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## Commercial Fishing Fatalities --- California, Oregon, and Washington, 2000--2006

During 2000--2006, commercial fishing was one of the most dangerous occupations in the United States, with an average annual fatality rate of 115 deaths per 100,000 fishermen. By contrast, the average annual occupational fatality rate among all U.S. workers during the same period was four deaths per 100,000 workers (1). During the 1990s, safety interventions in Alaska fisheries were followed by declines in that state's commercial fishing fatality rates (2). To assess the need for similar safety improvements in the other three Pacific Coast states, CDC analyzed data on commercial fishing fatalities from California, Oregon, and Washington during 2000--2006. The results of that analysis indicated that the three states combined had an average annual commercial fishing fatality rate of 238 deaths per 100,000 full-time equivalent (FTE) fishermen, approximately double the fishing fatality rate nationwide during the same period. CDC also determined that safety equipment (e.g., immersion suits or life rafts) had not been used adequately in these fatal events, and that the Northwest Dungeness crab fishery had the highest fatality rate of any fishery located off the coasts of California, Oregon, and Washington. To reduce fatalities among the Pacific Coast commercial fishermen at greatest risk, additional prevention measures tailored to the Northwest Dungeness crab fishery should be considered.

A case was defined as a fatal occupational traumatic injury in the commercial fishing industry during 2000--2006 reported from California, Oregon, or Washington. Determination of an occupational fatality used established guidelines for injury at work, which take into account where the injuries occurred (i.e., on or off employer premises) and whether the person was being compensated for the activity at the time of the event (3). Data were collected from multiple sources in each state, including reports from the U.S. Coast Guard, local law enforcement agencies, and local media; death certificates; and state-based occupational fatality surveillance programs.

Fatality rates were calculated using estimates of the number of FTE commercial fishermen for each year during 2000--2006; these estimates considered the number of vessels participating in a fishery, number of days at sea, and average number of crew members on board each vessel. Estimates of the number of FTE fishermen in some small-scale fisheries could not be determined; therefore, fatal events from those fisheries were included in the descriptive statistics but not in the rate calculations.

During 2000--2006, a total of 58 commercial fishing fatalities were reported from Oregon (21 [36%]), California (20 [34%]), and Washington (17 [29%]) ([Figure](#)). The number of fatalities, by year, during 2000--2006 was as follows: 2000 (eight), 2001 (seven), 2002 (10), 2003 (eight), 2004 (10), 2005 (five), and 2006 (10). All 58 decedents were male; mean age was 39 years. Forty-three (74%) of the fatalities resulted from the loss (i.e., capsizing or sinking) of 23 fishing vessels, 11 (19%) resulted from persons falling overboard, and four (7%) resulted from other incidents involving deck injuries or diving injuries.

Among the 43 fatalities that resulted from vessel loss, weather conditions were a contributing factor in 34 deaths (79%); other contributing factors included large waves (17 [40%]), flooding (16 [37%]), and vessel instability (11 [26%]) ([Table 1](#)). Among the 11 deaths that resulted from falling overboard, none of the persons wore a personal flotation device. Contributing factors in these deaths included being alone (six deaths [55%]), slipping or tripping (six [55%]), gear entanglement (three [27%]), wet or slippery deck (three [27%]), and alcohol or drug use by a decedent (three [27%]) ([Table 1](#)).

None of the 43 persons whose deaths resulted from vessel loss were able to enter a functional life raft. In 12 (28%) of the fatalities, no life raft was aboard the vessel; however, seven of those deaths were among fishermen aboard skiffs that were too small to carry a life raft. Other life raft complications included malfunctioning (12 [28%]) and inability to reach a raft (9 [21%]) ([Table 2](#)).

