



National Transportation Safety Board

Marine Accident Brief

Capsizing and Sinking of Fishing Vessel *Misty Blue*

Accident type	Capsizing/Listing	No. DCA18FM005
Vessel name	<i>Misty Blue</i>	
Location	Atlantic Ocean, 9 miles southeast of Nantucket, Massachusetts 41°11.35' N, 69°46.03' W	
Date	December 4, 2017	
Time	1806 eastern standard time (coordinated universal time – 5 hours)	
Injuries	2 fatalities	
Property damage	\$1.25 million est.	
Environmental damage	Oil sheen observed; about 1,635 gallons diesel fuel and 225 gallons of hydraulic fluid and lube oil were on board	
Weather	Visibility 10 miles, seas at 3–4 feet, winds north-northeast at 6 mph with gusts to 9 mph, air temperature 42°F, water temperature 46°F	
Waterway information	East side of Old South Shoal, Atlantic Ocean; water depth about 80 feet	

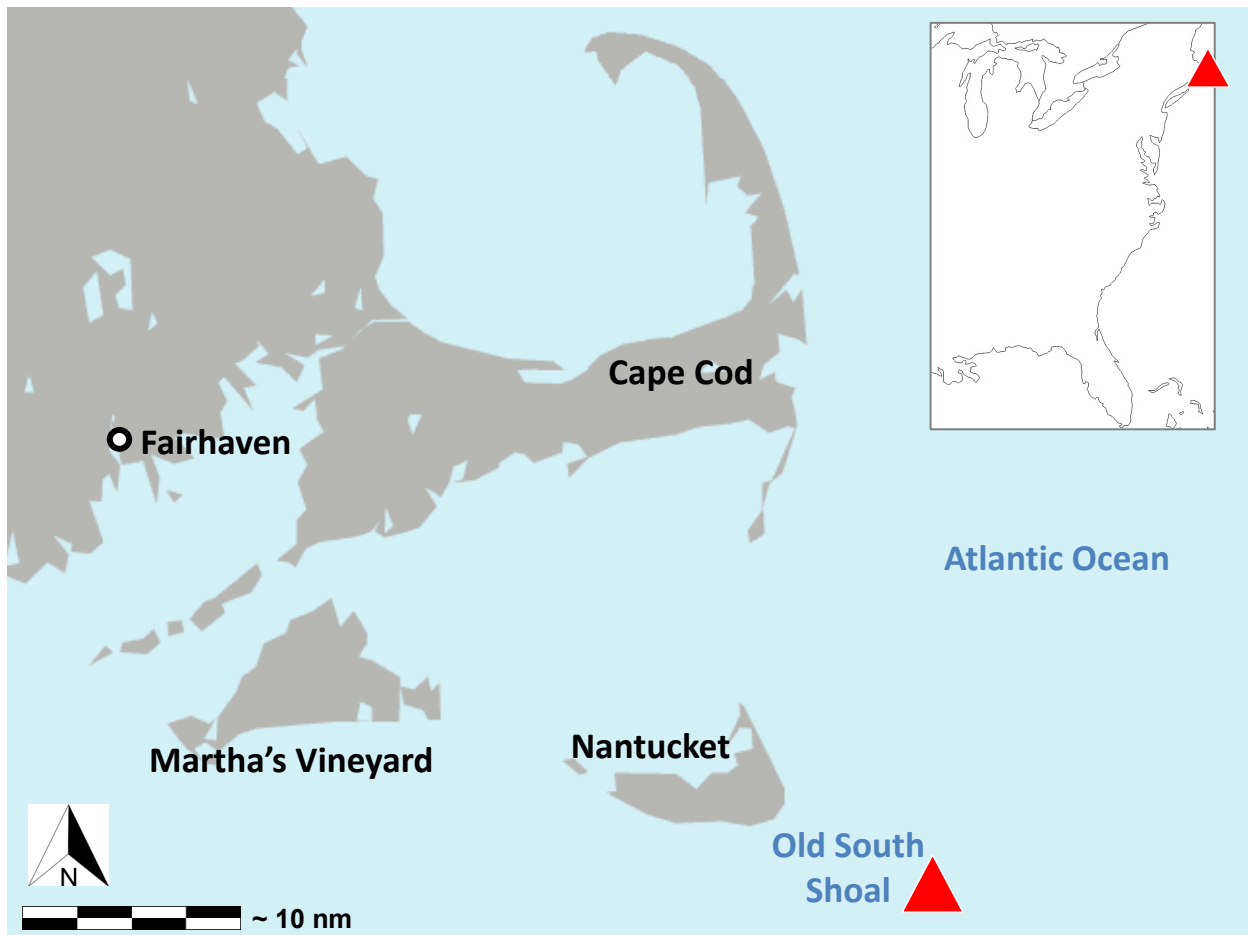
On December 4, 2017, at 1806 local time, the uninspected fishing vessel *Misty Blue* was harvesting clams 9 miles southeast of Nantucket, Massachusetts, when the port clam tank began flooding and the vessel subsequently capsized and sank.¹ Two crewmembers were trapped on board and perished when the vessel sank; the other two crewmembers managed to escape and were rescued by a nearby fishing vessel. Oil sheens were observed.



