



# National Transportation Safety Board

Washington, DC 20594

## Marine Accident Brief

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**Accident No.:** DCA-09-LM-010

**Vessel:** U.S. commercial fishing vessel *Lady Mary*, official number 520834, 76-foot length overall (71.2-foot documented length), 105 gross registered tons, 21.2-foot beam steel construction, built 1969, converted 2001

**Accident Type:** Sinking

**Location:** Atlantic Ocean, 65 miles southeast of Cape May, New Jersey

**Date:** March 24, 2009

**Time:** Exact time unknown; between 0510 and 0540<sup>1</sup>

**Owner:** Smith and Smith, Inc., Bayboro, North Carolina

**Property Damage:** Undetermined (total loss)

**Injuries:** 6 fatalities, 1 minor injury

**Complement:** 7 (master, 6 crewmembers)

### Introduction

Between 0510 and 0540 on the morning of March 24, 2009, the fishing vessel *Lady Mary* (figure 1) sank in 210 feet of water in the Atlantic Ocean 65 miles off the New Jersey coast. Six crewmembers died in the accident, including the two owners, one of whom was the master. One crewmember survived.

The sinking of the *Lady Mary* was investigated jointly by the National Transportation Safety Board (NTSB) and the U.S. Coast Guard, with the Coast Guard as the lead investigative agency. On March 30, 2009, the commandant of the Coast Guard convened a Marine Board of Investigation, which held a total of 9 days of hearings between April 14 and November 5 in Cape May, New Jersey. The NTSB participated fully in the Coast Guard hearing and investigation.

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<sup>1</sup> Times are eastern daylight time (UTC-4), based on the 24-hour clock.



**Figure 1.** Fishing vessel *Lady Mary* outbound from New Bedford, Massachusetts, July 2006. (Photo by Steven Kennedy of *Commercial Fisheries News*)

The wreckage was surveyed by divers in May 2009 and extensively photographed (figure 2). In October 2009, the Coast Guard, with the assistance of the U.S. Navy, retrieved the rudder and other equipment from the sunken vessel, which was sent for analysis to the materials laboratory at NTSB headquarters in Washington, DC. As of the date of this brief, the Coast Guard had not published its report on the *Lady Mary* accident.



**Figure 2.** Sunken wreckage of *Lady Mary*, May 2009. (Photo by Bradley Sheard)

## Accident Description

The *Lady Mary* departed its home port of Cape May, New Jersey, on March 18, 2009, bound for the Elephant Trunk, a permit-only scallop fishing area about 50 miles to the southeast (figure 3). The Elephant Trunk is regulated, as are all U.S. commercial scallop fisheries in the economic exclusion zone,<sup>2</sup> by the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA). On board the *Lady Mary* were the master and his brother, who co-owned the boat as principals of Smith and Smith, Inc., and five other crewmembers. According to the owners' representative, who testified before the marine board, the vessel had 11,000 pounds of scallops on board at the time of the accident, and the crew intended to work one more day to achieve a total catch of 12,500 pounds.

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<sup>2</sup> In international maritime law, an economic exclusion zone extends seaward generally 200 miles from a state's coastline, and gives the state special rights over the exploration and use of marine resources.



**Figure 3.** Area of Atlantic Ocean where *Lady Mary* sank.

At about 0000 on March 24, the sole survivor and another crewmember finished their 18-hour shift and went to bed in the belowdecks bunkroom (refer to figure 4). The survivor told the marine board that everything was normal at the time—the master was steering, the other crewmembers were on deck processing the catch, and the dredge was out, dragging for more scallops. The *Lady Mary* was proceeding west-northwest at 2–5 knots at that time, according to data from its vessel monitoring system (VMS),<sup>3</sup> which transmitted the vessel’s position every 30 minutes. A speed of 3–5 knots is normal when dredging for scallops, according to an NMFS fisheries management specialist.

Beginning with the next VMS transmission at 0033, the *Lady Mary* moved to the south-southwest, continuing on a track of 201°, plus or minus 12°, and at a steady speed of about 1.5 knots. The *Lady Mary*’s track and speed were the same as the prevailing direction and speed of the wind and waves (from 023 at 25 knots, swell from 023 at 4–7 feet), indicating that the

<sup>3</sup> The VMS allows NOAA to track where vessels fish, for compliance with regulations.

vessel was drifting. The Coast Guard conducted a drift simulation modeling at the request of the Marine Board of Investigation, taking into account the prevailing weather conditions and water currents at the time and location of the sinking. The model determined that the *Lady Mary* was “clearly within the particle distribution/probability grid for the drifted area,” indicating that the vessel likely drifted throughout the modeled period from 0130 until 0510 local time on the morning it sank. Investigators found no evidence of radio transmissions from the *Lady Mary* or any other information that would explain why the vessel was drifting.