Three (13%) of the 23 vessels that were lost had a current decal from a U.S. Coast Guard voluntary dockside safety examination. Three vessels had expired decals (i.e., >2 years since the examination), and 12 vessels did not have a decal and might have never participated in the safety examination program. Four vessels were skiffs and were not included in the examination program; decal status was unknown for one vessel. Among fatalities in these 23 vessel losses, three persons died despite successfully donning an immersion suit\*; 31 persons did not use an immersion suit, and immersion suit use was unknown for the other nine persons. Information regarding how many of the vessels had immersion suits aboard was not available.

The highest number of fatalities (23 [40%]) was reported from the shellfish fishery (including 17 from the Northwest Dungeness crab fleet), followed by salmon and other pelagic fisheries (15 [26%]) and the groundfish fishery (10 [17%]). Type of fishery was not identified for 10 fatalities.

The average annual number of FTE fishermen in the three states was 2,706. This number included annual averages of 828 in the shellfish fisheries (including 524 in the Northwest Dungeness crab fleet), 1,084 in the salmon and other pelagic fisheries, and 794 in the groundfish fisheries. The average annual fatality rate for all fisheries in the three-state area during 2000--2006 was 238 deaths per 100,000 FTE fishermen. The shellfish fishery had the highest average annual fatality rate (362 deaths per 100,000 FTE fishermen); within that fishery, the rate for the Northwest Dungeness crab fleet was higher still (463 deaths per 100,000 FTE fishermen). The salmon and other pelagic fisheries had a fatality rate of 132 deaths per 100,000 FTE fishermen, and the groundfish fisheries had a rate of 72 deaths per 100,000 FTE fishermen.

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## **Editorial Note:**

Commercial fishing has long been associated with high fatality rates; however, this report is the first to identify the most hazardous Pacific Coast fisheries outside of Alaska. The findings reveal that, during 2000--2006, the average annual fatality rate for commercial fishing deaths reported from California, Oregon, and Washington was approximately double the national fishing fatality rate of 115 deaths per 100,000 workers (*1*) and also double the Alaska rate of 107 per 100,000 FTE fishermen during the same period (CDC, unpublished data, 2008).

The analysis indicates that the Pacific Coast fishery with the greatest hazard, during 2000--2006, was the Northwest Dungeness crab fishery. Although Alaska's Bering Sea crab fishery has been described as the most dangerous fishery, data from this analysis indicate that the Northwest Dungeness crab fleet had a greater number of fatalities and a higher fatality rate during 2000--2006. During that period, the number of fatalities in the Bering Sea crab fishery was 11, and the fatality rate was 305 deaths per 100,000 FTE fishermen (CDC, unpublished data, 2008). By comparison, the number of deaths in the Northwest Dungeness crab fishery during 2000--2006 was 17, with a fatality rate of 463 deaths per 100,000 FTE fishermen. The Bering Sea rate represents a 60% reduction from the rate of 768 deaths per 100,000 FTE fishermen recorded during 1990--1999 (CDC, unpublished data, 2008).

Concern over the high fatality rates in Alaska during the 1990s led to institution of various safety measures. For example, in 1999, a preseason dockside enforcement program that ensures vessels are not overloaded with crab pots and that primary safety equipment is present and maintained was developed and implemented by the U.S. Coast Guard in Alaska (*4*). A similar program, tailored to the Dungeness crab fleet, might reduce deaths in the Northwest Dungeness crab fishery.

The U.S. Coast Guard has primary jurisdiction over the safety of the U.S. commercial fishing fleet, enforcing regulations of the U.S. Commercial Fishing Industry Vessel Safety Act of 1988 (CFIVSA)<sup>†</sup> with at-sea boardings, during which officers check for illegal fishing activities, illicit drugs, and safety violations. CFIVSA regulations focus primarily on saving lives after the loss of a vessel and not on preventing vessels from capsizing or sinking, falls overboard, or injuries on deck. CFIVSA regulations require that commercial fishing vessels carry various equipment (e.g., life rafts, radio beacons, and immersion suits) depending on the size of the vessel and the area in which it operates.

