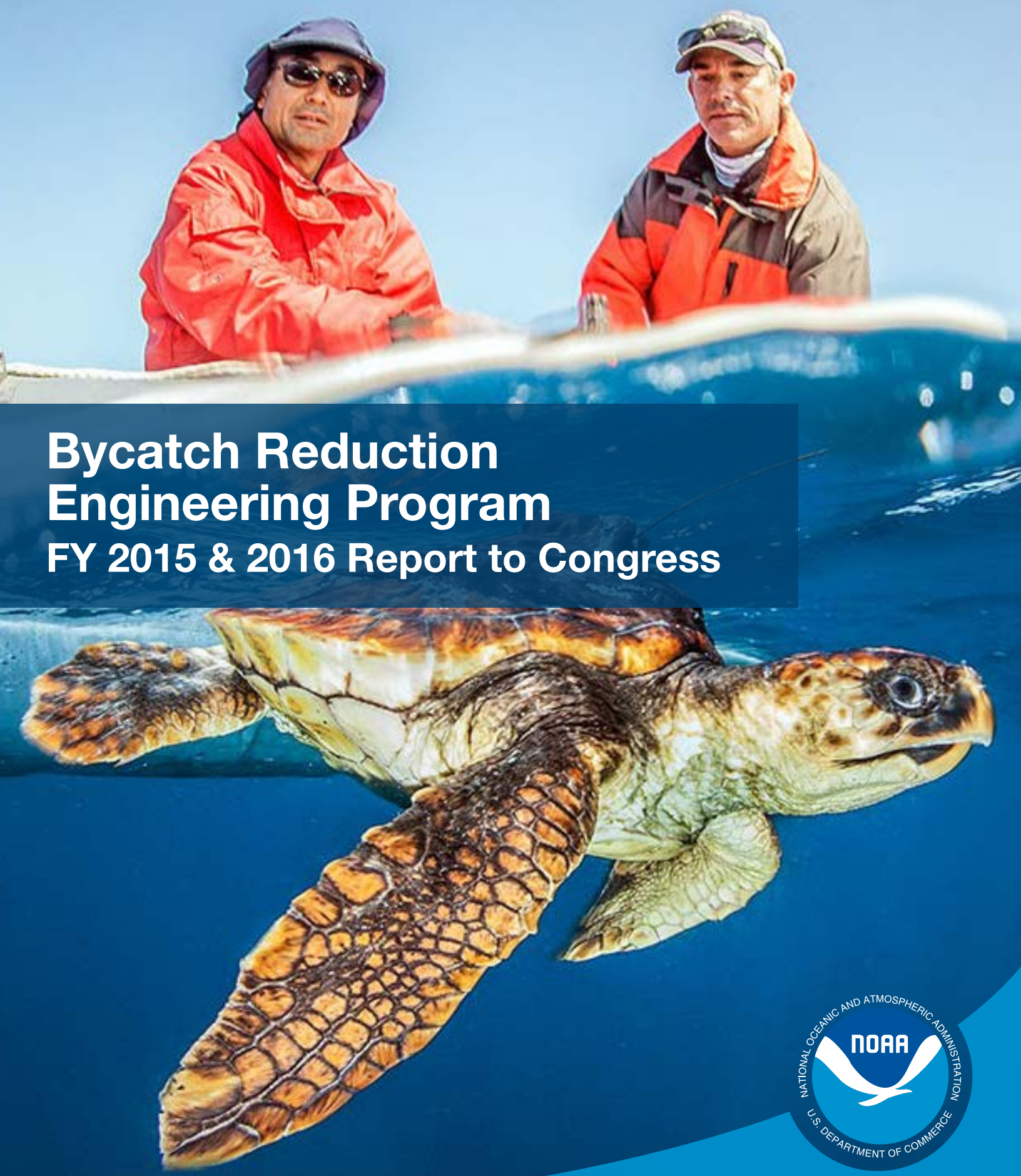
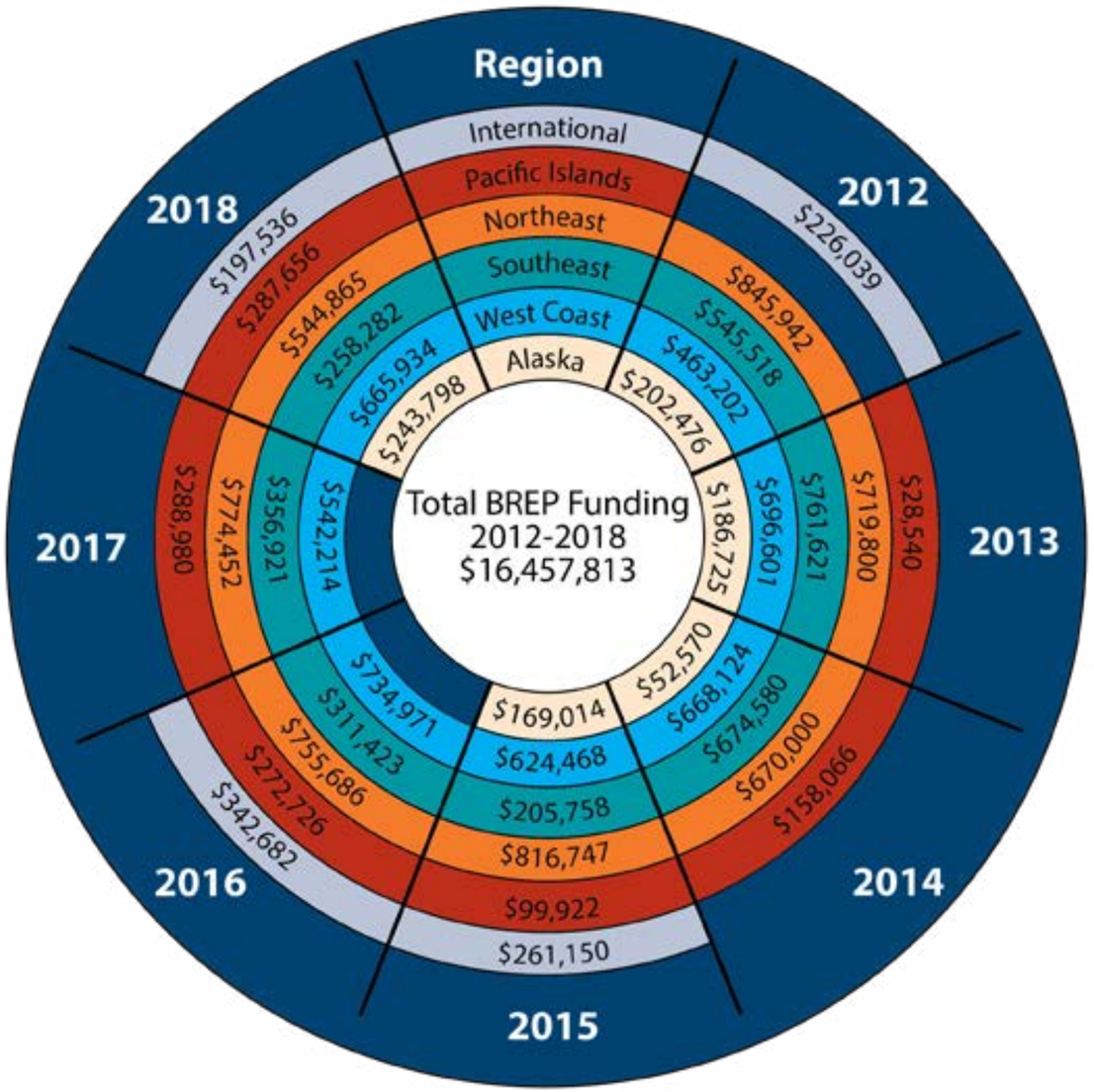


