



National Transportation Safety Board

Marine Accident Brief

Capsizing and Sinking of Fishing Vessel *Lydia & Maya*

Accident no.	DCA16FM053
Vessel name	<i>Lydia & Maya</i>
Accident type	Capsizing and sinking
Location	Jordan Basin, Gulf of Maine, about 45 miles south-southeast of Bar Harbor, Maine 43°35.0' N, 068°04.7' W
Date	August 17, 2016
Time	0008 eastern daylight time (coordinated universal time – 4 hours)
Injuries	None
Property damage	\$600,000 est.
Environmental damage	Approximately 100-yard-by-300-yard oil sheen observed
Weather	Overcast skies and rain, visibility at 1.6 miles, winds southerly at 23 knots with gusts up to 27 knots, waves 4 feet high with swells 8 feet high, air temperature 69°F, water temperature 66°F
Waterway information	Open waters in the Gulf of Maine, Atlantic Ocean

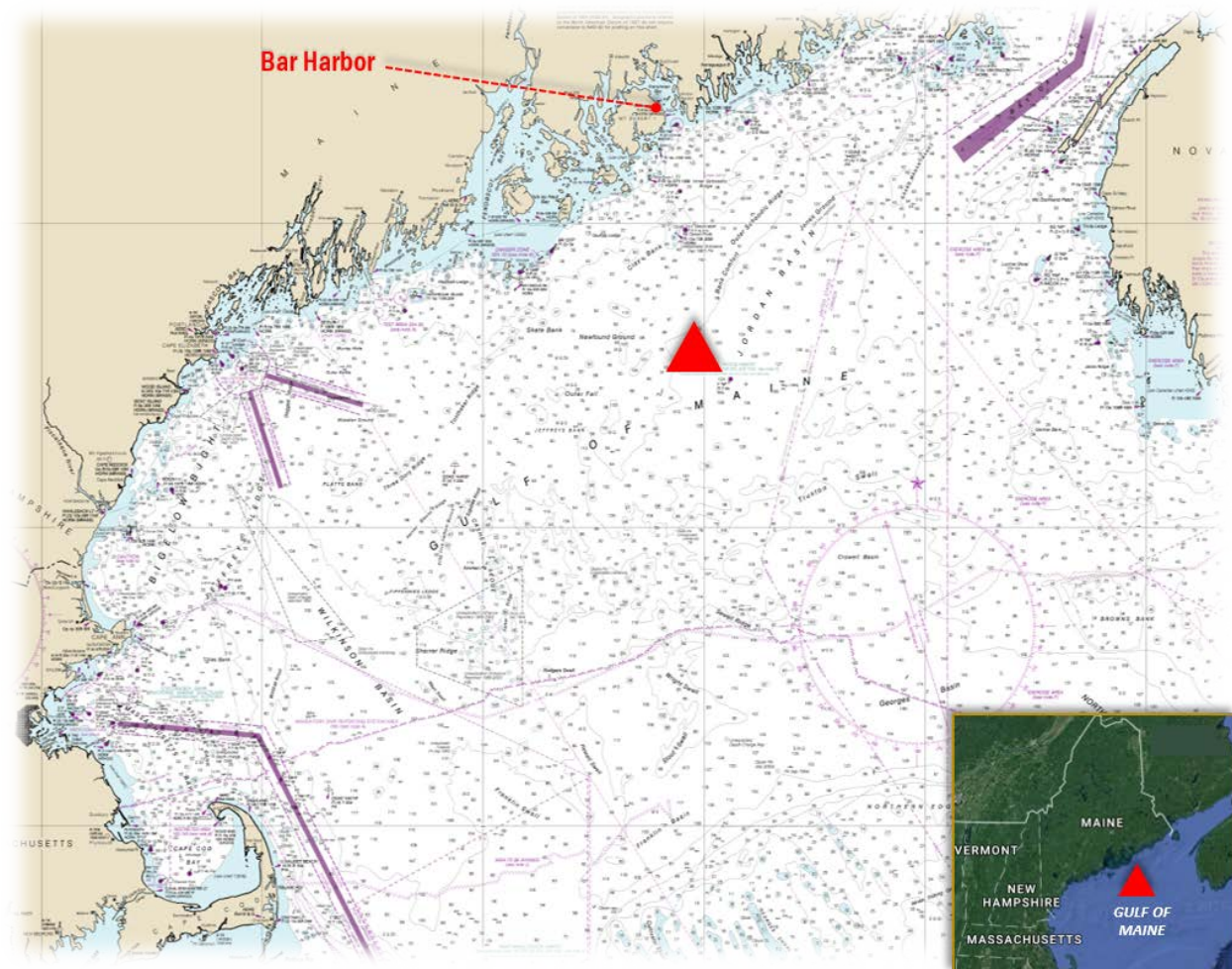
On August 17, 2016, about midnight local time, the fishing vessel *Lydia & Maya* was returning from fishing grounds in the Gulf of Maine to its home port of Boston, Massachusetts, when the vessel capsized. All four crewmembers abandoned ship into a liferaft and were later recovered by a US Coast Guard helicopter. The vessel, which was partially submerged when abandoned, subsequently sank in 540 feet of water with about 3,500 gallons of fuel on board. There was no report of injuries, but an oil sheen was observed after the accident. The vessel was valued at an estimated \$600,000.



