Fish Restoration Type

Open Ocean Restoration Area

From estuaries to the deep sea, fish play an important ecological role in the Gulf of Mexico by cycling and transporting nutrients between nearshore and offshore areas and between the water surface and the deep sea. The northern Gulf of Mexico commercial and recreational finfish fisheries support billion-dollar industries. Fish and water column resources injured by the *Deepwater Horizon* oil spill include species from all levels of the marine food web.

Draft Open Ocean Restoration Plan 2 focuses on the following Fish and Water Column Invertebrates restoration approaches from the *Deepwater Horizon* Oil Spill Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement:

- Reduce mortality among highly migratory species and other oceanic fishes.
- Reduction of post-release mortality of red snapper and other reef fishes in the Gulf of Mexico using fish descender devices.

- Incentivize Gulf of Mexico commercial shrimp fishers to increase gear selectivity and environmental stewardship.
- Voluntary fisheries-related actions to increase fish biomass.

Fish Restoration Goals
- Restore injured fish species across the range of coastal and oceanic zones by reducing direct sources of mortality.
- Increase the health of fisheries by providing fishing communities with methodologies and incentives for reducing impacts to fishery resources.

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Fish Restoration Type Proposed Projects

PROJECT NAME	PROJECT DESCRIPTION	EST. COST AND TIMEFRAME
REPLENISH AND PROTECT LIVING COASTAL AND MARINE RESOURCES		
Reduction of Post-release Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries	Barotrauma occurs when fish are rapidly brought to the surface from deep water and gases in the fish's tissues and organs expand and in some cases rupture. When fish suffering from barotrauma are released they can struggle to descend back into the water column to deeper depths, becoming easy prey to predators. Barotrauma can cause other physiological effects such as bulging eyes. Injuries due to barotrauma can result in mortality. This project would reduce mortality from barotrauma and restore reef fish populations by promoting the use of fish descender devices (FDDs) and other tools, targeting reef species such as red snapper, red grouper, vermillion snapper, and gag grouper. This project would focus on the development of best practices for FDDs through the distribution of FDDs to recreational anglers and providing information on their use. Surveys on attitude changes, use, and effectiveness of FDDs would be conducted to track project success. Supplying fishermen with the tools and knowledge to minimize barotrauma-related mortality would result in increased survival of fish released during recreational fishing activities.	$30,011,000 8 years
Better Bycatch Reduction Devices for the Gulf of Mexico Commercial Shrimp Trawl Fishery	The Gulf of Mexico shrimp fishery is a trawl-based fishery for brown, white, and pink shrimp. However, as trawl fishing involves the use of nets, shrimp trawls can result in unintentional catch of other species (or bycatch). This project would reduce finfish bycatch through voluntary partnerships with fishermen to use better bycatch reduction devices (BRDs). Project activities would include identifying innovative BRDs, validation of BRD effectiveness, and conducting outreach workshops/dockside training. Reducing bycatch of finfish would increase overall fishery health for commercially and recreationally important species.	$17,171,000 7 Years
Communication Networks and Mapping Tools to Reduce Bycatch – Phase I	The unintentional catch of non-target species (bycatch) can have substantial biological and economic impacts and prevent or delay the recovery of species injured during the DWH oil spill. This project would reduce bycatch in the south Atlantic and Gulf of Mexico by developing a bycatch hotspot identification system and communication network to avoid bycatch. This phased project would develop a system to create near-real time spatial maps of bycatch hotspots coupled with a communication tool to inform fishermen of the high bycatch potential in those areas. This initial phase would include activities such as conducting scoping workshops to identify fisheries, regions, and ports that would benefit from a bycatch identification system; the development of maps to identify areas of potentially high bycatch; and a workshop to discuss the issues surrounding voluntary communication network to avoid bycatch.	$4,416,000 5 Years
Restoring Bluefin Tuna via Fishing Depth Optimization	Atlantic bluefin tuna can be caught as bycatch in the pelagic longline (PLL) fishery that targets yellowfin tuna and swordfish. Data collected from recent studies suggest that increasing the PLL fishing depth may reduce bycatch of bluefin tuna. This project would restore Western Atlantic bluefin tuna by identifying and sharing fishing practices that reduce bycatch in the PLL fishery. This project would involve conducting a pilot study to better define an optimal PLL fishing depth to reduce bluefin tuna bycatch. Anticipated benefits of identifying optimal depths in the PLL fishery include positive economic benefits to fishermen from increased target catch per unit effort and positive benefits to bluefin tuna stocks and possibly other bycatch species by reducing fishing mortality.	$6,175,000 10 Years

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Reduction of Post-release Mortality from Barotrauma in Gulf of Mexico Reef Fish Recreational Fisheries

Fish Restoration Type

This project would restore recreationally important reef fish populations by reducing mortality from barotrauma.

Barotrauma occurs when fish are rapidly brought to the surface from deep water and air in their tissues and organs, including swim bladder expands and, in some cases, causes it to rupture. When fish suffering from barotrauma are released they may die from the injuries or may struggle to descend back into the water column, becoming easy prey to predators. Barotrauma can cause other physiological effects such as bulging eyes. Reef fish species that commonly experience barotrauma in recreational fisheries include red snapper, red grouper, vermilion snapper, and gag grouper.