Bycatch Reduction Engineering Program

FY 2015 & 2016 Report to Congress

NOAA FISHERIES

BREP Funding by Region 2012-2018



Funding Bycatch Reduction

Bycatch occurs when fishermen discard catch of marine species, or when resources like marine mammals, seabirds, or protected fish are harmed or killed by fishing gear. Reducing bycatch in fisheries can improve the recovery of protected species and have positive biological, economic, and social impacts. NOAA Fisheries has long been committed to reducing bycatch through monitoring, research, and management, education, enforcement and communication efforts as described in the 2016 National Bycatch Reduction Strategy.

The Bycatch Reduction Engineering Program (BREP) supports technological solutions and conservation engineering practices that minimize bycatch and bycatch mortality in federally managed fisheries. Since Fiscal Year 2012, NOAA Fisheries has supported over 100 BREP awards worth more than $16 million to external partners including state governments, academia, and the fishing industry. The awards are geographically diverse and address four different priorities: reducing protected species bycatch, innovative technologies, improving fishing practices, and reducing post release mortality.

Highlights & Outcomes

In 2015 and 2016 NOAA Fisheries provided funding for 34 BREP awards. This report summarizes the outcomes of those awards. While these awards were made in FY2015 and FY 2016, most of the work discussed here occurred during calendar years 2016 and 2017. This report shows that funding bycatch reduction research, as with any research, can have a range of outcomes. Some research yields results that can be directly applied in a management context. Other research posed valid questions that did not lead to actionable results. Most of the research involved important collaboration with the fishing industry which improves the likelihood of successfully applying research findings in fisheries. Finding technological solutions to bycatch problems can be a multi-year and multi-disciplinary endeavor requiring technical expertise, collaboration with fishermen, and effective communication with managers.

NOAA FISHERIES

Reducing Protected Species Bycatch 2015

Four 2015 BREP projects addressed bycatch of protected Chinook salmon, pilot whales, and sea turtles. These projects took place on the West and East Coasts and internationally. *Note: Cascadia Research Collective was also awarded funding to continue in 2016, and is discussed in the 2016 section of this report.

Pacific States Marine Fisheries Commission ($138,412)

The Pacific hake mid-water trawl fishery is the largest groundfish fishery by volume on the West Coast. While catch consists mostly of hake, if too many Chinook salmon are caught, the fishery must close early to conserve this protected species. Researchers with the Pacific States Marine Fisheries Commission worked with industry to test a sorting grid bycatch reduction device to reduce Chinook salmon bycatch in the Pacific hake fishery. Through this work, researchers found that the device was ineffective at reducing Chinook salmon bycatch, but was effective at minimizing bycatch of larger-sized rockfishes while maintaining Pacific hake catches. Results from this study have provided fishermen and management a quantitative assessment of the gear's performance and delivered valuable information for further gear development that could enhance the effectiveness of other selective fishing devices.