Lydia & Maya before the sinking. (Photo by US Coast Guard)

* Unless otherwise noted, all miles in this report are nautical miles.

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A red triangle identifies the accident site of *Lydia & Maya* in the Gulf of Maine, located about 45 miles south-southeast of Bar Harbor, Maine. (National Oceanic and Atmospheric Administration [NOAA] chart 13006; Google Maps)

The *Lydia & Maya* was a commercial fishing vessel that worked off the coast of New England fishing for groundfish, such as pollock, haddock, and hake. The vessel was equipped with a main boom to lift the nets, two outriggers to stabilize the vessel while fishing, and winch-driven reels to deploy and retrieve the fishing nets for stern-trawling operations. In order to keep the fish from washing overboard while being separated, the crew typically placed steel plates over the scuppers on both sides of the vessel.¹ Once caught, the fish were removed from the nets and dumped into check pens.² Afterwards, the fish were separated, cut, washed, and dropped into the fish hold below deck to be stored in ice. As the level of fish increased, wooden boards (two-by-eights and two-by-tens) were stacked on top of one another in the fish hold to reduce shifting while under way.

¹ A *scupper*, also called a freeing port, is an opening cut through the bulwarks of a ship that allows water collecting on the weather deck to flow overboard. Scupper plates are typically used on fishing vessels to prevent the loss of fish overboard when the contents of the net are opened on deck and removed during transit of the vessel.

² A *check pen* is a containment made of sturdy, removeable boards called “checker boards” to create a holding area for the fish after being removed from the fishing nets.

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About 1800 on August 12, 2016, the vessel departed from its home port of Boston, Massachusetts, with a crew of four—a captain and three deckhands—before transiting approximately 22 hours to arrive at the fishing grounds. The crewmembers worked over 3 days in Jordan Basin in the Gulf of Maine (approximately 45 miles south-southeast of Bar Harbor), during which time they caught an estimated 65,000–70,000 pounds of fish. Based on their estimates, the vessel had carried similar loads during previous trips.

About 2000 on August 16, the *Lydia & Maya* began its final “haul back” of nets and catch, motoring northeast at about 3 knots to prevent sloshing of the fish stored in the fish hold below deck. About an hour and a half later, all catch and nets were back aboard. The outriggers were left in their deployed (horizontal) positions, while about 2,500 pounds of fish remained on deck in check pens on the starboard side of the vessel. Also left in place was the last catch, about 7,000 pounds in the net, suspended by the main boom above the aft deck between the net reels. At least two of the eight steel covers were kept on the scuppers aft of the fish pen. Meanwhile, the crewmembers took a break to rest and eat dinner, with plans to return to the deck later to sort and pack the catch remaining in the net. About 2200, the *Lydia & Maya* altered course to the southwest to begin the transit back to Boston at about 3 knots.



