# CALIFORNIA'S LOST FISHING GEAR

## AN ISSUE ANALYSIS

### SUPPORTING THE SEPTEMBER 18TH 2017 PANEL DISCUSSION

The Bay Institute

# THE BAY INSTITUTE'S LOST FISHING GEAR REVIEW

## WRITING STAFF

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## OVERVIEW AND ACKNOWLEDGEMENTS

This report provides an introduction to the current conditions of lost and abandoned fishing gear along California's coast, and provides potential actions for discussion aimed at minimizing the effects of lost gear on humans, wildlife and the environment.

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# EXECUTIVE SUMMARY

The Bay Institute (TBI) recently received a grant from the National Fish and Wildlife Federation (NFWF) to host a public event and discuss the issue of lost fishing gear along the West Coast. This report is a primer for current issues and conditions and is intended to identify findings and recommended actions for discussion at the event. The purpose of our effort is to provide additional education and outreach, and to identify actions to help reduce the loss of fishing gear and to assist with processes for recovery of this equipment. Our event will have a panel discussion, with experts (Federal & State agencies, NGOs, academia, and the local fishing community) who will discuss the merits of the recommended actions. The information and potential actions will be used for education, outreach and advocacy through TBI and other partners and will be featured in a short video highlighting the recommended actions.

## Recommended Discussion Topics

We have identified the following discussion topics related to lost fishing gear through a collaborative process involving stakeholders from regional, state, and federal agencies, academia, fishing communities, and non-governmental organizations:

**EDUCATION/OUTREACH** – Initiate a program, or build on existing programs, to publicize gear removal efforts through various strategies (social media, video documentation, press releases, reports, profiles of removal leaders at public institutions), with a goal of garnering more public understanding and support for these efforts.

**TECHNOLOGY** – Utilize innovative practices (multibeam, sidescan sonar) to identify lost gear in deep waters within the National Marine Sanctuaries or other strategic targets, and assess the feasibility of removal through various methods (pumps, Remote Operated Vehicles, grappling hooks). Consider greater use of programs aimed at recycling recovered fishing gear.

**BEST PRACTICES FOR PREVENTION/RECOVERY** – Use published Best Practices documents as a baseline for similar documents across all of California's fisheries, and support continual review and communication of best practices regarding gear setup.

**MANAGEMENT/FUNDING** – Identify sustainable funding sources for ongoing removal programs, and advocate for policy amendments aimed at reducing lost fishing gear.

**RESEARCH**- Support research to evaluate the most efficient and effective technologies to reduce and recover lost gear, and to reduce ghost fishing from gear that cannot be recovered.

# SETTING THE STAGE: CALIFORNIA'S FISHING GEAR PROBLEM

## Identifying the Problem

Lost and abandoned fishing gear is an unfortunate and inescapable reality in the commonly fished areas off California's coast. No fisherman or fisherwoman wants to lose their gear. It is costly to replace and can cause damage to the environment. The fishing community demonstrates a substantial conservation ethic through efforts to reduce such losses and to help recover lost gear. Despite these efforts, the loss of gear occurs each season due to many causes including weather, ocean current conditions, and boat propellers cutting lines. Years of lost crab pots, gill nets, and other equipment have led to an accumulation of debris that is a survival concern for many species, and can be hazardous to humans. Until the mid-2000s, there was no standardized process for lost gear removal in California's coastal waters. This document focuses on legal lost gear and potential policy actions that can remedy the problem. *Illegal, Unreported and Unregulated* (IUU) fishing is another source of lost gear along the California coast, but is considered to be beyond the scope of this analysis.

Lost gear, also known as *Abandoned, Lost or otherwise Discarded Fishing Gear* (ALDFG), has significant potential for harm in marine ecosystems. Marine mammals, fish, sea turtles, crabs, and birds are common victims of 'ghost fishing', when leftover equipment continues to ensnare wildlife. Animals can be injured or die from entanglement events. Economic losses from ghost fishing include lost catch opportunity, removal of an organism from the ecosystem, and the cost of lost gear or repairing damaged gear due to entanglements with discarded equipment. Lost gear can be a hazard to humans, as recreation near some varieties can be dangerous.