The Research Foundation-State University of New York ($99,775)

Pelagic longlines are used in several high value fisheries. Interactions between pilot whales and long line gear is problematic because pilot whales have slow population growth rates and can be slow to recover from human impacts, such as being caught as bycatch. Attempts to decrease the number of pilot whale interactions in longline fisheries, such as limiting mainline length or using acoustic deterrents, have not fully addressed pilot whale bycatch. Instead, researchers with the State University of New York are researching methods to identify areas and times of high risk for interactions between pilot whales and longline gear that could help fishermen and managers reduce harmful interactions. Scientists used satellite, logbook and observer data to develop a model that predicts pilot whale habitat and interaction with pelagic longline fishery in the Mid-Atlantic Bight. The project demonstrate that these interactions can be predicted using a few readily available environmental parameters, and could inform future spatial management strategies to reduce pilot whale-longline interactions.

Ocean Discovery Institute ($82,000)

Nationally and internationally, gillnets are used in many commercially important fisheries, including the California drift gillnet fishery, the North Carolina flounder fishery, and coastal fisheries in Peru, Chile, Indonesia, and others. Sea turtle bycatch in gillnet fisheries can be problematic and lead to fisheries closures, but there are limited bycatch reduction options for this gear type. Scientists with Ocean Discovery Institute developed and tested an innovative, sensory-based bycatch reduction technology to help reduce sea turtle bycatch. The developed technology, called an acoustic deterrent device (ADD), plays sound within the hearing range of a green sea turtle and was used to test whether attaching the ADD to gillnets would deter turtles from being captured. In experimental trials, they found that using ADDs reduced sea turtle capture rates by more than half, suggesting that ADDs have potential to be used by gillnet fisheries to reduce sea turtle interaction rates.

Researchers from the Ocean Discovery Institute testing a device to reduce sea turtle bycatch.

Reducing Protected Species Bycatch 2016

Seven 2016 BREP projects addressed bycatch of Chinook salmon, sea turtles, and whales. These projects took place on the West Coast, Hawaii, and internationally.

Gettysburg College ($125,177)

An understanding of how animals perceive and respond to sensory cues in their environment can guide the development of successful bycatch reduction technologies. Researchers from Gettysburg College, Ocean Discovery Institute, and NOAA Fisheries examined the impact of low-frequency acoustic cues on sea turtles and target fish catch in gillnets in Baja, Mexico. Researchers chose Baja, Mexico to focus their work because it provides an area of high turtle interaction rates, access to commercial gillnet fisheries, and strong relationships with engaged fishery partners. Through their work, scientists have found that acoustic cues significantly reduced sea turtle interactions with nets while maintaining target catch. These results illustrate the potential for using sensory cues, and in particular, sound, to warn sea turtles of the presence of fishing gear and reduce sea turtle interactions.

SUBMON ($107,386)

Bycatch of turtles can be a challenge in various fisheries around the world. Decompression sickness (DCS), is a recent discovery in sea turtles incidentally captured by trawl, trammel- and gillnets. The turtles seem to have a high prevalence of disease and sometimes die. However, to date, diagnosis of the turtles with DCS has occurred at rescue centers, several hours after hauling, when they are already showing clear signs of disease. Typically, these include neurological signs that render the animal unable to swim and dive. Researchers with SUBMON are looking at the incidence and impact of DCS in sea turtles on board a fishing vessel, immediately after being hauled, to assess its incidence and clinical evolution during the first two hours, the external clinical signs, and the fate of released animals. So far results suggest a 100% incidence of decompression sickness in trawl captured sea turtles at depths as low as 20 meters and with trawls lasting 4 hrs. Researchers are now assessing post-release mortality of affected turtles.

A SUBMON researcher examines a sea turtle for decompression sickness.

Pacific States Marine Fisheries Commission ($146,473)

At the Pacific States Marine Fisheries Commission, research continues on the effects of artificial light on escapement of Chinook salmon from a bycatch reduction device in a Pacific hake mid-water trawl. As the largest groundfish fishery by volume on the West Coast, bycatch of salmon can sometimes be a challenge. Results from this work demonstrate that artificial light can significantly influence where Chinook salmon exit out the gear tested, but also that illumination can be used to enhance their escapement overall. As conservation of ESA-listed Chinook salmon is an management priority, this research contributes new information on how artificial light can minimize adverse interactions between Pacific hake trawls and Chinook salmon.

Reducing Protected Species Bycatch 2016

Cascadia Research Collective ($99,922)

False killer whales are the species of whale most frequently caught in the Hawaii-based longline fishery, but little is known about the interactions between these whales and longline gear. In 2015 and 2016 researchers with the Cascadia Research Collective analyzed the movements of whales to see if information on interactions between whales and the longline fishery could be used to help mitigate the high levels of depredation and bycatch in the fishery. Depredation occurs when whales attempt to eat fish from active fishing gear. Ultimately, the research did not provide any helpful insights into whale movements and longline gear.

University of California – Santa Cruz ($81,174) & University of Maryland ($134,262)

Reducing bycatch of protected species, while maintaining vibrant U.S. commercial fisheries is a key challenge of fisheries management. In many cases, a fishery may be required to close early to avoid interactions with protected species, including sea turtles. Marine heatwaves in the Pacific have caused shifts in the distributions of endangered loggerhead turtles, and these shifts in distribution have led to increasing overlap with California's Drift Gillnet fishery. In a collaborative effort between the University of California Santa Cruz, and The University of Maryland Center for Environmental Science, scientists developed and evaluated potential rules to help guide the timing of a fishery closure based on temperature indices to prevent bycatch of turtles. Through this work, they have found that a rule based on local temperature anomalies in Southern California was best able to balance trade-offs between avoiding historical turtle bycatch and minimizing opportunity costs to fishers. Analyses demonstrate a novel approach to developing fisheries management strategies for data-poor species.