According to data from the National Weather Service Ocean Prediction Center, winds increased from 25 to 35 knots, and wave heights increased from about 4.5 feet to over 7 feet during the early morning hours of March 24. Another fishing vessel master who was in the area at 0500 on the morning of the sinking stated that the weather at the time consisted of 20–25 knot winds from the northeast and 8–10 foot seas.

The *Lady Mary* survivor stated that he was awakened at 0500 by another crewmember, who told him that the vessel was sinking. The survivor went to the wheelhouse and donned his immersion suit. He stated that the master and the crewmember who had awakened him also donned their immersion suits. The vessel lost electrical power and the survivor jumped into the ocean. By that time, he said, the vessel had sunk by the stern to the winch deck behind the wheelhouse (refer to figure 4). He estimated that when he abandoned ship, seas were about 12 feet high and winds were blowing at 35 knots. The survivor said that before he jumped into the sea, he saw only two other crewmembers (other than the master and the crewmember who had awakened him) and that they were not wearing immersion suits. He said that he swam away from the hull, and that the *Lady Mary* sank about 5 minutes later.

The survivor said that he tried to reach the vessel’s liferaft, which was floating in the water, but that it drifted away in the heavy seas. A Coast Guard marine investigator told the marine board that the condition of the liferaft’s release mechanism, which was retrieved by Navy divers, indicated that the raft had been manually released from its cradle. The Viking<sup>®</sup> liferaft was certified for eight persons and was designed to inflate, after becoming waterborne, with a hard pull on its painter (securing) line.

The exact time of the sinking is unknown, but the last data from the *Lady Mary*’s VMS were transmitted at 0510. In written statements to the marine board, two fishing vessel masters reported that they heard a Mayday call on distress channel 16 about 0500 the morning of the accident. One master stated that he radioed back asking for the name and location of the vessel in distress but received no response. The other master stated that the transmission was “hysterical and distorted.” A Coast Guard search-and-rescue coordinator for the *Lady Mary* accident told the marine board that Sector Delaware Bay (Philadelphia) recorded no Mayday calls on either VHF or high-frequency radio.

As required by Coast Guard regulations (46 *Code of Federal Regulations* [CFR] 25.26-20), the *Lady Mary* was equipped with a float-free, automatically activated emergency position-indicating radio beacon (EPIRB) that could emit a 406-megahertz (MHz) distress

signal.<sup>4</sup> At 0540 on March 24, an EPIRB signal, later identified as transmitted by the *Lady Mary*, was detected by a NOAA geostationary satellite, part of the search-and-rescue satellite-aided tracking system. A geostationary satellite, positioned about 22,000 miles above the earth, provides continuous coverage of a particular location and receives all information transmitted by an EPIRB. However, a geostationary satellite cannot determine the position of the emergency radio beacon unless the EPIRB is equipped with an optional global positioning system (GPS) receiver, which the *Lady Mary*'s EPIRB did not have. Moreover, the EPIRB had been incorrectly registered in the database maintained by NOAA.<sup>5</sup> The database contains unique identifying information, including vessel name, home port, and emergency contacts, for each EPIRB. Because the identification information for the *Lady Mary* was incorrectly registered, NOAA could not identify the sinking vessel for Coast Guard search-and-rescue personnel on the basis of the EPIRB signal transmitted at 0540.

