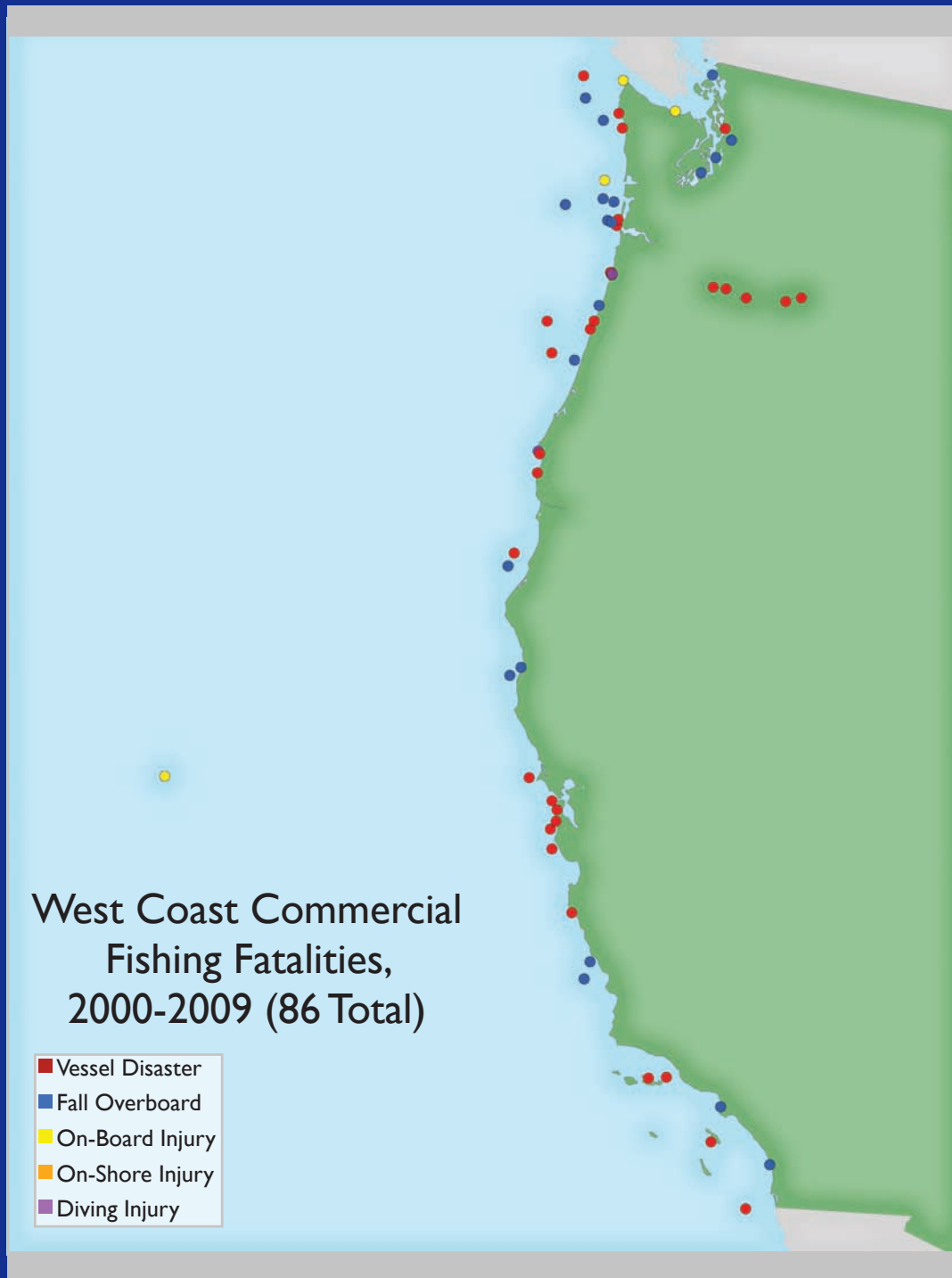


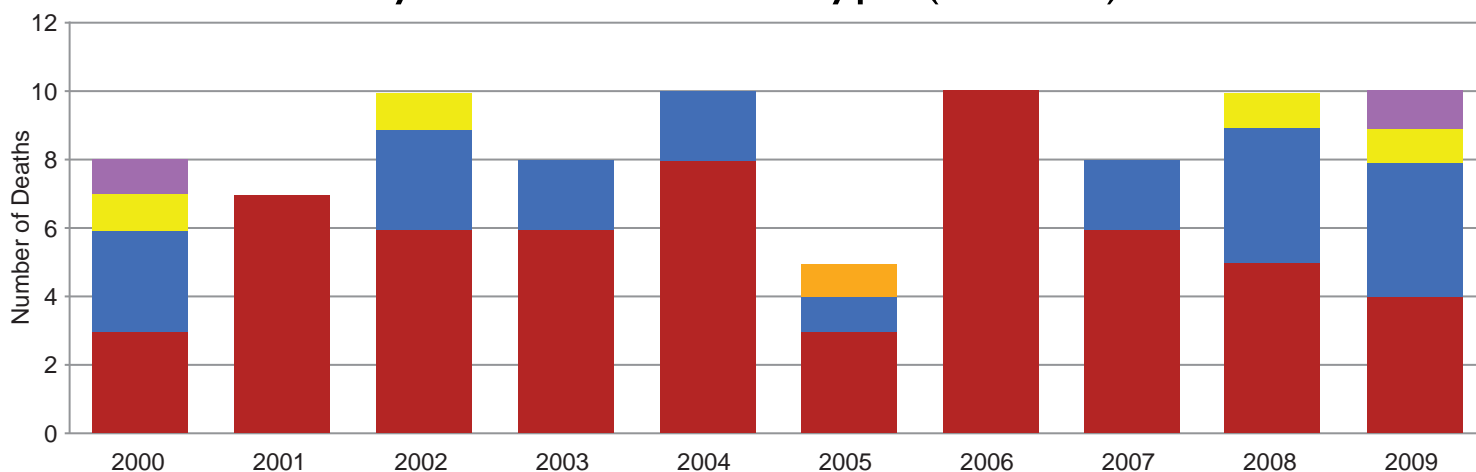
# Fatal Occupational Injuries in the U.S. Commercial Fishing Industry: *Risk Factors and Recommendations* West Coast Region



## About This Report

The National Institute for Occupational Safety and Health (NIOSH) is the federal government agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness. NIOSH recently completed an in-depth study of commercial fishing fatalities in the United States during 2000-2009. The purpose of the study was to identify the most hazardous fisheries around the country and to describe the unique safety issues in each. For this study the US was divided into four fishing regions: Alaska, West Coast, East Coast, and the Gulf of Mexico. This document is one in a set of four reports summarizing fatality data for US fishing regions.

### West Coast Commercial Fishing Fatalities by Year and Incident Type (86 Total) *Figure 1*



During 2000-2009, 86 commercial fishing deaths occurred off the West Coast of the US, an average of 9 per year (Fig. 1). Almost 70% of the deaths were caused by drowning following a vessel disaster (e.g. sinking, capsizing, fire, etc) in which the crew was forced to abandon ship. During two years (2001 and 2006) vessel disasters were the sole cause of commercial fishing fatalities. About one-quarter (24%) of fatalities were the result of falls overboard (Fig. 2). The remaining fatalities were due to traumatic injuries sustained on-board, while diving or on-shore.

Five fisheries contributed to 55% of fatalities on the West Coast during 2000-2009 (Fig. 3). Sixteen other fisheries had less than three fatalities each. The Dungeness crab fishery experienced the highest number of occupational deaths with 27 fatalities. Vessel disasters caused the most deaths among Dungeness crab fishermen (78%). The remaining fatalities were caused by falls overboard. Tribal salmon fishermen operating on the Columbia River had the next highest number of fatalities for a single fishery, with 10 deaths. All were the result of set-net skiffs capsizing. All but one of these incidents occurred in adverse weather conditions.