Main boom and net reels on the *Lydia & Maya* as well as the starboard outrigger, rail, and scuppers. (Photo by Coast Guard)

At some time between 2200 and midnight, while the crew was still resting and the last catch was left suspended in the net, deckhand no. 1, who was steering the vessel, observed that it started to list to starboard. He then heard a loud noise that he described as “a boom” and noticed that the *Lydia & Maya*, which previously was transiting normally, appeared to be “dragging

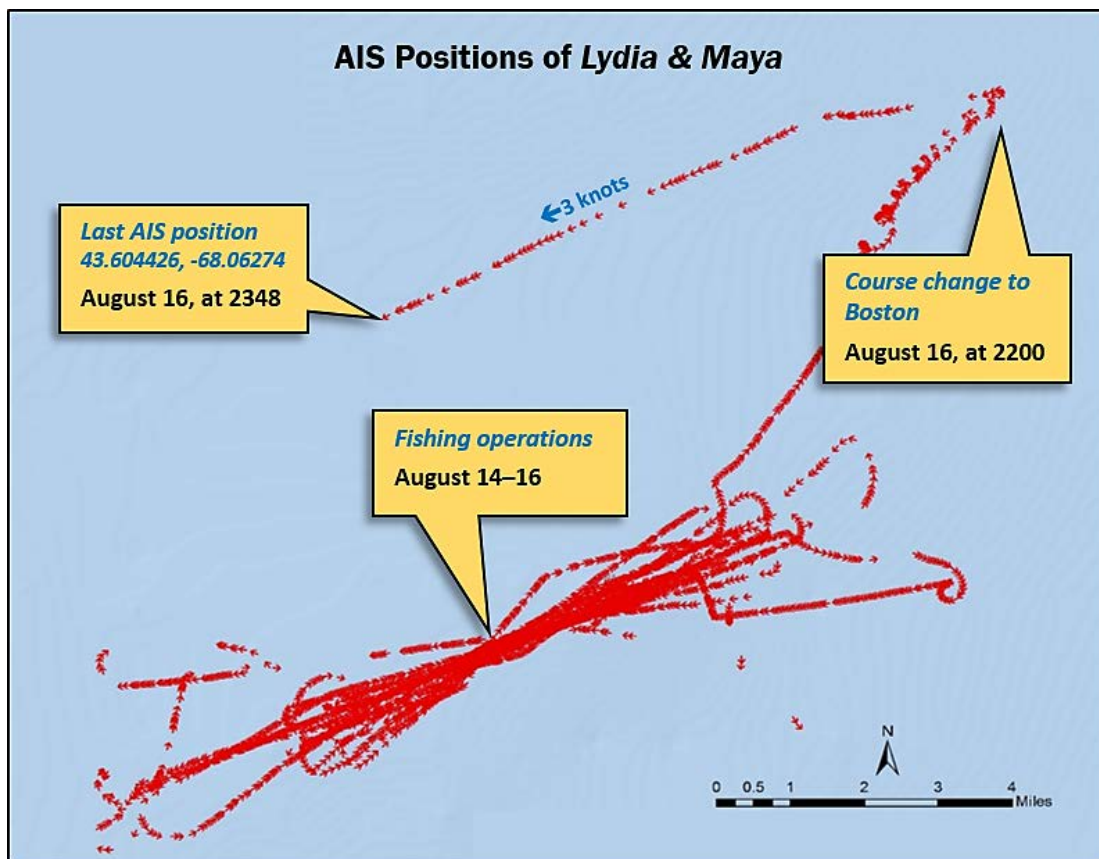
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behind.” When he went outside the wheelhouse to investigate, he found the starboard quarter of the vessel submerged up to the rail.

Deckhand no. 1 also observed that the starboard outrigger that was left in the deployed position over the starboard side of the vessel was submerged. Additionally, the main boom, which had been supporting the last catch of fish in the net, had snapped and was swinging. The boom breaking was likely the noise he heard while navigating the vessel. Deckhand no. 2 believed that the net and contents had fallen onto the main deck; he recalled seeing a deckhand trying to cut open the net with a knife to “bleed” the fish from the bag. Conversely, deckhand no. 1 believed that the contents of the net had fallen overboard.

Deckhand no. 1 told investigators that, after noticing the extreme list, he immediately notified the captain, who instructed him to awaken the other crewmembers. Because the vessel’s starboard list was so severe, crossing the deck was like “walking up a wall,” deckhand no. 1 stated. The captain recalled that about this time the stern was completely submerged. Deckhand no. 2 said that the water level in the galley was about 2 feet deep, up to the bottom of the refrigerator that was mounted on a raised platform. Before joining the other crewmembers in the wheelhouse, deckhand no. 1 tried to remove the plates from the scuppers in the aft section of the deck but was unsuccessful.