Misty Blue in June 2017 in Fairhaven, Massachusetts. (Photo by Enoch MacDonough)

¹ Unless otherwise noted, all miles in this report are nautical miles.

Capsizing and Sinking of Fishing Vessel *Misty Blue*



Accident location, identified by a red triangle, 9 miles southeast of Nantucket, Massachusetts. (Background and inset by Google Maps)

Background

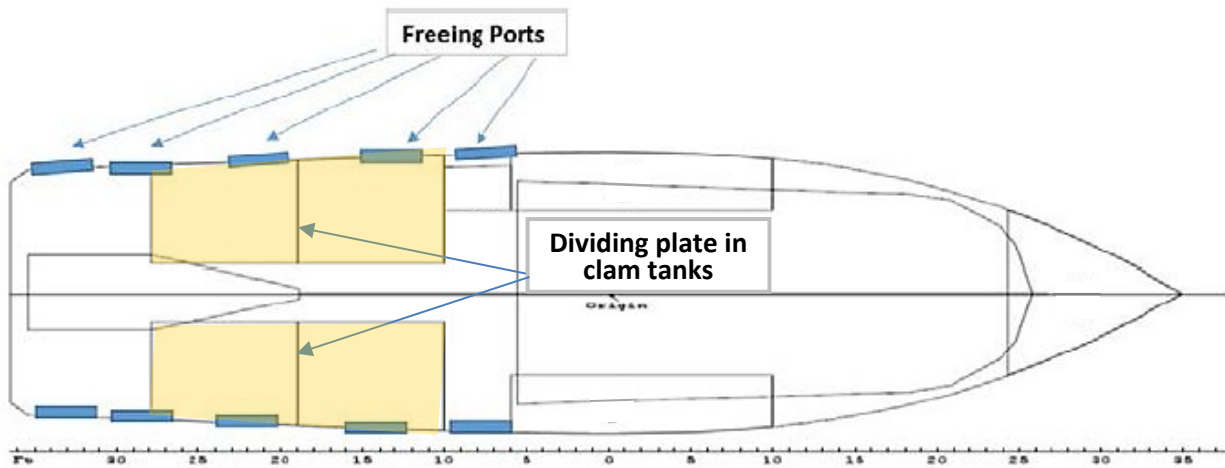
The *Misty Blue* was constructed in 1996 by Capt. Kevin, Inc., shipbuilding in Chauvin, Louisiana, as a 69-foot-long, 81-gross-ton, welded-steel-beam trawler outfitted for shrimp fishing. Initially named *Harvester*, the vessel underwent several modifications from its original design, being retrofitted as an offshore crab boat and then as a hydraulic dredger (fishing for offshore surf clams and ocean quahogs).