The fatality rate for the Dungeness crab fishery for the period 2000-2009 was 310 deaths per 100,000 full-time equivalent workers. The fatality rate accounts for the number of workers and exposure time on the water, and provides a way to compare risk using a common denominator. The fatality rate for the tribal salmon fishery was not able to be calculated due to missing workforce data.

Vessel disasters often result in multiple fatalities. The 58 deaths due to vessel disasters during 2000-2009 took place in 32 separate incidents. Vessel disasters were usually caused by a sequence of events, starting with an initiating event. The most common initiating events were: flooding, being struck by a large wave, and crossing a river bar during hazardous conditions (Fig. 4). In addition, severe

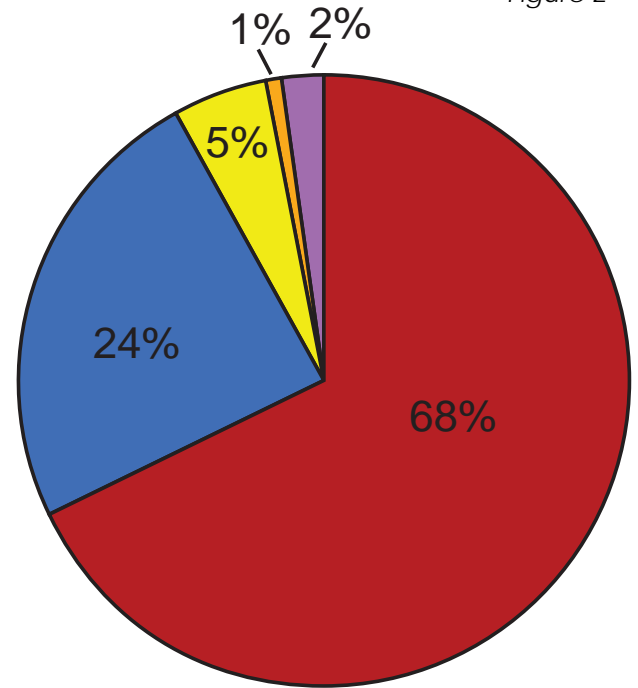


weather conditions contributed to 78% of vessel disasters. During 2000-2009, 21 Dungeness crab fishermen died in 10 separate vessel disasters. There were also 16 other vessel disasters in which all the fishermen survived. Crossing a bar in hazardous conditions led to 40% of fatal vessel disasters (Fig. 5). None of the non-fatal vessel disasters involved crossing a bar. Vessel instability led to both fatal and non-fatal disasters, but was slightly more likely to be involved in fatal disasters. Several initiating events only resulted in non-fatal vessel disasters, such as flooding and striking rocks.

Falls overboard accounted for 24% of all fatalities in the West Coast commercial fishing industry during 2000-2009. Falls overboard were caused most often by tripping or slipping on deck and by entanglement in fishing gear (Fig. 6). Factors that contributed to falls overboard were: working alone on deck (52%), using alcohol or drugs (19%), and poor weather conditions (14%). None of the victims of falls overboard were wearing a Personal Flotation Device (PFD).

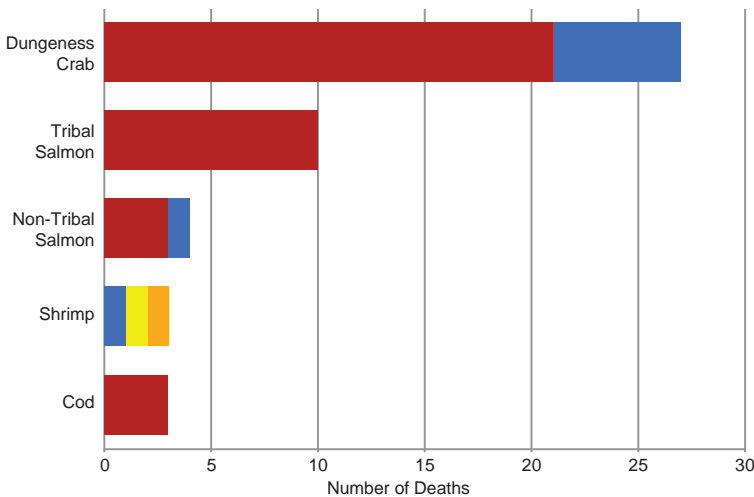
## West Coast Commercial Fishing Fatalities by Incident Type (86 Total)

