NOAA FISHERIES
Sustainable Fisheries

2018 Grantee Abstracts

Alaska Longline Fishermen's Association

Adapting towed array hydrophones to reduce interactions between sperm whales and longline gear in Alaska

In the Gulf of Alaska, sperm whales sometimes remove sablefish and halibut from commercial longline fishing gear. This interaction can be economically costly to fishermen, and presents risks of injury or mortality to the whales. Previous research has found that towed array hydrophone systems can detect whales from distances of up to 8 miles. If fishermen are able to detect when whales are present, they can avoid setting gear in areas where interactions are likely. However, there are some challenges to widespread use of hydrophones, such as cost, eliminating electrical noise, and usability of the software required when using the hydrophone. Researchers with the Alaska Longline Fishermen's Association seek to develop tools to enable a sperm whale reporting and avoidance network in the Eastern Gulf of Alaska. Building off the success of previous hydrophone projects, the Alaska Longline Fishermen's Association will work to improve the usability of the software needed, improve the usability of the hydrophone on vessels, and develop methods to automatically broadcast whale location data into a broad real-time whale location and reporting network.

Duke University

Testing the applicability of sensory-based bycatch reduction technologies to reduce sea turtle bycatch in North Carolina coastal gillnet and pound net fisheries

Previous studies have shown that net illumination and low-frequency acoustic deterrent devices on gillnets reduce catch rates of green sea turtles while maintaining fish catch and revenue. Researchers with Duke University plan to determine the effectiveness of such bycatch reduction technologies to reduce sea turtle bycatch in fisheries in North Carolina. This technology was previously tested with support from BREP in international fisheries. Technology that reduces sea turtle and other bycatch, but that maintains target fish catch rates and market value, is more likely to be readily adopted into a variety of U.S. coastal fisheries. This project will test the efficacy of net illumination (green LEDs) and acoustic cues in the NC pound net fishery and net illumination (green LEDs) in the NC gillnet fishery to reduce sea turtle bycatch. This project brings together fishers and researchers from local fisheries associations, academia, and the federal government to collaborate and examine a bycatch reduction strategy.

Massachusetts Division of Marine Fisheries

Creating a bycatch avoidance tool for cod in the Gulf of Maine recreational fishery

To help the Gulf of Maine cod stock rebuild, the New England Fishery Management Council has reduced the commercial cod quota in recent years and has established a zero possession rule for the recreational fishery. Despite the zero possession rule, recreational discards of cod have increased. Researchers with the Massachusetts Division of Marine Fisheries plan to create a seasonally-resolved spatial model of cod and haddock abundance to help recreational fishermen avoid cod while continuing to access abundant groundfish resources such as cod. Using this model, researchers will identify times and areas where haddock are abundant but where cod bycatch is likely to be low. They will then validate the model predications through chartered fishing trips. In addition, researchers plan to host workshops with charter and party boat captains to identify strategies they have applied to successfully reduce their cod bycatch rate.

Mote Marine Laboratory

Best fishing practices for the Gulf of Mexico reef fishery: Developing bycatch reduction techniques through refined modeling of electronic monitoring data

In the Gulf of Mexico, the commercial fishing industry desires to find solutions that address increasing bycatch of sharks and other non-target species in the reef fish fishery. The fishery can especially be impacted by shark bycatch. Electronic monitoring of the reef fish fishery has yielded more data on bycatch than was previously available. However, the ability to quantify shark bycatch using electronic monitoring is hampered by species identification. Researchers with Mote Marine Laboratory will conduct pilot studies to initialize gear and hardware testing on for hire recreational vessels in an attempt to develop underwater camera systems that can resolve species identification issues and improve observations of bycatch.

New England Aquarium

Implementation of emerging technology to estimate and mitigate the post-release mortality rate of prohibited sandbar sharks in a rapidly growing shore-based fishery

Sandbar sharks are currently considered overfished in the U.S. Atlantic and Gulf of Mexico, and measures are in place to help promote stock recovery, including a prohibition on recreational landings. Despite this prohibition, directed shore-based catch-and-release sandbar shark fisheries still persist in New England. Due to limited data, information on sandbar shark post release mortality rates in the New England shore based fishery, total sandbar shark fishing mortality cannot be accurately estimated or incorporated into stock assessments. Researchers with the New England Aquarium will partner with recreational fishermen to quantify the post release mortality of sandbar sharks using acceleration data loggers, and identify capture related factors that influence sandbar shark post release mortality and establish best-practice capture and handling guidelines.