In June 2015, the *Misty Blue* was purchased by F/V *Misty Blue*, LLC. Sea Harvest, Inc., operated the *Misty Blue*. In the last 2 years before the sinking, the vessel primarily harvested surf clams in the Atlantic Ocean shoals off Nantucket, Massachusetts. The vessel made about two clamming trips per week. A typical trip included 24 hours on site to harvest clams until the vessel was fully laden, plus a 20-hour roundtrip to and from the shoals.

The vessel's below deck spaces consisted of clam tanks and five other spaces: the lazarette, shaft alley, engine room, tool room, and forepeak. A watertight door was between the lazarette and shaft alley, and another was between the engine room and shaft alley; the bulkhead and door between the engine room and tool room were not watertight. The *Misty Blue* had two clam tanks, one on each of the port and starboard sides just below the main deck. Each tank had a carrying capacity of eight loaded cages. A watertight vertical plate divided each tank in half; the top of the plate ended about a foot below the top of the clam tank. To cover the catch, the crew typically

Capsizing and Sinking of Fishing Vessel *Misty Blue*

pumped some water in the tanks, and the water could communicate freely from each side over the top of the plate. A total of 16 cages were stowed below deck in the tanks and an additional 2 cages could be stowed above on deck.



Plan view of *Misty Blue*'s tank layout and freeing port locations. The clam tanks are highlighted in yellow. (Modified image from US Coast Guard model)

Accident Events

At 2300 on December 2, 2017, the *Misty Blue* departed Linberg Marine in Fairhaven, Massachusetts, for clam-fishing grounds southeast of Nantucket Island. A crew of four were on board (captain, mate, and two deckhands). The crew had placed the port and starboard outriggers in the down position; the vessel's stabilizers, known as "birds," were suspended above the water but not deployed.

The following morning about 1000, the *Misty Blue* arrived in the Old South Shoal area, 9 nautical miles off Nantucket. The mate, who had been on watch, woke the other crewmembers so that they could begin fishing. The crew deployed the clam pump hose and the clam dredge and its tow line, which was connected to the starboard tow post. They also deployed the stabilizers designed to dampen the vessel's rolling motion while under way. The captain relieved the mate on watch, who then went below to sleep.

The captain told investigators that, from initiating the first dredge tow until the time of the accident about 30 hours later, the only problem he noted with the vessel was the engine driving the clam pump located in the lazarette. He said the engine's fuel filter kept getting airlocked, which the crew would have to address about every 35 minutes. He also stated that when they began fishing, the current was strong, so he shifted to the east side of the Old South Shoal area, where the vessel could conduct "fair-tide tows". According to the captain, in a fair-tide tow, the clam dredge could be towed not only with the current but also directly into the current. The captain stated that everything seemed normal and that the *Misty Blue* was not listing.

On December 4, at 1752, the crew started to load a seventh cage of catch into the starboard tank, for a total of 14 cages aboard the vessel (the portside tank already held seven cages, as the normal loading process was to evenly distribute the catch on both sides of the vessel). At that time, the current, which was flowing in a northerly direction, had increased in speed again to a point where the captain could pull the clam dredge only in the same direction as the current. The captain decided to cease fair-tide tows and the crew hauled the dredge from the water and housed it low in

Capsizing and Sinking of Fishing Vessel *Misty Blue*

the gantry, and then they dumped the catch into the shaker/sorter on the aft main deck to place in cages. The captain said as he turned the *Misty Blue* to starboard, he noticed a slight port list. Moments later, the junior deckhand, who too noticed the list, came to the wheelhouse to report his observation. The winds were from the northeast at 6 mph.

The captain instructed the deckhands to remove the port clam tank plywood hatch covers. They then saw that the portside tank was flooded, which was unexpected, given that the crew would drain the water from the clams before loading the cages in the tanks. The captain said that, to correct the list, he turned the vessel to port and put the throttle to full speed, raised the port stabilizer from the water, and slightly raised the port outrigger, but these actions were unsuccessful. The captain said that he left the starboard outrigger in the down position and the stabilizer deployed because he worried that the vessel would immediately roll to port otherwise.