The captain then transmitted distress calls on channel 16 over VHF radio announcing that the vessel “was going down” due to an ingress of water; immediately afterwards, he directed the crew to abandon the vessel. In response, the crewmembers donned survival suits and activated the emergency position indicating radio beacon (EPIRB). The captain estimated that 10 minutes had elapsed between the time he was notified by deckhand no. 1 and the time the crew abandoned ship.



Automatic identification system (AIS) data of *Lydia & Maya*'s trackline during the accident voyage, as reported by the Coast Guard's Navigation Center (NAVCEN).

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At 0008 on August 17, Coast Guard Sector Northern New England received mayday transmissions from the vessel. The Coast Guard's Rescue Coordination Center in Boston also received a distress alert from the EPIRB registered to the *Lydia & Maya*. A Coast Guard helicopter from Air Station Cape Cod was requested at 0030 and launched to the accident location at 0100.

The vessel was equipped with a six-person inflatable liferaft stored on the port side of the deck aft of the wheelhouse. The crew attempted to launch the liferaft on the port side of the vessel but the extreme starboard list made the task very difficult. According to deckhand no. 1, the liferaft inflated automatically sooner than expected, inflating upside down on board the vessel rather than in the water, and became wedged under the covered portion of the stern. Due to the heavy list, the crewmembers could not throw the liferaft off the port side of the vessel but instead were able to launch the raft from the starboard side, where they boarded it in order to free themselves from the sinking vessel.

While drifting in the liferaft, deckhand no. 1 witnessed the partially sunken vessel, whose entire starboard side was submerged, was still making way before it disappeared from his view and could no longer be heard running. Because of the darkness, he could not see the vessel and therefore was not sure if it sank.

At 0211, the rescue helicopter arrived on scene; a few minutes later, a rescue swimmer was deployed to the liferaft and commenced hoisting operations, bringing the crew up one by one in a rescue basket. At 0250, all four crewmembers were aboard the rescue helicopter. The helicopter proceeded to Bar Harbor Airport, from where they were transported to a local hospital for medical evaluation. They were released without any report of injury.

The Coast Guard reported southerly winds at a speed of 23 knots, with gusts up to 27 knots, at the vessel's last known position. There were overcast skies and rain with a visibility of 1.6 miles. The sea temperature was 66 degrees Fahrenheit. The wave height was 4 feet with a swell height of 8 feet.

Although post-casualty alcohol testing was not conducted on the crewmembers due to the elapsed time from the accident, they were tested for drugs the morning after the rescue. Two of them tested positive for marijuana.

Because the *Lydia & Maya* conducted fishing operations beyond 3 nautical miles from the territorial sea baseline, the vessel was required to have dockside examinations conducted by a commercial fishing vessel examiner. The vessel was last examined on November 17, 2015, during which time minor deficiencies were found for expired alcohol strips, failure to label the high-water alarms, missing charts, and a missing bracket for a CO₂ extinguisher. After the deficiencies were corrected 3 days later to the satisfaction of the examiner, the *Lydia & Maya* was issued a Commercial Fishing Vessel Safety Examination decal valid until November 20, 2017. According to crewmembers, the vessel was equipped with bilge alarms and closed-circuit cameras.

There was no stability book available for the *Lydia & Maya*, nor was one required. Federal regulations require that commercial fishing vessels of 79 feet or more in length with a keel laid down after September 15, 1991, must meet stability requirements and have a stability book on board.³

Based on interviews with crewmembers, the vessel capsized to starboard. The tendency for a vessel to capsize increases if its center of gravity is moved higher. When cargo or gear is stowed on the upper decks, as was done on the *Lydia & Maya*, the location of that cargo or gear weight

³ Title 46 of the *Code of Federal Regulations*, Part 28, Subpart E ("Stability").

