawl

On the West Coast, fishermen engaged in the limited entry groundfish bottom trawl-fishery target a variety of flatfishes, roundfishes, and skates over soft bottom habitats. Bottom trawl gear is highly effective, but its potential impact on structure forming invertebrates, Dungeness crab, and other bottom dwelling organisms has become an increasing concern. To address this concern, this study will evaluate the efficacy of elevating trawl sweeps in the West Coast limited entry groundfish bottom trawl fishery off the seafloor by placing rubber discs along the length of the sweep. The project will use sonar and video technology to estimate the degree of seafloor contact made by these elevated trawl sweeps. Sea trials will occur over soft bottom habitats over the continental shelf and shelf break off the Oregon and Washington coasts.

Measuring the overall effectiveness of LED lights to reduce eulachon and darkblotched rockfish bycatch in the ocean shrimp trawl fishery

The mandatory use of sorting grid bycatch reduction devices has substantially reduced fish and halibut bycatch in the ocean shrimp trawl fishery on the West Coast. However, bycatch of eulachon, an anadromous smelt listed as threatened under the Endangered Species Act, and darkblotched rockfish are still a concern. A previous Bycatch Reduction Engineering Program project tested the effects of green LED lights attached to the ocean shrimp trawl on eulachon and juvenile darkblotched rockfish bycatch. Results showed a reduction in eulachon and darkblotched rockfish bycatch, while target shrimp catches were maintained. While the research showed positive results, understanding the overall effectiveness of LED lights and the size selectivity for eulachon and groundfishes remains somewhat unclear. This study will continue to build on some of that previous work to improve the effectiveness of using LED lights to reduce bycatch in the ocean shrimp trawl fishery.

Massachusetts Marine Fisheries Institute

Developing and testing a pelagic species distribution model to forecast river herring bycatch hotspots

River herring and blueback herring serve an important ecological role as prey for a variety of predators, and once supported important fisheries along the U.S. and Canadian Atlantic coasts. The NMFS Greater Atlantic Region Fisheries Office funded the creation of river and Atlantic herring habitat preference models to forecast the location of river herring so that fishermen can avoid those areas. This project will supplement those models with fisheries-dependent oceanographic and catch data, and evaluate their utility for bycatch mitigation. Five different methods will be used to evaluate if model results can produce a tool that could aid fishermen in reducing river herring bycatch. If successful, the forecast tool will be incorporated into an existing river herring bycatch avoidance program that works in synergy with river herring catch limits and restoration efforts.

University of Mississippi

Application of a New Bycatch reduction Device for Use in the U.S. Shrimp Industry

Bycatch of fish in the U.S. shrimp fisheries in the Southeast and Gulf of Mexico continues to be a challenge. This project will explore the use of a bycatch reduction device that exploits the natural tendency for fish to swim up current and take refuge in areas of the net with reduced water flow. The

device includes openings for fish to escape the trawl while retaining target shrimp. University of Mississippi will fabricate and distribute these devices to shrimp boat operators to assess the potential for acceptance of the device in the fishery.

Wild Fish Conservancy

Evaluation of Pound Nets as Stock-Selective Fishing Tools in the Lower Columbia River Basin

Bycatch impacts in the Columbia River and Pacific Northwest commercial salmon fisheries impede the recovery of Endangered Species Act (ESA) listed fishes and limit commercial fishing opportunities. Currently, non-selective commercial gears, such as gillnets and seines, can cause bycatch of some ESA listed wild stocks of salmon. This project will further develop pound net gear testing in the Lower Columbia Sub-basin. The project's objectives are to evaluate the effectiveness of pound nets in capturing salmon, targeting hatchery reared Fall Chinook and Coho salmon, and reducing cumulative bycatch mortality of ESA listed fishes. The performance of pound nets relative to previously tested commercial gears will be examined through a tag, release, and recapture study in which catch-per-unit-effort, capture conditions, bycatch, and cumulative survival of released fish are monitored.

Duke University

Developing move-on rules to mitigate odontocete depredation and bycatch in pelagic longline fisheries

Sometimes, marine mammals prey on fish that are being targeted or already captured during fisheries harvest operations. This is known as depredation. These interactions between marine mammals and longline fisheries can be costly both to industry and to populations of these protected species. Depredation of catch by odontocete cetaceans is an increasingly common and costly behavior in the world's pelagic longline fisheries. This project will assess the spatiotemporal patterns of depredation of the North Atlantic shortfinned pilot whale and the Central Pacific false killer whales. Researchers will use the results to create a tool that fishermen can use to discourage marine mammals from depredating on catch.