Fish descender devices are weighted devices that help fish return to depth and recover from barotrauma associated with the catch-and-release process.

To reduce barotrauma-related mortality rates in recreational fisheries, this project would promote the use of fish descender devices (FDDs) through distribution of FDDs to charter boats, head boats, and private

Estimated Cost and Timeframe
$30,011,000 • 8 years

anglers. FDDs are weighted devices that help fish return to depth and recover from barotrauma associated with the catch-and-release process. This project would focus on the development of best practices for FDDs and providing information on their use to recreational anglers.

Project Objectives

- Increase the effective use of FDDs to reduce discard mortality due to recreational fishing.
- Measure and evaluate the use of FDDs in the fishery and develop improved FDD practices.
- Study the effectiveness of FDDs in a range of oceanographic conditions and across affected species to provide improved release mortality estimates.

Surveys on attitude changes, use, and effectiveness of FDDs would be conducted to track project success. Supplying fishermen with the tools and knowledge to minimize barotrauma-related mortality would result in increased survival of fish released during recreational fishing activities.

The project supports the following Trustees' goals: 1) to restore injured fish species across the range of coastal and oceanic zones by reducing direct sources of mortality and 2) to increase the health of fisheries by providing anglers with methods and incentives for reducing impacts to fish populations.

Components

This project initially would focus on areas of high recreational fishing effort such as coastal Alabama and the Florida panhandle, and potentially would be expanded to additional areas of the Gulf of Mexico in later phases. The project would begin with development of best practices for FDD use in the Gulf of Mexico and include surveys of public knowledge, attitudes, and opinions regarding FDDs.

These findings from anglers would help to inform educational materials that would be distributed more widely during outreach and advertising campaigns. At the same time, the project would conduct field surveys on FDD use and related post-release mortality. This information would help to demonstrate FDD's effectiveness across a range of environmental factors and refine best practices. Data would be collected throughout the duration of the project, and the findings would be made available to fishermen, stock assessment scientists, and fishery managers.

Years one and two would consist of management activities, surveys, development of best practices, and community engagement. In years two through four collaborative release mortality studies would be performed. Years two through seven would focus on education and outreach, the sharing of project findings, and additional surveys. The project would be adaptively monitored in years one through eight.

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Better Bycatch Reduction Devices for the Gulf of Mexico Commercial Shrimp Trawl Fishery

Fish Restoration Type

Bycatch reduction devices are devices inserted into shrimp trawls which allow non-target species to escape while retaining shrimp.

This project would restore fish by reducing finfish bycatch in the commercial shrimp trawl fishery.

The shrimp trawl fishery targets brown, white, and pink shrimp. However, as trawl fishing involves the use of nets, shrimp trawling can result in unintentional catch of other species. This finfish bycatch can include juvenile red snapper, croaker, porgy, pinfish, and Gulf menhaden fish species.

Estimated Cost and Timeframe
$ 17,171,000 • 7 years

Finfish bycatch in the shrimp trawl fisheries is a concern as many of these species are commercially, recreationally, and ecologically important.

To reduce finfish bycatch, this project proposes to identify and implement a program to promote the use of better bycatch reduction devices (BRDs). BRDs are devices inserted into shrimp trawls which allow non-target species to escape while retaining shrimp.

The project supports two of the Trustees' goals for restoring injured fish species: 1) reduce direct sources of mortality; and 2) provide methodologies and incentives to fishing communities that reduce impacts to fishery resources.

Components

The proposed project area would include the northern Gulf of Mexico off the coasts of Texas, Louisiana, Mississippi, and Alabama. Outreach activities would be conducted at shrimping fleet locations along the Gulf coast.

The initial activity of the project would be to conduct a BRD innovation survey within the Gulf shrimp fishery to identify industry-based BRD innovations currently in use. The project would engage with U.S. and international entities that are actively involved in shrimp trawl bycatch reduction development to identify BRDs for further testing. Proof-of-concept tests would then be conducted on prototypes to identify innovative BRD technology for full certification testing.

To promote the use of these BRDs and help fishermen install and use them correctly, outreach workshops, training, and incentives would be made available. Experts on gear modification with longstanding working relationships with fishermen would be engaged to help develop these incentives to maximize project participation.

Year one activities would be focused on surveying and information gathering to identify new BRD innovations. Activities for years two through four would consist of conducting proof-of-concept and certification testing. Outreach and incentive-based engagement would be conducted throughout the seven year project timeline.

Communication Networks and Mapping Tools to Reduce Bycatch – Phase 1

Fish Restoration Type

By identifying areas where bycatch is high, fishermen can redirect effort to other areas, avoiding higher bycatch and potentially improving efficiency in retaining allowable catch.

This project would help restore fish by reducing bycatch in commercial fisheries. This project team would collaborate with Atlantic and Gulf of Mexico fisheries to develop a bycatch hotspot identification system and communication network to avoid bycatch.