Low earth-orbiting (LEO) satellites, which travel from pole to pole at an altitude of 600 miles and pass over a given location every 60–75 minutes, can establish position information from EPIRBs regardless of whether they have a GPS receiver. An orbiting satellite had crossed the *Lady Mary*'s location shortly before the sinking but, by the time of the accident, was out of range of the vessel's EPIRB signal. It was not until 0656 that another LEO satellite passed over the accident site and detected the *Lady Mary*'s EPIRB signal. At 0705, the satellite relayed the information to NOAA mission control in Suitland, Maryland; and at 0715, NOAA pinpointed the EPIRB's location in the Atlantic Ocean at latitude 38°32'22.2" N, longitude 73°42'54" W.<sup>6</sup>

Information from the LEO satellite was passed instantly, through a dedicated communications link, to the Coast Guard search-and-rescue coordination center (RCC) in Portsmouth, Virginia. At 0720, the RCC watchstander directed Air Station Atlantic City to dispatch a rescue helicopter to the accident site. A Coast Guard HH-65 helicopter was airborne at 0755 and arrived on scene at 0820. The helicopter crew located the *Lady Mary*'s liferaft and launched a rescue swimmer, who determined that the liferaft was empty. Shortly afterward, the crew rescued the survivor and retrieved from the water the bodies of the master and one crewmember, both wearing immersion suits. None of the three had properly donned their immersion suits. The helicopter flew the victims to Air Station Atlantic City, and an ambulance transported them to a hospital. The Atlantic County, New Jersey, medical examiner determined that the master and the crewmember had died of asphyxia due to drowning.

Other Coast Guard search assets (two more helicopters, a C-130 aircraft, and two cutters) were subsequently launched. Aided by several fishing vessels, the Coast Guard searched an area of 3,600 square miles, but the four other crewmembers were not found. Search-and-rescue efforts ended on March 25, 2009. Divers later discovered one crewmember's body inside the *Lady*

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<sup>4</sup> Uninspected commercial vessels 36 feet or longer are required to carry automatically activated EPIRBs. Vessels of less than 36 feet are permitted to carry manually activated EPIRBs. In either case, only 406-MHz EPIRBs are allowed. The *Lady Mary*'s EPIRB was tested at a laboratory after the accident and found to be "functional as intended." The Coast Guard determined that the EPIRB had been activated automatically, not manually.

<sup>5</sup> The owner's handwritten application form, submitted in January 2007, contained the sequence 2C01, which NOAA entered into the database as 2001.

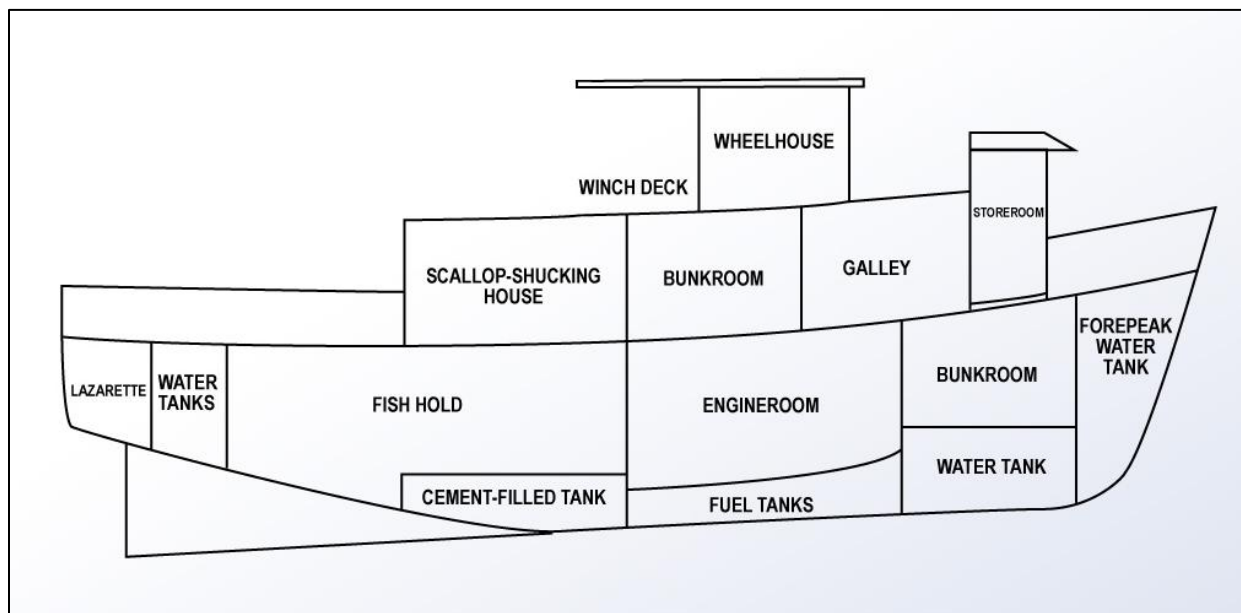
<sup>6</sup> The vessel's position after it sank was latitude 38°35'42.8" N, longitude 73°41'27.8" W, indicating that the EPIRB drifted to the southwest after the accident.