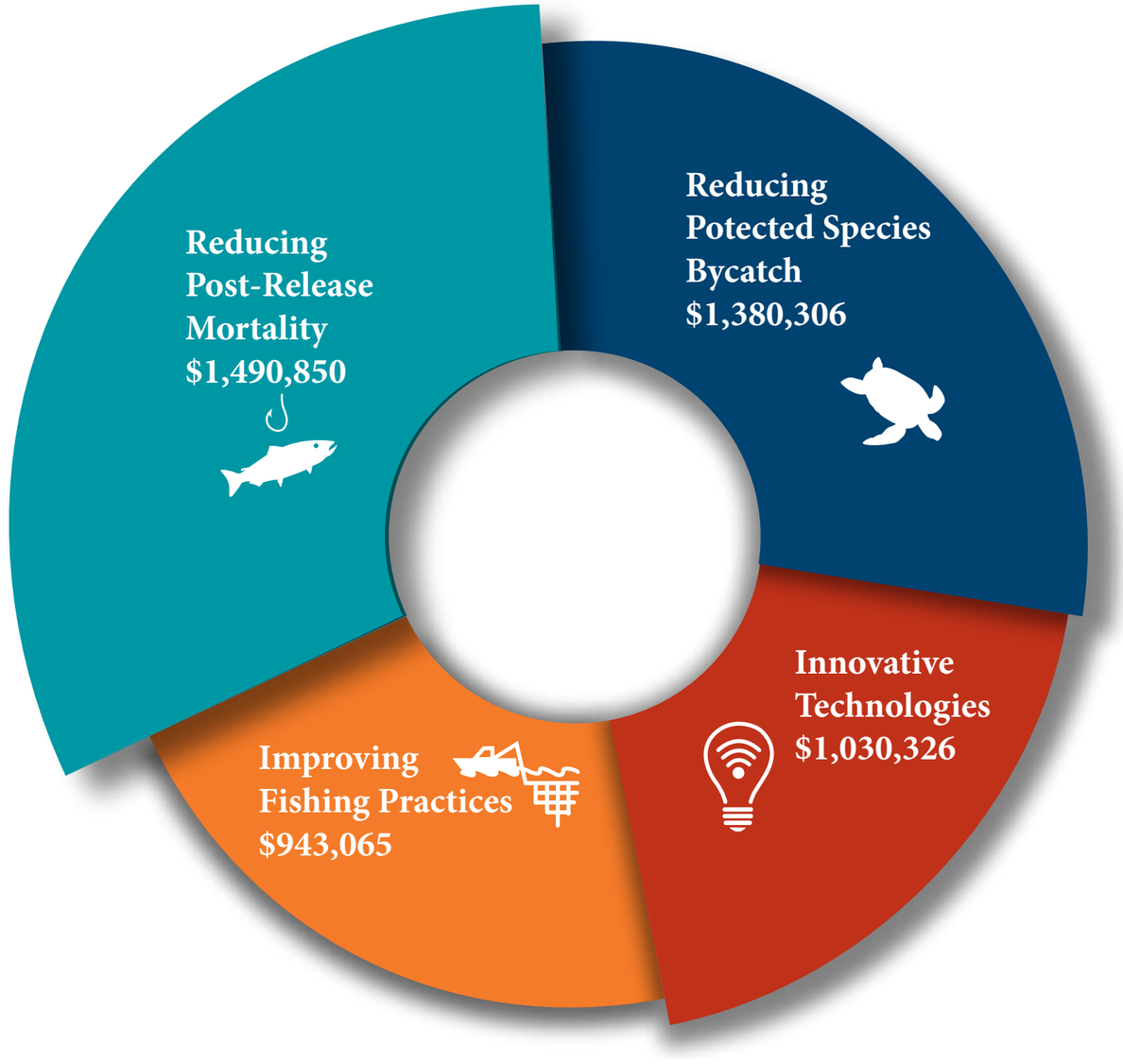
University of North Carolina – Wilmington ($110,119)

The Pacific leatherback turtle is one of NOAA's 'Species in the Spotlight', and is facing threats to its population. Unintended catch of these turtles by fishing operations is of particular concern. At the University of North Carolina, Wilmington, researchers used standardized bycatch assessment surveys to characterize fisheries interactions with marine megafauna. They also conducted workshops with fishermen to provide training and tools to promote best fishing practices in Colombia and Panama, where there are important foraging grounds for Pacific leatherback turtles. Through their collaborations with fishermen and government agencies, researchers were able to identify specific fisheries and geographic areas of concern for interactions with the critically endangered Pacific leatherback sea turtle, and to document very high levels of bycatch for multiple species of sea turtles, seabirds, and migratory sharks in Colombia and Panama. This work led to the establishment of a pilot fisheries observer program to promote best fishing practices, facilitate data collection, and contribute to efforts to mitigate bycatch in this region.