New England Aquarium (continued)

Testing ropeless fishing prototype for eliminating large whale entanglements in pot fishing gear

U.S. pot fisheries that target crustaceans are popular in New England, and are an important economically and culturally. However, the critically endangered North Atlantic right whale, and other large species of whale and protected species can become entangled in the ropes used in pot fisheries. One way to prevent the threat of whale entanglements is to remove the ropes used in pot fishing from the water column. "Ropeless fishing" involves securing the ropes to the seafloor where the traps are being fished, and when the trap is ready to be hauled to check for catch, ropes are released to the surface by an acoustically triggered device. Once the ropes are released, the trap can be hauled to the service. This ropeless fishing method has not been used in the U.S. but has had some success in fisheries internationally. Working with U.S. fishermen, researchers at the New England Aquarium will evaluate a prototype ropeless fishing system for use in pot fisheries targeting crustaceans and benthic fish.

Newcastle University

Low-cost solutions to cetacean bycatch in gillnet fisheries

Cetaceans have been affected by bycatch in gillnet fisheries for many years. There can be many challenges when developing, testing and implementing potential bycatch mitigation measure that would help cetaceans. Cost and harvest reduction of target species catch are two of the biggest factors fisheries must deal with, but other barriers to mitigation exist as well. Researchers from Newcastle University will explore these challenges and conduct comprehensive trials to evaluate the effectiveness of low cost mitigation methods aimed at reducing bycatch in gillnet fisheries in Argentina, Peru, and Tanzania, where there are high bycatch rates of dolphins. Researchers have identified U.S. fisheries that may be candidates for these bycatch mitigation methods, and representatives from these fisheries swill be invited to learn about the technology being tested.

Pacific States Marine Fisheries Commission

Use of LEDs to reduce Pacific halibut catches before trawl entrainment

Pacific halibut bycatch can sometimes be a problem for fishermen who trawl over the continental shelf on the West Coast of the United States for groundfish. Incidental catches of Pacific halibut often constrain some fishermen from fully utilizing their individual fishing quota of healthier fish stocks, as relatively limited bycatch quota of Pacific halibut is available to the groundfish fishery. Developing techniques that would allow fishermen to continue to access healthy groundfish stocks, while avoiding halibut will help them more fully utilize their harvest quotas. The Pacific States Marine Fisheries Commission will build on previous research to evaluate if artificial illumination (such as LED lights) attached to the upper bridles and wings of a low rise trawl can reduced Pacific Halibut bycatch. If the illumination helps halibut perceive escape areas around the trawl through the addition of lights, then Pacific halibut bycatch and mortality would be reduced.

Pacific States Marine Fisheries Commission (continued)

Identifying the optimal level of artificial illumination necessary to achieve maximum chinook salmon escapement rates out a bycatch reduction device integrated into a Pacific hake midwater trawl

The Pacific hake midwater trawl fishery is the largest groundfish fishery off the U.S. west coast by volume. Bycatch of Chinook salmon can sometimes be an issue for the fishery, and if too much Chinook salmon is caught, the fishery may have to temporarily close. Developing techniques that minimize Chinook salmon bycatch are crucial. Previous research by the Pacific States Marine Fisheries Commission has tested the use of artificial illumination as a technique to reduce Chinook salmon bycatch, and demonstrated the ability of illumination to influence where Chinook salmon exit out of a bycatch reduction device. This study will further that work to identify the optimal level of artificial illumination necessary to achieve maximum Chinook salmon escapement rates out of a bycatch reduction device integrated into a Pacific hake midwater trawl.