*Mary's* hull. On May 19, 2009, a fisherman's net brought up the body of another crewmember. Neither man was wearing an immersion suit. The two unrecovered crewmembers are still missing and are presumed dead.

## Vessel Information

### Original Construction

The *Lady Mary* was a 76-foot steel-hull fishing vessel, built in 1969 as a shrimp boat (the *Mr. Choper*) by Graham Boats of Pascagoula, Mississippi. As originally constructed, the vessel had a single deck, with wheelhouse forward and fishing deck aft. Belowdecks were the crew quarters, engine room, fuel and water tanks, fish hold, and lazarette (A vessel's lazarette is its aftermost compartment below its main deck, typically accessed by a deck hatch.). The layout of the *Lady Mary* is shown in figure 4.



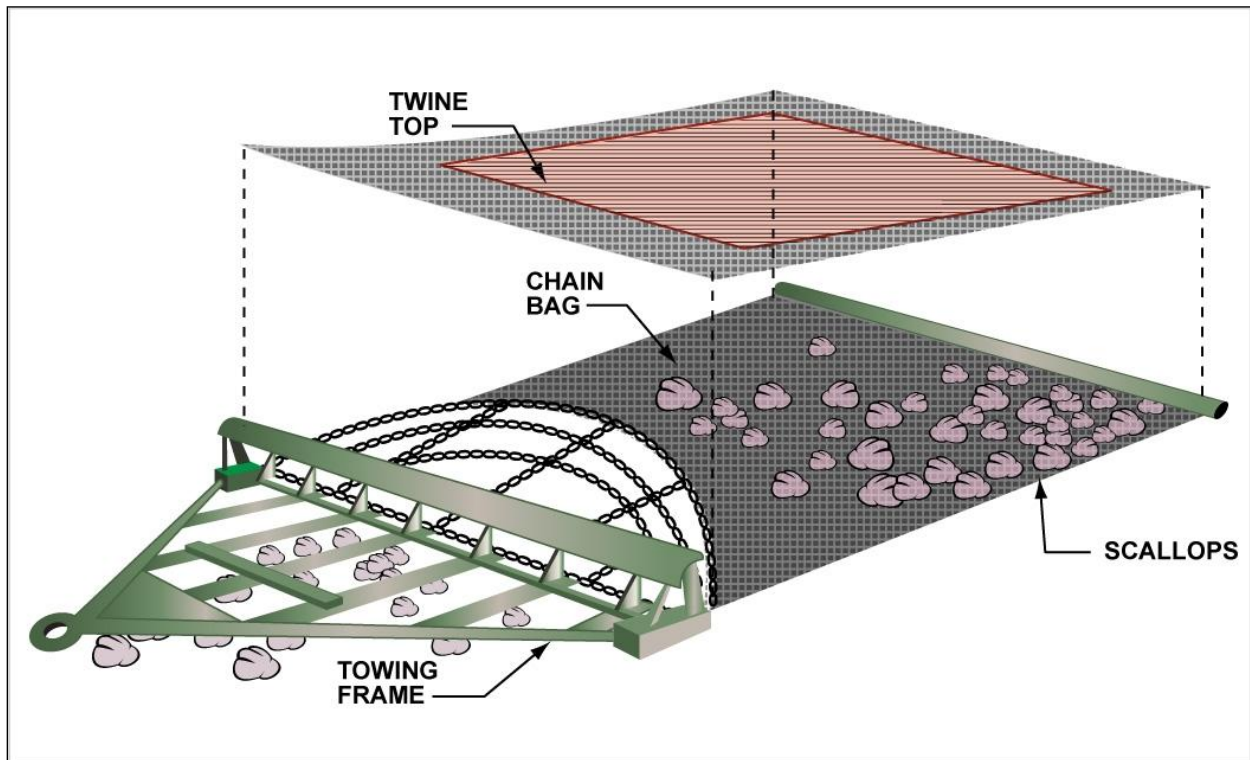
**Figure 4.** Profile view of *Lady Mary* (drawing based on Coast Guard sketch, not to scale).