Figure 2



## West Coast Fisheries with Three or More Fatalities During 2000-2009 (47 Total)

Figure 3



### Data Key

- Vessel Disaster
- Fall Overboard
- On-Board Injury
- On-Shore Injury
- Diving Injury

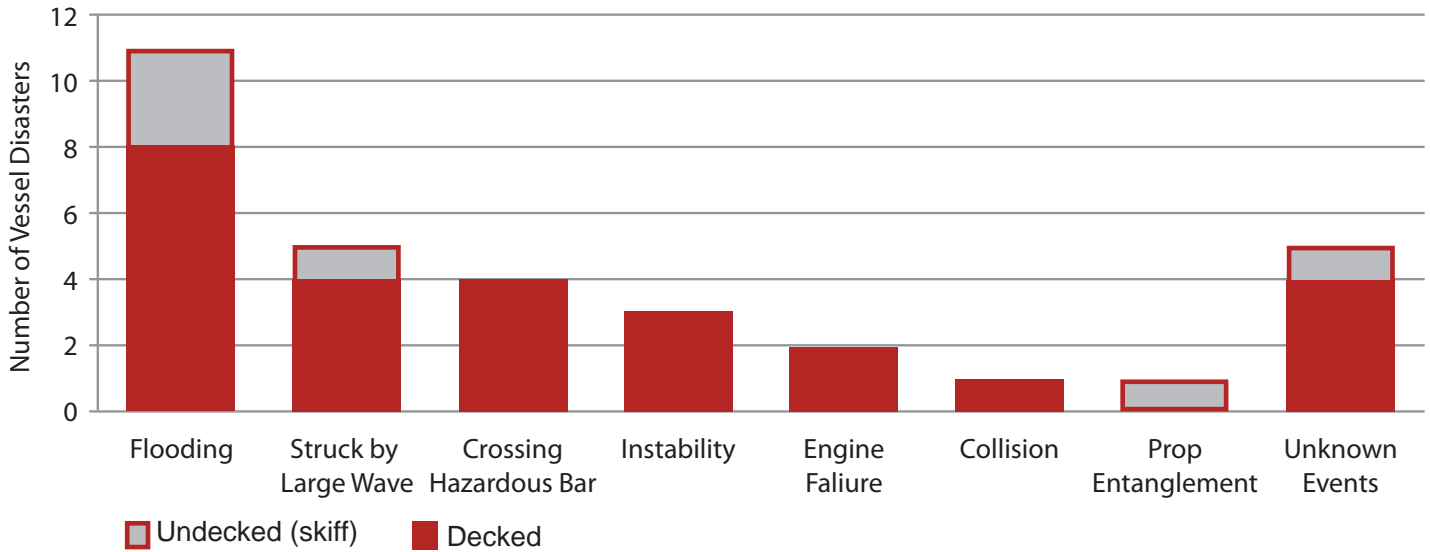
marine safety training and increasing PFD usage (Read full report at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5716a2.htm>). Since the report, the US Coast Guard implemented stricter safety guidelines for all vessels crossing river bars, and the Oregon Dungeness Crab Commission has increased fleet participation in safety training programs and has sponsored rebates for crew members to purchase PFDs. Incremental progress in implementing these recommendations has been made, but it is too early to determine their impact.

The tribal salmon fishery on the Columbia River claimed many lives during 2000-2009, and all of the deaths were attributed to a single cause: skiffs capsizing on the river. All but one of the skiffs capsized after being swamped by waves in poor weather conditions. To prevent deaths on these skiffs, fishermen should wear a PFD in the skiff, especially in bad weather. Avoid going out in conditions that exceed the safe operating limits of the skiff. Finally, have emergency communications equipment on-board to call for help.