Pacific States Marine Fisheries Commission ($155,684)

Over the last few years, there have been increasing entanglements of whales in West Coast Dungeness crab gear. If too many interactions with protected species occur, the fishery will have to close early, or implement other mitigation measures. The Pacific States Marine Fisheries Commission has been working with fishermen and gear researchers to test potential modifications of gear that might reduce entanglements. Modifications include using swivels and/or manila line on the top part of the line and examining how these innovations affect how the line hangs and breaks. A "smart buoy" has also been tested that detects if a whale is entangled and relays position information to better assure successful disentanglement efforts. Information has also been distributed and ropeless gear tested by fishermen to familiarize them with the various technologies under development.

2015 & 2016 BREP Funding by Priority



Innovative Technologies 2015

In 2015, four BREP-funded projects along the West Coast, Alaska, and Peru focused on innovative technology to understand bycatch. Some tested tools like underwater cameras and hydrophones and others explored gear changes to reduce fish and marine mammal bycatch.

Pacific States Marine Fisheries Commission ($143,929)

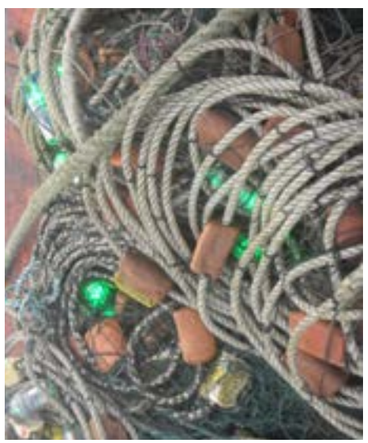
On the West Coast, fishermen in the limited entry groundfish bottom trawl fishery must use a low rise trawl when operating in certain areas to reduce catches of certain overfished and rebuilding species of groundfish, rockfish, and and prohibited Pacific halibut. While this trawl is effective at reducing bycatch of some species, it is less effective at reducing bycatch of more benthic rockfish, such as darkblotched rockfish, which limits fishermen's ability to fully utilize their quota. At the Pacific States Marine Fisheries Commission, scientists tested how illuminating the headrope of a low-rise selective flatfish trawl can affect catches of target and constraining groundfish and rockfish. Results showed that use of illumination can minimize catches of constraining species, such as sablefish and Pacific halibut, while maintaining catches for several target flatfish species. Results from this study contribute new data to the growing field of research exploring catch effects of artificial illumination on trawl gear and could have potential applications in other trawl fisheries.

University of California, San Diego Scripps Institution of Oceanography ($250,000)

There are two types of interaction with longline fisheries that are detrimental to fishermen and non-target species. Sharks, sea turtles, and marine mammals can be caught as bycatch in pelagic and demersal longline fisheries. This negatively affects these non-target species. Meanwhile, whales eating fish from longlines can result in lost catch for fishermen. Researchers with the Scripps Institution of Oceanography used GoPro cameras, underwater microphones, and accelerometers on longline deployments in Hawaii and Alaska in an attempt to document marine mammal depredation. In an effort to better understand these interactions, scientists were hoping to determine if species-specific acoustic or accelerometer signatures existed during depredation encounters. Unfortunately, researchers were not able to gather a large enough sample size to make any conclusions. More controlled trials using captive species may be necessary to further explore this idea.

Pro Delphinus ($72,750)

Sea turtles, marine mammals and seabirds are captured incidentally by net fisheries around the world, including in the United States. The Peru-based marine conservation organization Pro Delphinus, explored whether illuminating fishing nets using inexpensive green LED lights could reduce bycatch of endangered sea turtles and other marine fauna. The study was conducted in Peru's small-scale driftnet fleet, and their results showed declines in sea turtle and seabird bycatch in the illuminated nets. Given the massive size of Peru's driftnet fleet, net illumination has great potential as a tool to prevent bycatch interactions and help recover protected species populations.



Inexpensive LED lighting attached to nets shows promise in reducing sea turtle and seabird bycatch.

FishNext Research ($169,014)

Alaska bottom trawl fisheries are some of the most productive in the world. While the fisheries are sustainably managed, the overlapping abundance of species targeted by other fisheries such as halibut, salmon, and crabs, often makes bycatch of these species a challenge. Scientists with FishNext Research have been exploring how to reduce halibut bycatch in Gulf of Alaska groundfish trawl fisheries. They found that fishers and managers can learn how much halibut was caught and released by trawlers sooner and more accurately if they are released through camera chutes. These innovative camera chutes take and process pictures of each halibut, measure their size and provide a total weight and count after sorting each catch. Researchers tested these chutes on Kodiak trawling vessels, which in turn made fishermen familiar with the devices and lead to an important exchange of feedback on how to improve the function and durability of the systems.

Memorial University - Fisheries and Marine Institute ($106,400)

Due to unforeseen circumstances, researchers were unable to conduct the research as planned and the funds for this project were de-obligated and returned.

Innovative Technologies 2016

Two BREP-funded projects in 2016 along the West Coast and New England focused on improving technology and exploring how gear changes can help reduce fish and marine mammal bycatch.

HT Harvey and Associates ($126,953)

Interactions between whales and fishing gear has increased desire to understand what characteristics of gear lead to entanglements and bycatch. This is especially true for the Dungeness crab fishery on the West Coast, where interactions with whales has the potential to affect the management of this valuable fishery. Working with commercial Dungeness crab fishermen in Oregon and California, researchers with HT Harvey and Associates documented underwater buoy line profiles, measured line tension under various conditions, and evaluated the visual contrast of buoy lines. Currently, researchers have collaborated with five different Dungeness crab fishermen, and surveyed many more along the West Coast in an attempt to understand regional differences in gear configurations and fishing strategies. Understanding how fishing gear behaves in the water will help fishermen and managers develop alternative gear configurations or strategies to reduce interactions between whales and gear.