### Conversion

In 2001, Smith and Smith, Inc., purchased the *Lady Mary* and converted it for use in the Atlantic sea scallop fishery. According to the owners' representative, the main deck was enclosed to create a scallop-shucking house, a bunkroom, and a galley. A superstructure containing the wheelhouse and winch deck was built above the main deck. The winches were moved from the main deck to the afterend of the wheelhouse deck, and the winch controls and a remote steering station were installed at the same location. The wheelhouse was constructed of plywood because of concerns about weight, according to the owners' representative; and a fuel tank under the fish hold was filled with concrete to add ballast. The impact of the conversion on intact stability could not be determined due to lack of information on the vessel's lightship values. However, the additional weight added by the modifications, about 5 percent of the vessel weight, in effect reduced the vessel's freeboard by 4 inches in all conditions. This in turn

increased the probability that downflooding points<sup>7</sup> would be submerged in adverse weather, leading to progressive flooding and eventual sinking of the vessel.

The vessel's shrimp net was also replaced with a scallop dredge. The dredge consisted of a heavy steel towing frame and a chain bag that dragged along the ocean floor behind the vessel (figure 5). At the end of a towsing run, the crew would hoist the dredge on board, empty the bag, and shuck the scallops while the dredge was being towed again. The shucked scallops were kept on ice in the vessel's fish hold awaiting transport to shore.



**Figure 5.** Scallop dredge, with twine top removed for illustrative purposes. Front of towing frame rides off sea floor, chain bag drags on bottom, and bar at rear maintains bag's shape.<sup>8</sup>

In 2006, according to the owners' representative, a ramp was added to the stern to help the crew recover the dredge from the water. The ramp was an inclined flat steel plate with vertical sides and rollers at the top and bottom. A steel structure below the ramp maintained its inclination and attached the ramp to the stern. The aft ends of the ramp were also connected by port and starboard stays to the rigging (refer to figure 1).

<sup>7</sup> "Downflooding points" are the lowest external openings that could not be closed watertight as measured from the waterline.

<sup>8</sup> Illustration based on a drawing by Robin Amaral in Ronald Smolowitz, "Bottom Tending Gear Used in New England," in Eleanor M. Dorsey and Judith Pederson, eds., *Effects of Fishing Gear on the Sea Floor of New England* (Boston: Conservation Law Foundation, 1998), <<http://www.fishingnj.org/artsmolowitz.htm>> (accessed June 11, 2010).



## Engineroom Equipment

The *Lady Mary* was powered by its original six-cylinder, 425-horsepower Caterpillar diesel engine. The vessel had one propeller and one rudder. The *Lady Mary* had two General Motors diesel-driven generators—a four-cylinder, 60-kilowatt unit and a two-cylinder, 20-kilowatt unit. To save fuel, the smaller generator was generally used.

## Safety Examination

As a U.S. commercial fishing vessel, the *Lady Mary* was exempt from Coast Guard inspection (46 *United States Code* [U.S.C.] 3302). The vessel had, however, undergone a voluntary Coast Guard dockside fishing vessel safety examination on July 21, 2008, and received a safety decal that was valid at the time of the accident. Instituted by the Coast Guard in the absence of inspection authority, voluntary dockside examinations focus on safety equipment such as liferafts and fire extinguishers but do not address a vessel's material condition, stability, or watertight integrity.

## Crew Requirements

Federal laws and regulations regarding the licensing and manning (including watchkeeping) of U.S. vessels (46 U.S.C. Part F and 46 CFR Part 15) do not apply to masters or crewmembers on commercial fishing vessels of under 200 gross tons such as the *Lady Mary*.<sup>9</sup>

## Toxicological Testing

As required by Coast Guard regulations at 46 CFR 4.06, the survivor was tested for drugs<sup>10</sup> and alcohol after the accident. The results were negative. The bodies of the master and one crewmember, which were retrieved when the survivor was rescued, tested negative for alcohol but positive for marijuana. The two bodies recovered weeks after the accident were not tested. Masters and crewmembers on commercial fishing vessels of less than 200 gross tons are not subject to preemployment, periodic, or random testing for drugs or alcohol under Federal laws or regulations.