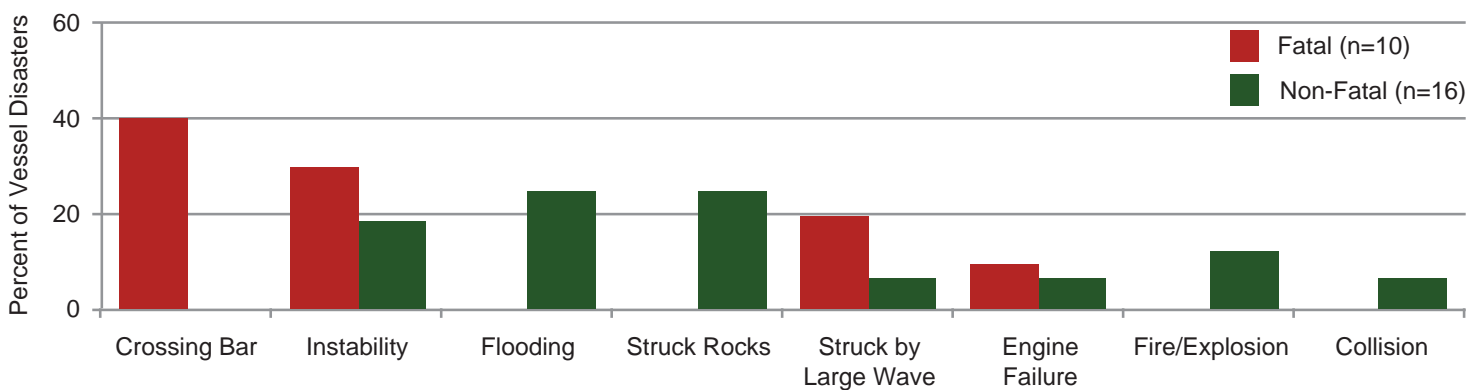
## Conclusions

The Dungeness crab and tribal salmon fisheries have the highest number of fatalities on the West Coast. In 2008, NIOSH reviewed commercial fishing deaths that occurred along the West Coast and Alaska. The report identified the Dungeness crab fleet as having a higher fatality rate than the Bering Sea and Aleutian Island crab fleet and made recommendations including activities that would result in better weather reporting, safer procedures for crossing river bars, continued

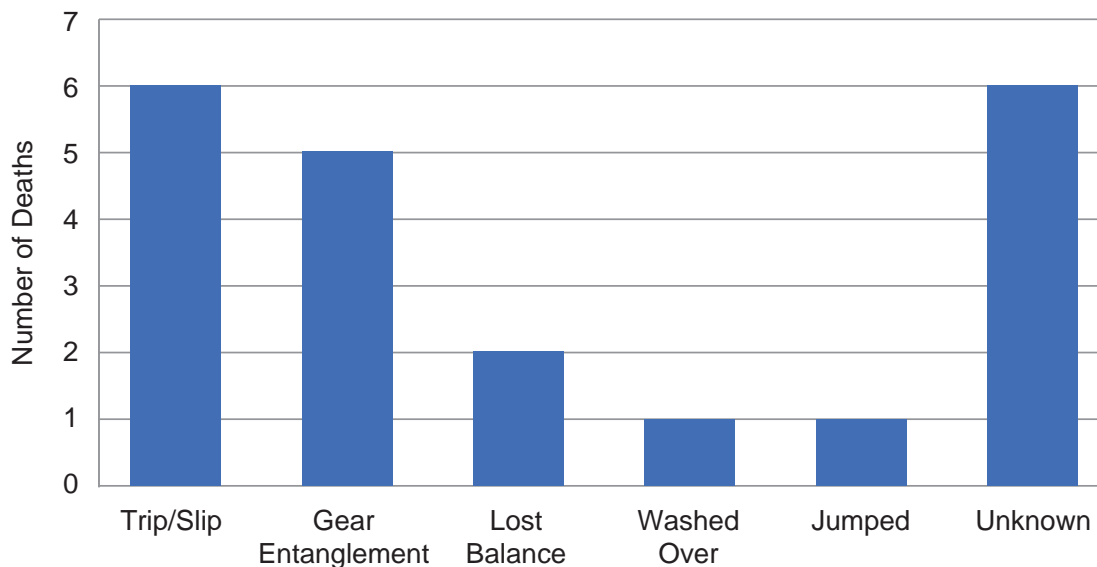
### Initiating Events Contributing to Fatal Vessel Disasters, West Coast, 2000-2009 (32 Disasters with 58 Deaths) *Figure 4*