University of New Hampshire ($161,280)

In the Gulf of Maine, low cod population puts a strain on fishermen and fishing communities in the region. Scientists at the University of New Hampshire are working to reduce bycatch of cod by using a trawl net with a low fishing opening and guiding ropes in the form of a deflector panel. The net is designed to target flounder while directing cod up and over the guiding ropes and deflector panel and out of the path of the trawl. During trials on fishing vessels, results show a greater than 50% reduction in cod catch while retaining target flounder. Fishermen involved with the project are excited about the deflector because it's a simple, low-cost, and effective device that can easily be put on and taken off a ground fish trawl.

Improving Fishing Practices 2015

Four 2015 BREP-funded projects aimed to improve fishing practices along the West Coast and the Southeastern U.S. Results from these projects will help reduce bycatch and improve fisheries' sustainability.

Pfleger Institute of Environmental Research ($118, 327)

Off the coast of California, the primary fishery for swordfish is the California drift gillnet fishery, which also interacts and catches protected species, such as sea turtles. At the Pfleger Institute of Environmental Research scientists are focused on the development and advancement of alternative west coast fishing techniques for swordfish. The project expanded upon previous NOAA Fisheries-funded gear research to develop and test linked buoy gear, a selective deep-set gear type that was designed for use aboard California drift gillnet vessels. This cooperative study worked with fishers to design the gear, incorporate bycatch mitigation features and collect set and catch composition information. This work directly resulted in the final gear configuration that was accepted by the Pacific Fisheries Management Council for exempted fishery trials in 2018.

Hanan and Associates, Inc. ($223,800)

Also in response to bycatch issues with the California drift gillnet fishery for swordfish, researchers with Hanan and Associates are comparing the effects of deep-set and shallow-set pelagic longline swordfish fishing on bycatch in the California Current. Their field research has not yet begun as they are waiting on an exempted fishing permit to be approved and issued before they can begin this work. This project is important as it will hopefully provide information on the effectiveness of two different gear types for targeting swordfish.

Pfleger researchers test gear to reduce sea turtle bycatch in California drift gillnet fishery.

University of Mississippi ($107,438)

In the Southeastern U.S. and Gulf of Mexico longline fisheries, silky, dusky, night, blue, and tiger sharks are the most common species of shark caught as bycatch. Scientists with the University of Mississippi tested an "entangling-leader" designed to promote shark bite-offs and help prevent the need to land a bycaught shark to remove the gear. The loops of leader were found to entangle in the teeth of sharks after the animals take the baited hooks, which result in the line being cut and sharks released. Although further testing is required to evaluate the leader for its ability to capture target species (particularly tuna and swordfish) results from this project suggest that use of the entangling leader could reduce shark bycatch during commercial tuna/swordfish longlining.

North Carolina Dept. of Environment and Natural Resources ($98,320)

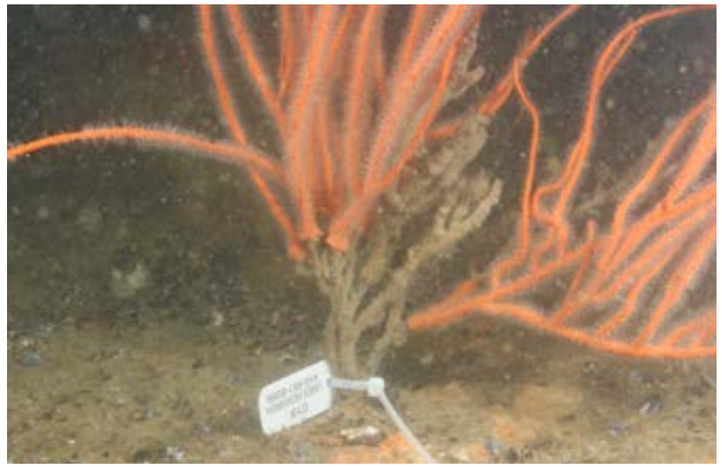
In North Carolina, the commercial shrimp fishery is valued at over $14 million, but bycatch of finfish is a challenge for the fishery. Scientists with the Department of Environment and Natural Resources are looking to find technical solutions to reduce bycatch in the North Carolina otter trawl shrimp fishery. Working with multiple partners, they have tested a number of gear modifications in Pamilco Sound and nearshore areas of NC. Various combinations of gear were tested and results indicate that these modifications may have played a substantial role in reducing finfish bycatch. The results of this study were presented to the North Carolina Marine Fisheries Commission at its May 2018 meeting. The commission passed a motion requiring all shrimp otter trawls, fishing inside waters where greater than 90-ft headrope length is allowed, to use one of the four gear combinations that this study identified as reducing finfish bycatch by at least 40 percent.

Improving Fishing Practices 2016

Three 2016 BREP-funded projects aimed to improve fishing practices in New England and the Mid-Atlantic. Results from these projects will help reduce bycatch and improve the sustainability of fisheries.