## Survivability

According to data from a weather buoy located 48 nautical miles from the accident site, at 0500, about the time of the sinking, the air temperature was 33° F and the water temperature was 40.6° F. The probability of survival for the two victims whose bodies were recovered by the rescue helicopter was calculated using the Cold Exposure Survival Model (CESM) developed by Canada's Defence and Civil Institute for Environmental Medicine. The model predicts functional time (having the ability to move) and survival time (staying alive) based on the cooling of the

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<sup>9</sup> Licensing requirements for masters apply only to fishing vessels of 200 gross tons or greater, and fishing vessels are specifically exempted by 46 U.S.C. 8105 and 46 CFR 15.103(e)(2) from the requirements of the International Convention on Standards of Training, Certification and Watchkeeping. Fishing vessels are also specifically exempted from the requirements for unlicensed personnel at 46 U.S.C. 8701 and 8702.

<sup>10</sup> Regulations at 46 CFR 16.113 specify testing for marijuana, cocaine, opiates, phencyclidine, and amphetamines.

body's core as affected by a person's physical characteristics and clothing and by weather and sea conditions.<sup>11</sup>

Functional time is the predicted number of hours after initial exposure that a person's body core temperature decreases to the end of mild hypothermia at 34° C (93.2° F). At functional time, the person is incapacitated by hypothermia and is at the limits of self-help. Survival time is the predicted number of hours after immersion when the person's core body temperature falls to the end of moderate hypothermia at 28° C (82.4° F). A person with a core temperature of 28° C will lose consciousness. An immersed unconscious person is unable to maintain an airway, which quickly results in drowning.

The two victims whose bodies were retrieved after the survivor was rescued had been in the cold water for 3–3.5 hours. For one victim, the CESM results showed a functional time of 1.5 hours and a survival time of 2.9 hours. For the other victim, functional time was 2.4 hours and survival time was 4.4 hours. The delay between the transmission of the *Lady Mary*'s first EPIRB signal and the arrival of rescuers was 2.5 hours. If a rescue helicopter had been launched after the first EPIRB signal was received at 0540, it would presumably have arrived on scene within an hour, given the launch history of the actual rescue helicopter. If the rescuers had arrived earlier, it is thus possible that the two victims found in the water wearing immersion suits would have been alive.

Two problems were associated with the EPIRB carried on the *Lady Mary*: it did not transmit vessel position data, and it was incorrectly registered. Had the EPIRB been equipped to broadcast the location of the *Lady Mary*, the geostationary satellite would have received the vessel's position, regardless of the incorrect identifying information in NOAA's database, and the location would have been instantly transmitted to the Coast Guard RCC. According to manufacturers, the GPS option adds about \$100 to the cost of a marine EPIRB. As a result of this accident investigation, the NTSB recommended that the Federal Communications Commission require that all EPIRBs carried on commercial vessels be capable of transmitting position data (see "Recommendation" section).

Two months after the *Lady Mary* accident, on July 13, 2009, the Coast Guard issued a safety alert (No. 04-09) addressing the issue of EPIRB registration. The alert urged owners and operators of EPIRBs and personal locator beacons (small emergency beacons intended for individual use) to confirm that their registrations were correct and to update them if necessary.

## Tests and Research

### Examination of Vessel Components

The wreck of the *Lady Mary* was not recovered. To investigate possible causes of the sinking, Navy divers, operating from a Military Sealift Command vessel that carried a Coast Guard member of the marine board, recovered the rudder and shipped it to the NTSB

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<sup>11</sup> The model does not include the effects of dehydration, injuries, medications, drugs, alcohol, sleeplessness, or circadian hormonal cycles.

materials laboratory for examination.<sup>12</sup> The laboratory also examined photographs of the vessel's propeller and stern ramp that had been taken by commercial divers.