The mate took the helm and both deckhands began searching for the point of water ingress. The captain told investigators he went below deck to check all spaces but did not find any flooding except inside the portside clam tank. The clam tanks were not fitted with high-water level alarms. He then tried to transfer the port tank water into the starboard clam tank but could not get the pump system to operate.

By 1759, the vessel's portside scuppers had become submerged and waves were breaking over the port gunwale.² As the port list was worsening, the captain instructed the crew to prepare for abandoning the vessel. The mate radioed the nearby fishing vessel *Enterprise* for help. At that time, the aft deck was already submerged, so the captain mustered the crew in the galley area where there was still enough dry deck space for everyone to don their survival suits. Next, water began entering the accommodation spaces through a door that led to the aft deck. The junior deckhand donned his survival suit and exited out of the wheelhouse's starboard door, where he waited by the railing for the other crewmembers.

The captain said he looked out the wheelhouse's back window and saw the port gunwale completely under water. He shouted to the mate and the senior deckhand, "Get out! Get out!" and then he exited through the starboard door. He had only partially donned his survival suit. The captain said that both he and the junior deckhand continued to call out from the starboard side to the mate and the senior deckhand who were both still in the galley area. However, neither of them escaped before the *Misty Blue* rolled hard to port and capsized at 1806. The vessel sank immediately afterward, according to both the captain and junior deckhand.

When the *Misty Blue* sank, the vessel's float-free emergency position-indicating radio beacon (EPIRB) deployed as designed and began broadcasting a distress signal, which the US Coast Guard's First District Command Center received. The Coast Guard dispatched multiple search-and-rescue assets to the area, including an MH-60 Jayhawk helicopter, a HC-144 Ocean Sentry fixed-wing aircraft, the 47-foot-long motor lifeboat *CG 47289*, the 87-foot-long cutter *Steelhead*, and the 110-foot-long cutter *Tybee*. Several nearby clam-fishing vessels that were also affiliated with the Atlantic Capes Fisheries—the *Enterprise*, the *Lori*, the *Ann Mariette*, and the *Lauren*—responded to the *Misty Blue*'s radio call.

² A *scupper*, also called a freeing port, is an opening cut through the bulwarks of a ship that allows water collecting on an exposed weather deck to flow overboard. Scupper plates are typically used on fishing vessels to prevent the loss of fish overboard when nets are opened on deck.

Capsizing and Sinking of Fishing Vessel *Misty Blue*

The *Enterprise*, about 2 miles away, was the nearest vessel to the *Misty Blue* and the first assist vessel to arrive on scene after the sinking. Its crew retrieved the captain and the junior deckhand, both of whom had managed to enter the *Misty Blue*'s liferaft after it automatically deployed when the vessel sank. Both survivors were transferred to the Coast Guard cutter *Steelhead* for medical evaluation. The Coast Guard suspended search-and-rescue operations at 2000 on December 5.

Divers contracted by Sea Harvest, Inc., and personnel from the Massachusetts State Police Underwater Recovery Team located the *Misty Blue* upright in the sand on the seafloor in about 75 feet of water on December 5. The condition of the hull and systems pertaining to navigation, propulsion, and steering could not be determined based on the limited information provided by the dive survey. The captain stated, however, that to his knowledge all systems were operational before the sinking. He also said that before the capsizing, he saw no water in the engine room, lazarette, shaft alley, or other spaces, and no alarms of any kind had activated.

Due to adverse conditions at the site, divers were not able to return to the scene until December 18, 2017. Massachusetts State Police and contracted divers recovered the bodies of the mate and the senior deckhand from inside the *Misty Blue*'s galley area. It appeared that the senior deckhand had managed to partially don his survival suit, but the mate had not.