University of Maryland – Eastern Shore ($139,925)

Gorgonian sea whips are the primary vertical component in Mid-Atlantic benthic habitats, and are an important component of habitat for black sea bass, but can be damaged by trap fishing. Researchers at the University of Maryland are the first to attempt to estimate age and growth rates for sea whips on the East Coast by counting age bands. They will also be the first to estimate growth rates by re-measuring colonies with known temperature histories. Knowing the time required for growth and recovery is critical for understanding the impacts of disturbance on these important organisms and habitats and improving fishing practices in the future.



Researchers from the University of Maryland - Eastern Shore are studying Gorgonian sea whips to establish age and growth rates.

University of Rhode Island ($185,255)

The Atlantic sea scallop supports one of the most valuable fisheries in the United States. However, too much bycatch of flounder and other flatfish species can lead to seasonal closures and other management measures. Researchers at the University of Rhode Island Fisheries Center have collaborated with commercial scallop fishermen from Rhode Island to design and test a flatfish deflector bar that is located ahead of the scallop dredge. The deflector bar is a series of chains that hang down vertically and make contact with the sea floor, creating small dust clouds to scare away the fish, reducing bycatch of flatfish before they even enter the dredge. Preliminary results from the fieldwork show a potential to reduce the catch of yellowtail flounder and little skate.

Cornell University ($70,000)

In the northeastern United States, butterfish and longfin squid are often in the same areas, and can result in butterfish being caught as bycatch in the squid fishery. A bycatch communication network, developed using BREP funds, allows fishermen to report bycatch of butterfish, river herring/shad, windowpane flounder, Georges Bank stock of yellowtail flounder, and Southern New England/ Mid-Atlantic stock of yellowtail flounder caught by common pool and sector vessels in the groundfish fishery. This collaboration between the fishing industry and Cornell University scientists has led to bycatch monitoring and reduction, illustrating the ability to reduce bycatch voluntarily and increase fishing opportunities without regulation. Bycatch information is relayed by Cornell back to the fleet, enabling fishermen to operate outside of reported "bycatch hot spot" locations. This program has reduced bycatch and provided an economic advantage to the industry by reducing the risk of exceeding bycatch thresholds and causing future declines in target species catch levels.

Although targeting yellowfin tuna, the pelaic longline fishery sometimes catches non-target species like dusky sharks. Researchers at the University of New England are studying the post-release mortality rates of dusky sharks in the fishery.

Reducing Post-Release Mortality 2015

Three BREP-funded projects in 2015 explored how to reduce post-release mortality in commercial and recreational fisheries in New England. Results from these projects will help improve understanding and management of post release mortality in species including sharks, and fish.

University of New England ($224,040)

Pelagic longline fishery operators along the Atlantic coast target swordfish, bigeye and yellowfin tuna. It is a high value fishery that generates over $31 million in revenue a year. However, bycatch of non-target species such as Atlantic Bluefin tuna, sea turtles, seabirds, and dusky sharks can be a challenge for the fishery. At the University of New England, scientists are collaborating with commercial pelagic longline captains and NOAA scientists to determine the post-release mortality rates of dusky sharks. Using satellite tags, they've found that the post-release mortality of dusky sharks was much lower than previously estimated. These results reinforce that post-release mortality rates should be evaluated by species, season, and gear type as the rates may vary.

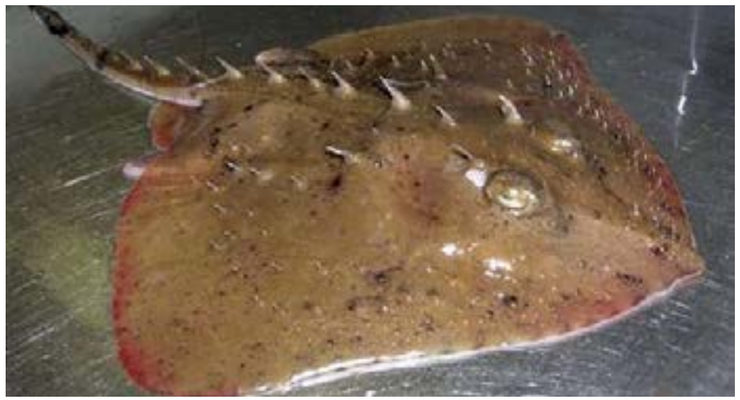
University of New England ($249,008)

In New England, Atlantic cod populations are low and the stock is in a rebuilding plan. Cod caught as bycatch is one factor that affects rebuilding progress. Traditional lobster traps can sometimes catch groundfish or other organisms. Working in collaboration with commercial lobster fisherman, researchers at the University of New England have provided the first quantitative analysis of post-release morality for Atlantic cod captured in commercial lobster gear. Their on-board assessment of injury indicated that the majority of captured cod were in good condition, and the accompanying acoustic telemetry data indicated that morality was low. Results from this study will help develop best practices for handling of cod caught in lobster gear, and provide discard mortality estimate data for this species in the Gulf of Maine.

New England Aquarium ($223,924)

The thorny skate is a prohibited species that is frequently caught as bycatch in demersal bottom trawls in the Gulf of Maine. Thorny skate is currently overfished, so finding ways to reduce mortality of this species is important. To better understand and reduce incidental mortality of this species, scientists at the New England Aquarium used a two-pronged approach. Using pop-off satellite archival tags they evaluated delayed mortality in the Northeast multispecies trawl fishery and the development of bycatch avoidance strategies to reduce fishery interactions. In general, the satellite data showed that smaller skates were more vulnerable, experiencing higher delayed mortality than larger individuals. To develop bycatch avoidance strategies, researchers identified locations with a high-likelihood of thorny skate capture by fishery and time of year in the Gulf of Maine. These temporal avoidance grids are presently being disseminated to a variety of industry groups and management sources, and will be an important tool in reducing thorny skate bycatch.