Of particular concern in this study are the results showing a lack of use of life rafts and immersion suits. CFIVSA requirements for life rafts and immersion suits likely contributed to a survival rate of 94% among commercial fishermen aboard vessels that sank or capsized during 1997--1999 in Alaska; this rate was up from 73% in 1991 (*2*). CDC determined that, during 1992--2004, survivors of vessel sinkings in Alaska were approximately seven times more likely to have worn an immersion suit than decedents in these events and 15 times more likely to have used a life raft (CDC, unpublished data, 2008). To improve survival chances among Pacific Coast fishermen, added emphasis should be placed on formal marine safety training in the deployment and use of life rafts and immersion suits.

The findings in this report are subject to at least three limitations. First, unlike the methodology used in this study, national fatality rates for commercial fishermen are not calculated based on FTE fishermen but are calculated using annual average estimates of employed civilians aged  $\geq 16$  years and deaths from the Census of Fatal Occupational Injuries. Therefore, the national rates might not be directly comparable to the rates calculated in this study for California, Oregon, and Washington. Second, fatality rates for the three states do not include the number of fatalities or FTE fishermen in certain small-scale fisheries where deaths occurred. Finally, certain information (e.g., type of fishery

or immersion suit usage) was not available for all fatal events. The U.S. Coast Guard is working with CDC to improve data-collection instruments so that investigating Coast Guard officers can produce more complete reports.

Safety improvements in the Alaska commercial fishing industry during the 1990s did not occur because of a single intervention. Several interventions were implemented, including requirements for emergency gear, development of hands-on safety training, and tailored safety interventions addressing specific hazards for particular fishing fleets. The findings in this report suggest that safety interventions should be tailored to specific groups of vessels and emphasis should be placed on the Northwest Dungeness crab fleet, with targeted preseason safety inspections and safety and stability training. Other areas of emphasis should include improved weather reporting, training in the deployment and use of life rafts, and increased training in the use of immersion suits and personal flotation devices.

## Acknowledgments

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\* One person who drowned wore the immersion suit improperly; another person wore the suit properly but died from head trauma after striking his head on rocks; the third person wore the suit properly but drowned, with no indication of head trauma.

† Requirements for commercial fishing industry vessels. 46 CFR part 28.

## Table 1

**TABLE 1. Number and percentage of fatalities\* from commercial fishing vessel loss or falls overboard, by contributing factors — California, Oregon, and Washington, 2000–2006**

Contributing factor†	No.	(%)
<i>Vessel loss</i>		
Weather conditions	34	(79)
Struck by large wave	17	(40)
Flooding	16	(37)
Instability	11	(26)
Grounding	8	(19)
Crossing hazardous sandbar	7	(16)
Illicit drugs used by any crew member	6	(14)
Open door or hatch	3	(7)
Fatigue experienced by any crew member	2	(5)
Alcohol used by any crew member	1	(2)
<i>Falls overboard</i>		
Alone (not witnessed)	6	(55)
Trip or slip	6	(55)
Gear entanglement	3	(27)
Wet or slippery deck	3	(27)
Alcohol or drugs used by the decedent	3	(27)
Lost balance	2	(18)
Ropes on deck	2	(18)
Fatigue experienced by the decedent	2	(18)
Vessel motion	1	(9)

\* Vessel loss (n = 43 [23 vessels]); falls overboard (n = 11).

† Fatalities might have had more than one contributing factor.

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## Table 2

**TABLE 2. Number and percentage of fatalities from commercial fishing vessel loss,\* by life raft complications — California, Oregon, and Washington, 2000–2006**

Life raft complications†	No.	(%)
No raft aboard vessel§	12	(28)
Raft malfunctioned	12	(28)
Unable to reach raft	9	(21)
Unable to free raft	3	(7)
Trapped in vessel	3	(7)
Unknown	4	(9)

\* N = 43.

† None of the fishermen who died were able to enter a functional life raft.