Even with many removal and reduction efforts in place along California's coast, lost equipment can affect animals from crabs to large megafauna such as whales and other marine mammals. While accumulation studies, removal efforts, and happenstance sightings are beginning to provide an idea of how much gear is lost off California's coast, the amount of equipment is clearly enough to cause a serious concern for wildlife. Ghost fishing creates inefficiencies in the fishing industry and can result in the needless loss of marine life.

## Lost Gear Impacts the Marine Environment

The amount of gear lost annually far outweighs the removal rate, which demonstrates the need to identify strategies to reduce lost gear and to identify the most effective and efficient methods for recovery. Gear loss is also costly for fishermen and their industry. Loss of potential fishing catch, and bycatch from ghost fishing, also result in economic losses to the industry.

Fishing is and will continue to be an important cornerstone of human protein consumption. Alongside the benefits of seafood harvesting, equipment will continue to be lost. The proportion of lost or abandoned fishing gear to other marine debris varies according to location and the relative inputs of terrestrial versus oceanic debris. Marine debris at sites near urban areas can have as little as 25% fishing-related debris while remote sites can have as high as 90% (Faris and Hart, 1994). A national beach litter report asserts that 17.7 percent of quantified debris was attributed to fishing activities (Sheavly, 2007). Equipment from a variety of fisheries including crab pots, lobster traps, gill nets, and

longlines are lost along the West Coast every year. 10% of 400,000 crab pots are thought to be lost every year during the winter months in California, Oregon and Washington combined (PFMC, 2013).

It is a challenge to hold owners responsible for retrieved gear, as many types of gear do not require identification tags required by the crab fishery. Ghost fishing occurs from all types of lost gear, but can be particularly harmful to sex-restricted fishing stock such as the Dungeness crab (where only male crabs are fished, allowing females to reproduce). Once a trap is lost, crabs are trapped indiscriminately. A study reported a loss of $744,000 per year due to ghost fishing in the Washington Dungeness crab fishery (Antonelis, 2011). The study found that traps with degradable “escape cords” had a lower ghost fishing time than traps without the cord. A study in Alaska found that the ghost fishing time for a crab pot can be more than seven years (Maselko et al., 2013). Escape mechanisms are required in California, Oregon and Washington, but the success of these mechanisms depends on the type of trap deployed (NRC, 2015).

Marine mammal entanglements are a critical concern. The NOAA 2016 West Coast Entanglement Summary provides the recent findings related to whale entanglements along the west coast. According to the report, documented whale entanglements have risen sharply in the past decade. Although increased removal efforts could be beneficial to migrating whales, it is likely that the vast majority of whale entanglements occur due to active, legally deployed gear. In 2016, 71 entangled whales were documented, with only ten cases of observed disentanglement occurred (seven cases of assisted disentanglement and three cases of self-release). A recent study found that in a 6-year period in California, nearly 10% of brown pelicans and gulls treated at care centers are observed to have fishing gear-related maladies i.e. hooks and fishing line (Kaplan-Dau et al 2009). Furthermore, local Marine Protected Areas could be threatened; an Australian study found that movement of legal lost gear due to currents and illegal fishing practices can result in impacted marine reserves (Williamson et al 2014). Of 582 incidental wildlife entanglement sightings at the Farallon Islands National Wildlife Refuge by Point Blue Conservation Science since 2013, more than 70% of the sightings with identified material were due to lost fishing gear. Documented entangled wildlife included pinnipeds (seals and sea lions), birds, and a Humpback Whale (Point Blue Conservation Science, unpublished data). A vast majority of the sightings involved tightly wound or embedded material at the neck and torso. The Marine Mammal Center, headquartered in Sausalito, provides veterinary care and rehabilitation services for marine mammals rescued along the California coast and beyond.