Researchers at the New England Aquarium are studying bycatch of the overfished thorny skate and evaluating avoidance strategies in the Northeast multispecies trawl fishery.



Reducing Post-Release Mortality 2016

Five BREP-funded projects in 2016 explored how to reduce post-release mortality in commercial and recreational fisheries in New England, the Southeast, West Coast, and Hawaii. Results from these projects will help improve understanding and management of post release mortality in species including sharks, and fish.

University of New England ($199,226)

The Barndoor skate is one of seven skate species managed by the New England Fishery Management Council, and is currently a prohibited species. Over the last 10 years, populations of Barndoor skate have increased, and as the population continues to recover, fishermen are finding they must discard the species at an increasing rate. Currently, little is known about their post release mortality. Working in collaboration with commercial captains, scientists at the University of New England provided the first quantitative analysis of post release morality for Barndoor skates captured in sink gillnet gear. Their on board assessment of injury indicated that while the majority of captured skates were in good condition, satellite tag data indicated that post release morality was high. Fishery wide post release mortality estimates are currently being modeled to extrapolate total mortality for capture in the gillnet fishery.

Texas A&M University ($191,655)

Barotrauma is experienced by some deep-water fish that are brought to the surface too quickly. Fish suffering from barotrauma often have trouble swimming or diving back to depth after release. Fish descending devices are gaining popularity as a conservation tool that can help increase survival of deep-water reef fish caught and released during recreational fishing. Researchers at Texas A&M University have been conducting experimental trials using electronic fish tags and high definition camera footage, and have found that using descending devices significantly reduces the impact of barotrauma and can increase survival of reef fish, such as red snapper. Several other physical factors including fishing depth, temperature, and handling time have also been shown to play a large role in fish survival, and proper consideration of these additional factors coupled with the use of descending devices will maximize the chance of post-release survival during recreational fishing.

University of Hawaii ($172,804)

The Hawaii and American Samoa longline fisheries interact with several shark species that have declining populations, many of which are of low commercial value and are discarded at sea. At the University of Hawaii, scientists are exploring the effects of handling on post-release mortality of sharks caught as bycatch in longline fisheries. Post-release mortality of blue sharks released in good condition from tuna longline vessels is relatively high. However, researchers have found that most sharks are released by the fishers cutting the line as opposed to removing the gear from the animal. As a result, sharks are released with trailing gear still attached to them. Blue sharks released

Reef fish are being studied by Texas A&M University researchers trying to reduce barotrauma in deep-water fish that are brought to the surface too quickly.

Reducing Post-Release Mortality 2016

in good condition with trailing gear still attached showed higher rates of delayed mortalities than seen in previous studies. Blue sharks released in a compromised condition, such as showing signs of injury or lethargy, also had higher mortality rates. Estimates of post-release mortality from this study are being incorporated into stock assessment models to strengthen population assessments and predictions and improve management measures.

Pfleger Institute of Environmental Research ($90,425)

Deep-set buoy gear is a low-impact fishing method that has been developed to catch swordfish and other highly migratory species off the West Coast. The use of this gear is currently undergoing approval with the Pacific Fishery Management Council. While selective, the gear has been shown to frequently interact with big eye thresher sharks. Scientists at the Pfleger Institute of Environmental Research are exploring ways to quantify the post-release survival rate of bigeye thresher sharks caught using deep-set buoy gear. This work also documented depth distribution to assess if practical gear modifications can be made to further reduce fishery interaction. To date, findings suggest that bigeye threshers are resilient to capture on this gear, with most of the sharks tagged surviving the deployment period. Additional findings suggest that current deep-set buoy gear depth targeting techniques may already result in reduced fishery interaction with this species.

Mote Marine Laboratory ($119,768)

Sharks are vulnerable to fishing pressures and impacts of post-release mortality due to their slow growth rate and late maturity. At Mote Marine Laboratory, researchers are continuing previously NOAA Fisheries-funded work that is documenting post-release mortality of large coastal sharks. Scientists have developed electronic tagging technology in an attempt to understand how many animals die after they are caught and released. New developments from this project include creation of a corrodible clamp that allows tags to be quickly attached to shark fins and then falls off after the tags are done recording, accelerometer tag packages with satellite pingers that allow the tags to be located and recovered anywhere in the world, and the smallest accelerometer float package developed to date. This smaller package allows the use of this technology on smaller sharks and sport fishes for the first time. All three of these developments are now in use in new projects on different species.

Scientists at Pfleger Institute are studying big eye thresher shark interactions with deep-set buoy gear off the West Coast.

This report responds to the requirements of Section 316(d) of Magnuson-Stevens Act.

U.S. Secretary of Commerce
Wilbur Ross

Administrator of National Oceanic and Atmospheric Administration and Undersecretary of Commerce
Rear Admiral Timothy Gallaudet, Ph.D., USN Ret.

Assistant Administrator for Fisheries
Chris Oliver

November 2018

www.fisheries.noaa.gov

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National Marine Fisheries Service
1315 East-West Highway
SSMC 3, F/SF, Room 13362
Silver Spring, MD 20910