### Initiating Events Contributing to Fatal and Non-fatal Vessel Disasters in the West Coast Dungeness Crab Fishery, 2000-2009 *Figure 5*



### Causes of Fatal Falls Overboard, West Coast, 2000-2009 (21 Total) *Figure 6*



# RECOMMENDATIONS

## Vessel Disasters

**Take a marine safety class at least once every 5 years** - Safety training for fishermen is available, affordable, and saves lives. All fishermen should learn and know how to use basic lifesaving equipment like immersion suits, life rafts, EPIRBs, and fire extinguishers.

**Do monthly drills: Abandon ship, Flooding, Fire** - Safety training equips fishermen with survival skills and knowledge. Monthly drills give fishermen an opportunity to practice and re-enforce those skills.

**Test immersion suit for leaks** - When watertight, immersion suits provide thermal protection and flotation in cold water. If an immersion suit has leaks, it will provide less protection from cold water. Instructions for inflation testing immersion suits are available at [www.amsea.org](http://www.amsea.org).

**Heed weather forecasts and avoid fishing in severe sea conditions** - Hazardous weather conditions contributed to nearly 80% of vessel disasters off the West Coast during 2000-2009, and the deaths of 52 fishermen. Make the decision to stay in port when the seas are too rough for your vessel to operate in. Keep track of forecasts and seek shelter before the storm arrives or intensifies beyond the safe operating limits of your vessel.

**Maintain watertight integrity** - Flooding is the most common initiating event for vessel disasters on the West Coast. Inspect and maintain the hull of your vessel and all through-hull fittings. When seas are rough, ensure that watertight doors and hatches are sealed. Inspect and test high water alarms regularly.

## Falls Overboard

**Wear a PFD on deck** - Falls overboard occur without warning or time to prepare. A PFD stowed away onboard will not help float a fisherman who has fallen overboard. Wearing a PFD on deck is the single most important thing a fisherman can do to increase survivability following a fall overboard. There are many new styles of PFDs which have been evaluated by fishermen in real working conditions and are comfortable to work in on deck. Results of the NIOSH PFD study are available at [www.cdc.gov/niosh/topics/fishing](http://www.cdc.gov/niosh/topics/fishing).

**Utilize a man overboard alarm system** - Man overboard alarms are devices which alert others instantly to a fall overboard emergency, even if the fall was not witnessed. Systems vary in features and cost, but even the most inexpensive and basic system can save lives by immediately sounding an alarm if a fisherman falls overboard. Some of these systems can also benefit fishermen who work alone on small vessels by shutting down the engine if the sole operator falls overboard. This gives the fisherman, especially one prepared by wearing a PFD, a chance to get back to the vessel and re-board it.

**Conduct monthly man-overboard drills** - If you fell overboard, would you want it to be the first time your crewmates tried to recover a man-overboard? Practicing man-overboard recovery procedures is essential for a crew to perform well in an actual emergency.

## On-Board Injuries

**Install emergency stop (e-stop) devices on deck machinery**

- Deck machinery, especially deck winches, are particularly hazardous and result in many fatal and non-fatal injuries. Emergency-stop buttons have been developed specifically for deck machinery on fishing vessels and can be adapted and retrofitted onto any winch or other machinery. More information about e-stops for fishing vessels can be found at [www.cdc.gov/niosh/topics/fishing](http://www.cdc.gov/niosh/topics/fishing).



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