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adversely raises the vessel's center of gravity. If a vessel that initially had adequate stability has its center of gravity raised by carrying disproportionately large weights higher on the vessel, that vessel will begin to have less resistance when rolling to port or starboard; as a result, it will roll to a larger angle of heel for a longer period of time. Ultimately, the vessel can capsize if its center of gravity shifts farther outboard than its center of buoyancy at larger angles of heel. In the case of the *Lydia & Maya*, there were several factors that likely contributed to its capsizing:

- 1) *Leaving the catch suspended from the boom while transiting.* Until cargo is lowered to the deck, the cargo's center of gravity remains at the height of the end of the boom, thereby reducing the vessel's stability.
- 2) *Blocking the scuppers on the stern of the vessel while transiting,* which prevented accumulating water from draining overboard. A deck filled with water creates an undesirable free surface effect, while the weight of the additional water increases the height of the vessel's center of gravity and decreases its freeboard, consequently reducing the vessel's overall stability.⁴ Additionally, high water on deck may begin flooding the vessel through non-watertight hatches and doors, which are often left open.
- 3) *Breaking of the center boom,* which resulted in the 7,000 pounds of fish in the net likely falling onto the starboard side of the main deck. These events likely shifted the vessel's center of gravity to starboard, considering that a starboard list was reported.
- 4) *Shifting of the cargo of ice and fish, as well as the vessel's fuel and freshwater,* which likely was a result of the vessel's initial large heel to starboard. This shifting would move the vessel's center of gravity further outboard to starboard, increasing the heel even further.

Because the vessel was not salvaged for inspection, other potential sources of failure that may have contributed to the compromised stability of the vessel could not be determined.

Interview summaries also revealed that the crew of the *Lydia & Maya* was operating in a sleep-deprived state; some of the crew identified having as little as 3 hours of sleep throughout the 3 days of fishing operations. In addition to extended wakefulness, the crewmembers were tasked with physically strenuous activities, along with demanding cognitive duties such as navigating the vessel and operating heavy equipment. Physical exertion compounded by limited sleep opportunity increases the likelihood of operator error and diminished performance. Thus, the combination of sleep debt, physical workload over a 3-day period, and potential drug use likely affected their ability to maintain situation awareness.⁵

Probable Cause

The National Transportation Safety Board determines that the probable cause of the capsizing and sinking of the fishing vessel *Lydia & Maya* was the uncontrolled drop of a suspended load onto the deck resulting in a sudden shift of weight that severely compromised the vessel's stability. Contributing to the sinking was the combination of the crewmembers' sleep debt, physical

⁴ A *free surface effect* is the reduction of stability caused by the movement of liquids in partially filled (slack) tanks, holds, or enclosed decks when a ship is inclined.

⁵ *Sleep debt* is a cumulative effect of not getting enough sleep, which leads to partial or total sleep deprivation.

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workload, and potential drug use that likely affected their ability to recognize the hazards created by the suspended load on the main boom and the blocked scuppers on the aft deck.

Precautions after Completing Fishing Operations

Fishing vessel operators should ensure that suspended loads are not left unattended but are lowered to the deck and properly secured before transiting. Operators should also ensure that all scuppers (freeing ports) in the bulwarks are kept clear for rapid draining of water on deck. A deck filled with water creates an undesirable free surface effect, while the weight of the additional water increases the height of the vessel's center of gravity and decreases its freeboard, consequently reducing the vessel's overall stability.

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Vessel Particulars

Vessel	<i>Lydia & Maya</i>
Owner/operator	F/V Lydia & Maya Inc.
Port of registry	Boston, Massachusetts
Flag	United States
Type	Fishing vessel
Year built	1967
Official number (US)	507419
IMO number	7100201
Construction	Steel
Length	71.5 ft. (21.8 m)
Draft	10.9 ft. (3.3 m)
Beam/width	20.5 ft. (6.2 m)
Gross and/or ITC tonnage	104 gross tons
Engine power; manufacturer	700 hp (523 kW); Luggier Marine Diesel
Persons on board	4

NTSB investigators worked closely with our counterparts from Coast Guard Sector Northern New England throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA16FM053.

Issued: May 25, 2017

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under Title 49 of the *United States Code*, Section 1131(b)(1). This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, “[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” Title 49 of the *Code of Federal Regulations*, Section 831.4.

Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. Title 49 of the *United States Code*, Section 1154(b).