FL Fish and Wildlife Conservation Commission

Evaluation of alternative fishing technology and strategies to increase yield in the Florida spiny lobster fishery

The spiny lobster fishery is one of the most valuable commercial fisheries in Florida. Undersized lobsters are used as bait to attract larger lobster to traps in the fishery. This practice causes an estimated mortality of about a quarter of bait lobsters and cost fishermen 10 to 62% of the value of future landings. This project aims to improve the understanding of the effect of escape gaps to reduce mortality of under-sized lobsters in commercial lobster traps. A field experiment will measure catch rates and mortality of under-sized and legal-sized spiny lobsters in traps with and without escape vents. The experiment will also test alternative baiting practices including the use of legal-size lobsters as bait. Researchers will evaluate different fishery scenarios that incorporate revised mortality and catch estimates resulting from the field experiments. If this project indicates significant gains to the lobster population are possible, future cooperative research and outreach with commercial fishermen would be developed to build a consensus on future management options in the fishery

New England Aquarium

Closing data gaps on discard mortality and tactical capture and handling practices to reduce mortality in the Gulf of Maine recreational groundfish fishery

Recreational fishing is a popular activity that produces significant social and economic benefits in the U.S. A portion of recreational catch may be discarded due to management measures, or personal conservation ethics. In the Gulf of Maine, total annual fishery removals and discard rates in commercial and recreational fisheries is a concern for key species like Atlantic cod and haddock. The objective of this project is to generate and broadly disseminate detailed technical fishing tackle recommendations to increase the probability of survival in cod and haddock discarded in the Gulf of Maine recreational rod-and-reel fishery. Through past work, researchers at New England Aquarium validated condition indices and discard mortality predictors for cod and haddock in the Gulf of Maine recreational groundfish fishery. This project will take that work a step further and examine cod and haddock captured in the recreational rod-and-reel fishery to discern which tackle configurations result in the most severe injuries and highest discard mortality rates in these two species. Researchers plan to determine and communicate the technical configurations that are most advisable for implementation by management. They will work closely with the recreational fishing industry and employ various outreach channels to disseminate these technical recommendations for adoption by recreational anglers in Massachusetts and other key New England states

Oregon State

Uncovering blind spots: Novel methods to assess fine-scale seabird-fisheries overlap to prioritize conservation management

Although significant advances in seabird bycatch mitigation have been achieved, particularly in U.S. fisheries, many seabirds are killed or injured each year, including Laysan and black-footed albatrosses. Until recently, the spatial and temporal scale of fishing activity has been relatively coarse, creating “blind spots”. This project aims to reduce these blind spots by exploring how vessels move across the ocean via Automatic Identification Systems and overlaying that information with seabird distribution data. Developed methods will be fully transferable to other groups wishing to assess fine-scale seabird-fisheries overlap, thus facilitating insight on global seabird-fishery interactions on the high seas at fine-scales for the first time.

Marine Resources Research Institute, SC Dept. of Natural Resources

Post-release mortality of adult red drum caught by recreational anglers

Red drum is an important recreational fish in the U.S. South Atlantic and Gulf of Mexico. They can live for 30-60 years, and reach maturity at about 5 years. Their long lifespan makes them vulnerable to overexploitation. Fisheries managers, charter captains and anglers have expressed concern that spawning aggregations of large, long-lived adult red drum are being increasingly targeted. Most mortality of adult red drum is attributed to post-release mortality, as there are strict harvest regulations. There is a pressing need to quantify post-release mortality, understand factors that influence it, and explore methods of minimizing it. There are four objectives for this study (1) determine physiological condition of adult red drum caught by anglers in South Carolina coastal waters across a range of conditions, (2) determine long-term post-release mortality in the wild, (3) test whether fish

descending devices reduce post-release mortality, and (4) construct a predictive survival model based on results.

University of New England

Determining the discard mortality rate and "best capture and handling" methods for Atlantic cod (*Gadus morhua*) captured in the Gulf of Maine lobster industry

Although designed to land a single species, the configuration of lobster traps still yields bycatch of groundfish, including cod, and other organisms. This project will use field observations and acoustic telemetry to estimate the discard mortality rate of Atlantic cod captured in the lobster fishery. This project is a continuation of previously funded BREP work that used passive acoustic telemetry and vitality scores (i.e. injury and reflex codes) to estimate the post-release mortality rate and derive "best capture-and handling" methods for Atlantic cod discarded in Gulf of Maine lobster fishery. This project will continue previous work and aims to improve estimates of Atlantic cod discard mortality following capture and release from lobster gear; identify best capture-handling techniques to increase the survival of cod discarded after capture and release from lobster gear; and disseminate results and best capture-handling techniques to invested fishery stakeholder groups, including management and industry sources, and the scientific community.