Lost gear impacts marine habitats wherever it is found, from open ocean to the intertidal zone. Rocky reef habitat is of particular concern along California’s coast. Large nets, seines, and traps often accumulate on high relief rocky reef areas and can envelop, dislodge, crush, displace, and disturb these reefs and the algae and sessile invertebrate species that occupy them. Given the relative rarity of such habitats in parts of California and the critical ecosystem functions they provide, such habitat loss and degradation can have significant consequences. Recovery of lost gear is also important due to the increased use of polystyrene and other plastics in fishing gear, as these materials ultimately degrade into smaller pieces and become micro-debris that can then be ingested by wildlife or produce toxins detrimental to fitness and survival in animals.

## Key Players: Programs and Organizations

A variety of groups in California are engaged in the issue of lost fishing gear in the ocean. Government agencies at the local, state and federal levels have allocated resources to address the issue of marine debris and fishing gear in particular. Various non-profits are devoted to cleaning up lost gear through shore clean-ups and at-sea recoveries. In addition, the fishing community regularly assists in removal efforts by reporting sightings and retrieving lost gear.

One organization is the SeaDoc Society, a program of the University of California, Davis School of Veterinary Medicine. SeaDoc is dedicated to the protection of marine wildlife and leads a variety of ocean-health based programs. SeaDoc started the California Lost Fishing Gear Recovery Project in 2005, and has led gear removal efforts in California waters from San Diego to Crescent City in partnership with local fishing communities. As of March 2017, SeaDoc has removed over 120 tons of gear including more than 100 nets, close to 800 lobster traps and more than 1,200 Dungeness crab traps, and has freed more than 2,400 live animals from lost gear. To date the majority funding for this removal has been provided by a mixture of federal and state sources. SeaDoc also published a Policies and Procedures document focused on strategies for recovering lost gear in California. The Half Moon Bay Seafood Marketing Association used the SeaDoc model to jumpstart a successful crab pot recovery program, and is expanding their influence to other major California crabbing ports.

Many other agencies and organizations are working toward a solution for California's lost fishing gear. Government agencies focused on addressing marine debris issues include the National Oceanic and Atmospheric Administration's (NOAA) Marine Debris and National Marine Sanctuary Programs, California Ocean Protection Council (OPC), and California Department of Fish and Wildlife (CDFW). The NOAA Marine Debris Program has partnered with various groups through grant opportunities for debris removal and prevention projects and manages a shoreline citizen science survey program, the Marine Debris Monitoring and Assessment Project (MDMAP). The Marine Debris Program has also fostered the creation of marine debris curricula for the K-12 range focusing on stewardship. Cordell Bank, Greater Farallones, Monterey Bay and Channel Islands National Marine Sanctuaries have partnered with many groups to investigate removal techniques. The OPC is in the process of developing updated policy priorities on marine debris. The OPC is also working in partnership with the CDFW and the National Marine Fisheries Service (NMFS) in convening the California Dungeness Crab Fishing Gear Working Group, which is a 21-member coalition of diverse stakeholders, including commercial and recreational Dungeness crab fishermen, environmental organization representatives, members of the whale entanglement response network, and state and federal agencies who have come together to develop options to reduce the risk of whale entanglement in Dungeness crab fishing gear. The California Dungeness Crab Fishing Gear Working Group recently published a Best Practices guide to minimize potential entanglement and inform best practices, which can include reducing instances of lost equipment. They have placed significant emphasis on identifying ways to reduce whale entanglements. The CDFW works in partnership with OPC and other agencies to minimize lost gear, and runs a statutorily-required crab pot tagging program. The California Coastal Commission (CCC) has required some applicants for coastal development permits to provide funding to SeaDoc as a mitigation strategy for projects that affect seafloor habitats. This mitigation has provided substantial funding for lost gear removal efforts offshore California.