Sea Harvest, Inc., also used the contracted divers to do a complete external and internal video examination of the *Misty Blue*. During the January 25, 2018, underwater survey, divers found that the exterior of the vessel was intact with no breaches; the deck door to the galley was closed; the watertight door between the lazarette and shaft alley was open; the watertight door from the shaft alley to the engine room was open; and the non-watertight door from the engine room to the tool room was open.

The captain stated to investigators that the watertight door between the engine room and shaft alley was usually left open for easy access to the lazarette. The captain stated he usually closed the watertight door from the lazarette to shaft alley.

Other Information

Toxicological Testing

Autopsies were conducted on the mate and the senior deckhand on December 19; in each case the cause of death was drowning, and no natural disease was identified. The senior deckhand's postmortem specimen revealed cocaine metabolites, but the active impairing compound was not detected. Additionally, the specimen was positive for amphetamines, but confirmatory testing was not possible due to poor specimen quality. NTSB medical staff reviewed the available findings in the laboratory report and were unable to determine whether or not the presence of amphetamine in the senior deckhand's specimen played a role in the accident because confirmatory testing on the blood sample was not possible. Likewise, the presence of cocaine metabolite indicated that he had used cocaine in the past, but there was no toxicological evidence of impairment at the time of his death.

In addition, postaccident urine toxicological testing for illegal drugs was conducted on the captain and the junior deckhand. The results for the junior deckhand were negative. The results for the captain, who admitted to smoking marijuana 7–8 days before departing on the accident voyage, were positive for marijuana metabolite. Although the captain tested positive for marijuana

Capsizing and Sinking of Fishing Vessel *Misty Blue*

metabolite, medical staff could not establish impairment at the time of the accident. Alcohol testing was not conducted on either survivor.

Personnel Information

The captain, who was 44 years old, told investigators he had been “brought up on the water.” He had about 8 years of experience as captain in the clam fisheries aboard similar size and tonnage vessels that included the *Goody Hallet* and *Miss Maegan*. He was hired by Sea Harvest, Inc., about 2.5 weeks before the accident, on November 16, 2017. Since that time, he had completed three clam-fishing trips for the company before the accident.

Vessel History and Modifications

Based on historical data as well as multiple surveys, investigators determined that the *Misty Blue* had changed owners and undergone a series of modifications from the original configuration. In September 2003, the vessel was converted for gillnetting, which included removing the shrimp-trawling gear and modifying the rigid stern gunwale to a gated configuration that allowed easier recovery of the deployed fishing nets. The vessel was sold again in December 2005 and converted for crab fishing. It was sold again in May 2009 when it was renamed *Misty Blue* and then underwent another conversion, this time from a crab-fishing vessel to a hydraulic dredger for surf clam fishing. For this type of fishing, a vessel drags a dredge, which is a large metal structure with a cutting edge and collection bin, along the seafloor to scoop out the targeted clam species.³ A pump on board the vessel is used to shoot multiple jets of seawater into the seafloor in front of the dredge to loosen the sediment, reduce force on the tow wire, and increase the catch. Also, in 2009, an approximately 16-inch by 4-inch fresh air vent to the lazarette was added through the aft main deck near the port corner bulwark; the vent was fitted with a baffle plate (cover). The dredge is recovered using a hydraulic winch and pulled up into a gantry structure for emptying into a hopper bin. The clams, along with rocks and other debris collected during dredging, flow from the hopper bin along a conveyor belt for hand sorting. The rocks and debris are thrown back into the sea and the clams are stored in cages on or below deck in the port and starboard tanks. After the conversion to clam fishing was completed, the *Misty Blue* remained in that service through the time of the accident.

Commercial fishing vessels less than 79 feet in length, such as the *Misty Blue*, are not required to conduct a stability test or calculations. However, the vessel owner hired a naval architect to conduct a deadweight survey on the vessel in September 2008 and an inclining test in July 2009. The architect subsequently concluded that the *Misty Blue* with 16 clam cages in the tanks and 10 cages on deck would not meet the Coast Guard’s intact stability criteria.⁴ He informed the owner, “Although the vessel does have good initial stability . . . the vessel has quite a bit of stern trim and very little freeboard.”