Bycatch is the unintentional catch of non-targeted species and can have economic impacts on fisheries as well as substantial biological effects on affected species. Bycatch within U.S. and international fisheries around the Gulf of Mexico includes species such as blue marlin, white marlin, bluefin tuna, yellowfin tuna, sailfish, greater amberjack, triggerfish, red

Estimated Cost and Timeframe
$4,416,000 • 5 years

snapper, speckled hind, warsaw grouper, and snowy grouper.

By identifying areas where bycatch is high, fishermen can redirect effort to other areas, avoiding higher bycatch and potentially improving efficiency in retaining allowable catch. The goal of this project is to reduce the amount of bycatch and mortality of injured species injured by the *Deepwater Horizon* oil spill by the identification of bycatch hotspots and developing tools to avoid bycatch.

The project would rely heavily on close coordination with fishermen and state and federal fishery managers. Phase 1 would be a feasibility study that would focus on designing a system to create near-real time, spatially explicit maps of bycatch hotspots in fisheries selected for this project. These maps would be coupled with a communication tool that informs fishermen of the high bycatch potential in those areas.

The primary anticipated outcome from this project would be the creation of designs for communication networks, hotspot mapping technology, and evaluation of options for implementation. This project would stop short of implementation which would be accomplished in future phases.

The project supports the Trustees' goals to 1) restore injured fish species across the range of coastal and oceanic zones by reducing direct sources of mortality and 2) increase the health of fisheries by providing fishing communities with methodologies and incentives for reducing impacts to fishery resources.

Components

Project activities would include conducting scoping workshops to identify fisheries, regions, and ports that would benefit from a bycatch identification system; developing maps to identify areas of potentially high bycatch and high fish densities; and holding workshops to discuss the use of a voluntary communication network to avoid bycatch. Year one would focus on development of an implementation plan, with years two and three focusing on preliminary development of predictive maps. During this time, workshops would be held to enhance stakeholder engagement and involvement in the project.

Project Objectives
- Determine the feasibility of a bycatch communication network for Gulf of Mexico and South Atlantic fisheries.
- Identify priority fisheries for the proposed feasibility study based on factors such as benefits to injured species, current fishery bycatch challenges, fishery bycatch data availability, existing fishery management, and industry characteristics.
- Create designs for communication networks, develop hotspot mapping technology, and evaluate options for implementation.

Workshops with fishermen, fishery groups, management experts, and communication network administrators would be used to identify priority fisheries and species for the development of hotspot analyses and communications networks. Years four and five would include identification of requirements for specific bycatch communication networks to inform potential future implementation of the project.

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Restoring Bluefin Tuna via Fishing Depth Optimization

Fish Restoration Type

This project would conduct a pilot study to better define an optimal depth to set pelagic longlines (PLL) in order to reduce bycatch of Atlantic bluefin tuna.

Atlantic bluefin tuna are caught as bycatch in the yellowfin tuna PLL fishery. PLL fishing gear is primarily composed of a mainline that is five to 40 miles long and has approximately 20 to 30 hooks per mile. Data collected by the National Oceanic and Atmospheric Administration show that about 70 percent of the PLL fishery effort in the Gulf of Mexico occurs at depths of 195 to 330 feet. However,

Estimated Cost and Timeframe
$6,175,000 • 10 years

data have also shown that PLL gear deployed at depths greater than 360 feet may have the potential to reduce bluefin tuna interaction with PLL gear thus decreasing bluefin tuna bycatch mortality.

Reducing bycatch of bluefin tuna would increase overall fishery health in the Gulf of Mexico and possibly provide economic benefit to fishermen by developing more efficient fishing techniques.

Data have shown that pelagic longline gear deployed at depths greater than 360 feet may have a potential to reduce bluefin tuna interaction with gear thus decreasing bluefin tuna bycatch mortality.

The project supports the Trustees' goals to 1) restore injured fish species across the range of coastal and oceanic zones by reducing direct sources of mortality and 2) to increase the health of fisheries by providing fishing communities with methodologies and incentives for reducing impacts to fishery resources.

Components

Components of the project would involve conducting a pilot study to better define an optimal PLL depth to reduce bycatch of Atlantic bluefin tuna. Data would also be collected on possible effects to other species from a deeper PLL fishing depth. This may include bycatch rates of yellowfin tuna, dolphinfish, skipjack tuna, wahoo, swordfish, sea turtles, and marine mammals.

The pilot study would be conducted for an estimated four years in cooperation with voluntarily participating commercial PLL vessels in the northern Gulf of Mexico. Outreach workshops would be held along the U.S. Gulf Coast in Texas, Louisiana, Florida panhandle, and south Florida as well as two locations in Mexico.

Onboard observers would collect data on catch

rates at normal and deeper PLL depths. Data would be analyzed, and the results would be provided to the fishery to educate fishermen on techniques to reduce bycatch. Additional outreach efforts through outlets such as industry meetings would be conducted to increase awareness of benefits of the techniques studied in this project and to encourage voluntary adoption by commercial fishermen.

Project design and outreach planning would be conducted in year one, with years two through six being dedicated to the pilot study and data analysis on bluefin tuna bycatch. Years seven through 10 would focus on implementation of the outreach plan.