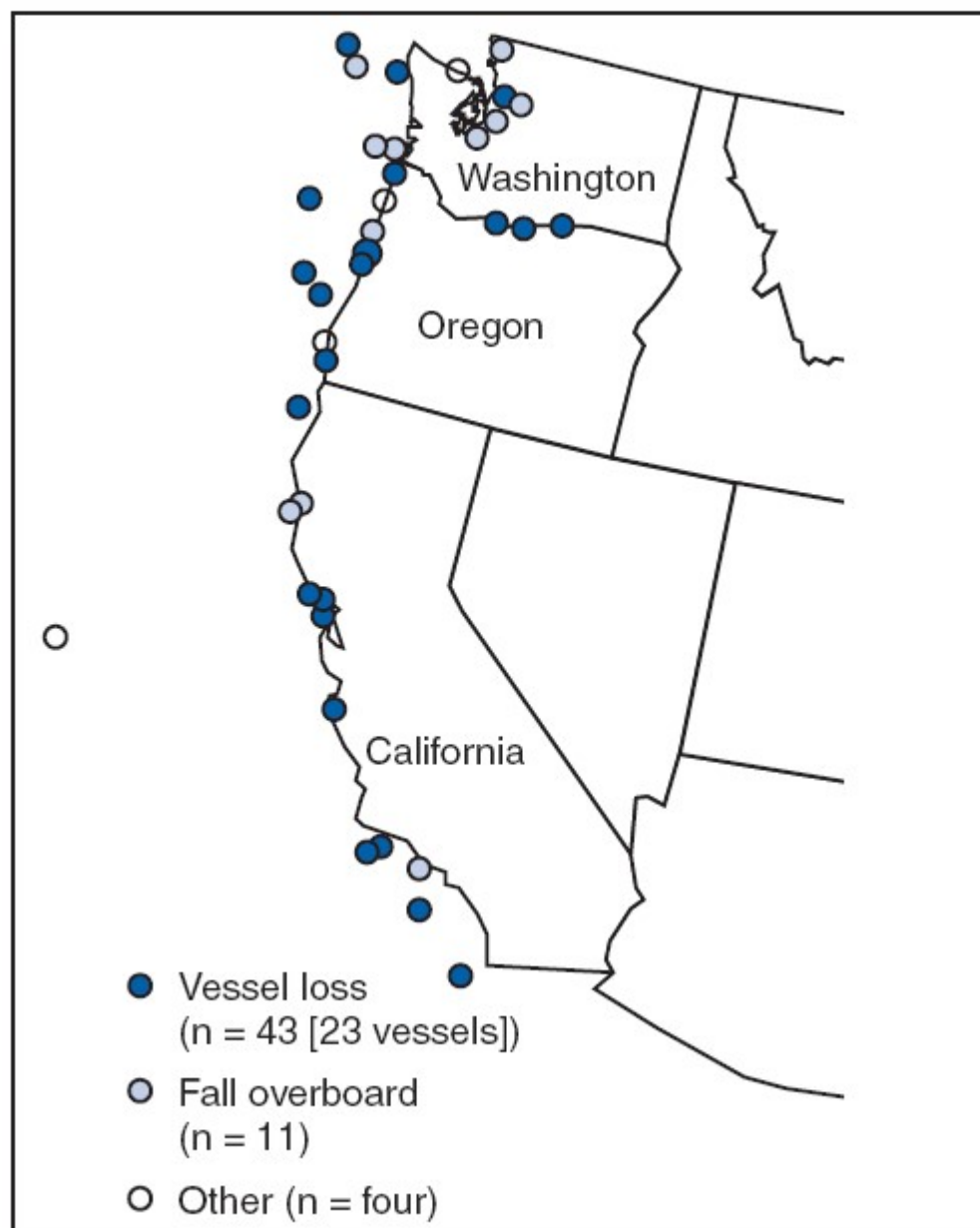
§ Includes seven deaths of fishermen aboard four skiffs that were too small to carry a life raft.



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## Figure

**FIGURE. Number of commercial fishing fatalities,\* by location and fatal event — California, Oregon, and Washington, 2000–2006**



\* N = 58.

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