Pfleger Institute of Environmental Research

Documenting post-release survival and depth distribution of bigeye thresher sharks caught using linked buoy gear

Linked-buoy gear and deep-set buoy gear are two deep set gear configurations used to selectively target swordfish and avoid bycatch by positioning hooks below a certain depth during the day. Both gear types are currently being considered for fishery implementation and management on the U.S West Coast. Although selective, these deep-set gear types frequently interact with bigeye thresher sharks, a large and slow growing shark species that is often discarded when caught. Pfleger plans to produce a post-release mortality estimate for bigeye thresher sharks caught when using Linked Buoy Gear. Although bigeye threshers are a marketable species, they do not support a strong demand off the West Coast, and fishers often release or discard them. Researchers also hope to document vertical movement patterns of bigeye thresher sharks to assess whether fishery impacts on this species can be further mitigated through fishing gear modifications. This work will help further improve the selectivity of the West Coast deep-set swordfish fishery, and provide information for the management of bigeye thresher sharks.

South Carolina Wildlife Federation

Changing recreational fishing practices through outreach to decrease post-release mortality of South Atlantic deep-water species

Barotrauma is a condition experienced when fish that live in deeper water are brought to the surface too quickly. These fish can struggle to return to depth, and may have reduced survival rates. In some cases, this can lead to an increase in mortality. Descending devices can be used to return fish back to depth, and are popular with anglers on the U.S. West Coast, but are not as widely used in the Southeast. Recreational angler education on best practices and use of descending devices could help reduce bycatch and improve the survival rates for species caught as bycatch in the snapper group recreational fishery in the Southeast Atlantic. Researchers at the South Carolina Wildlife Federation will develop and launch an online tutorial and in person workshops on best fishing practices and descending devices. These workshops will cover best fishing practices for fish in the snapper grouper complex, barotrauma and how to use descending devices and recreational data collection. Fishermen who participate in the online tutorial or the workshops will receive a free descending device.

University of Hawai'i

A community tagging program aimed at reducing mortality to sharks found in association with fish aggregating devices in Hawai'i

Oceanic whitetip and silky sharks can be found at anchored fish aggregating devices around Hawai'i. As a result, these species are often incidentally captured by recreational and commercial fishermen targeting tuna and billfish. Both oceanic whitetip and silky sharks are considered a nuisance by local fishermen because the sharks are often feeding on the bait fishermen use when targeting tuna and billfish. As a result, fishermen may kill sharks captured on their gear if they appear to be scaring tuna away. A current BREP project, focusing on oceanic whitetip sharks and fish aggregating device association is highlighting the potential to change fishermen's attitudes and handling practices of these sharks through outreach and education. Researchers with the University of Hawai'i will continue that important work, and continue to engage the fishing community, and expand a tagging study to include silky sharks in addition to oceanic whitetip. The tagging study may help clarify habitat use and fish aggregating device associative behavior and help fishermen and others develop shark avoidance strategies and improved fishing practices so they can avoid catching the sharks while continuing to catch tuna and billfish.

Illuminating the shark bycatch post-release mortality black box

Sharks can become bycatch in pelagic longline fisheries in Hawai'i and are typically discarded at sea where their post release condition is unobserved and survival rates are unknown. There are likely three main factors that affect shark bycatch mortality rates in longline fisheries: the amount of time an animal spends struggling on the line, handling methods used to release/remove sharks from fishing gear and impacts are species specific. A tagging project to assess post-release mortality rates of sharks is currently underway, and blue, bigeye thresher, silky and oceanic whitetip sharks captured in the Hawai'i tuna and American Samoa longline fisheries have been successfully tagged. Researchers with the University of Hawai'i will expand the scope of the tagging study to understand the effects of sharks in compromised conditions at the vessel. Researchers will also explore the effects of trailing gear left on sharks when they are released by cutting the line. With these data researchers hope to generate robust estimates of post release mortality for stock assessments and be able to identify and recommend the shark bycatch handling and release methods that can maximize post-release survival.

Wild Fish Conservancy

Evaluation of pound nets for stock-selective harvest in Lower Columbia River spring Chinook, summer Chinook, and shad fisheries

Bycatch impacts from non-selective conventional gears in the Columbia River spring and summer Chinook salmon fisheries can impede the recovery of Endangered Species Act listed fish and constrain commercial fishing operations. Wild Fish Conservancy and their partners will continue to test pound nets as a stock selective harvest tool in the Lower Columbia Spring Chinook, Summer Chinook, and shad fisheries during 2019. Wild Fish will test pound nets under a host of variable conditions, and determine the effectiveness of the nets in targeting hatchery reared Spring/Summer Chinook and invasive shad stocks while reducing the bycatch of ESA listed species.