At the owner’s request, that same naval architect explored loading scenarios that would allow the vessel to meet the Coast Guard’s intact stability criteria. The architect concluded that with 16 clam cages in the tank and 10 cages on deck the vessel could meet the criteria during two scenarios: one, if the vessel’s fuel tanks were kept at least 50-percent full during fishing, and two,

³ Per the captain’s estimate, the clam dredge had a 75-inch knife edge and, with the drag shoes, was about 100 inches in total width. It weighed an estimated 3 tons.

⁴ Norton Marine Design, Inc. letters of August 6 and 12, 2009, referencing Title 46 *Code of Federal Regulations* Part 28 – Requirements for Commercial Fishing Vessels, Subpart E – Stability.

Capsizing and Sinking of Fishing Vessel *Misty Blue*

if 8,300 pounds of ballast were added in the lowest portion of the space just aft of the forepeak. Shortly thereafter, the owner at that time installed 8,000 pounds of rocks in the tool room below the floorboards and 300 pounds of concrete weight on top of the water tank access hatch at the bow. Investigators found no records suggesting that a naval architect was consulted after August 2009 in any of the vessel's subsequent modifications.

The owner at the time of the accident, F/V *Misty Blue* LLC, purchased the *Misty Blue* in June 2015. In winter 2016, the company added an Iowa Mold Tooling (IMT) articulating boom crane on the deck above the accommodation space so that the vessel could be self-offloading. Investigators determined that the IMT crane weighed about 2,370 pounds. Additional steel plating and structures were also added to mount and support the crane. The crane was fitted to the vessel's centerline and the articulating boom was stowed to the port of centerline.

In spring 2017, the vessel was hauled out for servicing and the company replaced the hopper dump bin with a larger system, installed a 290-pound Earthquake Industries-manufactured vibrator/shaker system, and replaced the conveyor belt system, all on the aft working deck. The company also installed a doubler plate on the stern transom to back up the elephant ears that guide the dredge into the A-frame. Maintenance was also conducted, such as replacing the sacrificial hull zincs and sand blasting and painting the hull.

Early surveys indicated that the port and starboard bulwarks each had four scuppers on the main deck, each roughly 8 inches by 15 inches. Photographs of the vessel in the years preceding the accident show that there had been another scupper the approximate size of the original ones, and a second, much smaller one cut into both bulwarks. Later, the last scupper added on the starboard side was converted to a gate-style opening for easier access to the main deck.

In addition, video from the surveys showed electrical cables that penetrated two watertight bulkheads: between the engine room and shaft alley, and between the shaft alley and lazarette. Electrical cables also penetrated a non-watertight bulkhead between the tool room and engine room. The penetrations were not properly sealed or made watertight. There were no records indicating a naval architect was involved in any of the modifications made during the last drydock.

Post-Sinking Stability Analysis

As part of investigating the *Misty Blue*'s sinking, the Coast Guard requested that its Marine Safety Center (MSC) conduct a post-sinking stability analysis of the vessel. NTSB investigators participated in providing the vessel's modification history and arrangement details, the accident loading condition, and the wind and waves at the time of the accident. The MSC report stated that although the *Misty Blue* was not required to meet any regulatory stability standards, an objective reference standard for a vessel of similar size and service was found at Title 46 *Code of Federal Regulations* §28.570. The 2009 naval architect indicated, and the MSC review confirmed, that the *Misty Blue* met the intact stability standards when loaded with 16 cages in the clam tanks below deck and 8 cages on deck. The MSC report concluded that at the time of the accident the *Misty Blue* "would have likely satisfied" the intact stability criteria for a vessel of similar size and service. The report further stated:

In our review of the vessel's loading and witness reports provided for the day of the sinking, the off-center flooding of the port clam tanks could have created the port list noted by survivors. We estimate that this list would have brought the bottom of the freeing ports to about the water line in a static condition. While our

Capsizing and Sinking of Fishing Vessel *Misty Blue*

analysis provides insight into the vessel's stability in static conditions, we are not able to quantify the effects of the many external and dynamic forces that likely acted on MISTY BLUE at the time of the casualty. We did estimate the impact of water trapped on deck and found that even small amounts of water on deck would significantly reduce stability of the vessel. Wind and wave action would have further negatively impacted stability. We found that the freeing port area on this vessel was relatively small compared to a vessel which must comply with the regulatory requirements of 46 *Code of Federal Regulations* §28.555 which likely resulted in compounding water accumulation on the main deck.

Regarding the lazarette vent with a fitted plate, the report "calculated that at a [port] heel angle of 22° the vessel will downflood into the lazarette vent." However, it also noted that "detailed information regarding the arrangement, placement or watertight integrity of this vent was not known."

Analysis

The investigation found that the vessel underwent several conversions and configuration modifications during its lifetime. The *Misty Blue*'s last stability analysis in 2009 took place several years before the current owner modified the vessel (by adding a crane, a clam dredge gantry frame, a hopper dump bin, other fishing equipment, and a vibrator/shaker system). These changes were done without a professional naval architect reassessing the vessel's stability, which, although not required by regulation, would have been prudent. However, the Coast Guard MSC's postaccident report found that the vessel, as configured and loaded at the time of the sinking, would have "likely" met the intact stability criteria for a vessel of similar size and service. Given that the vessel likely had a stability margin, the reported flooding of the portside clam tanks would have been the initiating event that ultimately sank the vessel. Potential points of water ingress could have been the clam tank fill and drain lines, or a hull breach. Investigators concur with the conclusions in the MSC report that off-center flooding, water trapped on deck, and dynamic forces from wind and seas led to the sinking.

The Coast Guard MSC's postaccident report stated that at a heel angle of approximately 22°, the port lazarette air vent could be a downflooding point. If the vent's baffle plate was not watertight, when submerged, the space would be subject to flooding. However, the watertight status of the baffle plate in front of the vent was undetermined, so the point of water ingress could not be determined. The watertight door between the lazarette and the shaft alley, along with the watertight door between the shaft alley and the engine room, were found open by divers. Additionally, underwater examination of the wreckage revealed that at least two watertight bulkhead cable penetrations below deck were not properly sealed or made watertight. The open doors and, to a lesser degree, the non-watertight cable penetrations, would have allowed progressive flooding between spaces, thereby decreasing reserve buoyancy and stability.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the capsizing and sinking of fishing vessel *Misty Blue* was flooding of the port clam tank from an undetermined point of ingress, which led to a decreased freeboard and a list allowing boarding seas to be trapped on deck, thereby decreasing the vessel's stability. Contributing to the sinking was the relatively small freeing port area of the vessel, which likely increased water accumulation on deck.

Capsizing and Sinking of Fishing Vessel *Misty Blue*

Vessel Particulars

Vessel	<i>Misty Blue</i>
Owner/operator	F/V Misty Blue, LLC/Sea Harvest, Inc.
Port of registry	New Bedford, Massachusetts
Flag	United States
Type	Uninspected fishing vessel
Year built	1996
Official number (US)	1043789
IMO number	N/A
Construction	Welded steel
Length	69 ft 5 in (21.2 m)
Depth	8 ft (2.4 m)
Beam/width	22 ft (6.7 m)
Gross and/or ITC tonnage; net tons	81 gross tons; 65 net tons
Engine power; manufacturer	410 hp (305 kW) Caterpillar model 3408 turbo diesel
Persons on board	4

NTSB investigators worked closely with our counterparts from Coast Guard Marine Safety Unit New Bedford throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA18FM005.

Issued: February 6, 2019

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 *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 *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 *United States Code*, Section 1154(b).