Examples of other groups engaged in this issue include 5 Gyres, Marine Applied Research & Exploration (MARE), and Ocean Defenders Alliance (ODA). 5 Gyres works to increase awareness of plastic pollution in the ocean, and partners on many litter removal projects. MARE has partnered with Monterey Bay and Cordell Bank National Marine Sanctuaries to provide removal of lost gear through the use of ROVs. ODA is a non-profit that employs volunteers in advanced technical debris removal in Southern California. ODA has also experimented with the use of drones to scout for lost gear.

The passage of California Senate Bill 1287 (September 2016) was a recent milestone for cleaning up lost fishing gear. The bill sets out guidelines for a lost Dungeness crab gear recovery program that financially supports fishermen and fisherwomen partnered with the California Department of Fish and Wildlife in the collection of lost crab traps during the off season. The original owner of the lost traps, if identified, remains financially responsible for any gear that is lost. Dungeness crab vessel permits will not be renewed until owners have paid for their gear. Up until the passage of SB 1287 it was unlawful to move or disturb lost gear owned by others, even if it was just recovered, during the off season. The new strategy allows participating fishermen and fisherwomen to receive supplemental income while cleaning up the ocean in the off season. The success of the California Lost Fishing Gear Recovery Project on the North Coast motivated much of the local fishing community to support the legislation.

## Expected Benefits of a Reduction of Lost Gear

Despite all our efforts at prevention, fishing gear is still regularly lost. There has been considerable effort among concerned parties to better understand and respond to the current situation. The SeaDoc Society conducted an economic analysis that showed a 1 to 14.5 cost to benefit ratio on the removal of lost crab traps in Puget Sound, Washington – where a lost trap would accrue $19,656 in damages to the Dungeness crab fishery in the lifetime of the trap and would only cost $1,358 to remove (Gilardi et al., 2010). Furthermore, removal of discarded gear aligns with the objectives of the Marine Mammal Protection Act (MMPA) and minimizes the chance for animal welfare concerns such as extremely prolonged deaths in whales and other animals (Moore et al., 2006).

## Actions and Policy Options for Discussion

Our goal with this document is to provide a short list of broad/high level actions produced with the consultation and expertise of the fishing community, government agencies, NGOs, and academic institutions that can be discussed in the session. Ultimately, we hope to identify solutions that can be shared with audiences including Congress, State legislature, the fishing community, and the public. Here are example recommendations for discussion:

**EDUCATION/OUTREACH** – Initiate a program, or build on existing programs, to publicize gear removal efforts through various strategies with a goal of garnering more public understanding and support for these efforts

> ***Discussion points include:*** social media, video documentation of removals, press releases, reports, and profiles of removal leaders at public institutions

**TECHNOLOGY** – Utilize innovative practices to identify lost gear in deep waters within the National Marine Sanctuaries or other strategic targets, and assess the feasibility of removal through various methods. Consider greater use of programs aimed at recycling recovered fishing gear.

> ***Discussion points include:*** sonar mapping, Remotely Operated Vehicle-assisted removal or neutralization, and companies using recycled materials from lost gear to produce new products

**BEST PRACTICES FOR PREVENTION/RECOVERY** – Use published Best Practices documents as a baseline for similar documents addressing all of California's fisheries, and support continual review and communication of best practices regarding gear setup.

> ***Discussion points include:*** expanding Best Practices education, large scale off-season removal efforts, and ways to prevent lost gear impacts from international fisheries

**MANAGEMENT/FUNDING** – Identify sustainable funding sources for ongoing removal programs, and advocate for policy amendments aimed at reducing lost gear.

> ***Discussion points include:*** used gear recycling programs, utilizing successful strategies found in international fisheries, expanded gear identification requirements, and a mitigation bank centered on gear recovery

**RESEARCH**- Support research to evaluate the most efficient and effective technologies to reduce and recover lost gear, and to reduce ghost fishing from gear that cannot be recovered.

> ***Discussion points include:*** product design research, funding large scale evaluations of the geographic distribution of lost gear, and investigating how to lessen the impact of monofilaments

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