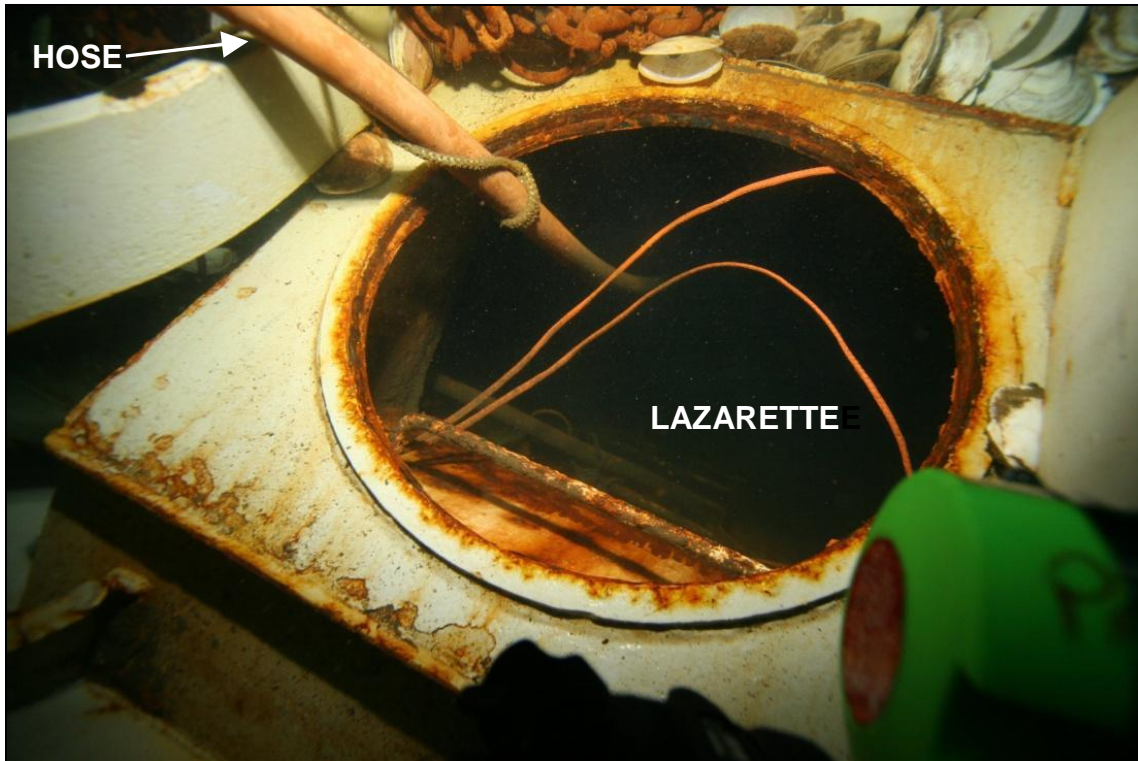
The rudder was found a short distance from the *Lady Mary*, broken off the rudder stock but still connected to the vessel by a chain. Laboratory examination revealed a large indentation, fractures, deformation, and shearing on the rudder's port side, as well as missing paint. The rudder stock exhibited buckling and weld separation consistent with being subjected to a vertically applied compressive force. The rudder damage matched the geometry of the propeller and the end of the propeller shaft, and the severity of damage increased toward the lower end of the rudder, consistent with that part of the rudder being forced forward. The starboard side of the rudder did not display any damage. A question arose concerning the possibility that the *Lady Mary's* rudder damage could have been the result of a collision. If another vessel had struck the rudder (see "Discussion" section), one side would have been damaged by the strike, and the other side would have been damaged by being pushed into the propeller and keel. Overall, the pattern of damage indicates that the fractures, indentations, deformations, and other changes to the rudder were consistent with the rudder striking the ocean floor.

Photos of the stern ramp showed considerable structural damage on its port side. No abrasions or other marks were visible on the stern. The port side of the ramp was fractured and buckled, and the lower roller bearing was fractured. The underlying support structure was buckled, consistent with the ramp being forced forward, and part of the ramp support structure had penetrated the stern and entered the lazarette.

The photographs showed that the lazarette hatch on the main deck was open. A hose that emerged from the lazarette through the open hatch was tied overboard by a rope (figure 6). Although not shown in the photographs, a pump was positioned inside the lazarette, according to both the surviving crewmember and the owners' representative. The survivor told investigators that when it was necessary to dewater the lazarette, a crewmember would remove the hatch cover, enter the lazarette, rig the pump by hand, and empty the space using a hose that discharged over the side. He stated that the lazarette would typically be pumped out three or four times on a 10-day trip, and—in bad weather—they would have to pump it out "about once a day."

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<sup>12</sup> The divers also retrieved the *Lady Mary's* two GPS units. The NTSB recorder laboratory found that salt water damage prevented data retrieval.



**Figure 6.** Open access hatch to lazarette, showing hose emerging from inside and tied overboard. A vessel's lazarette is its aftermost compartment below its main deck, typically accessed by a deck hatch. (Photo by Paul Whittaker)

### Stability Analysis

At the marine board's request, the Coast Guard Marine Safety Center conducted a postaccident stability analysis of the *Lady Mary*.<sup>13</sup> The analysis evaluated the three most likely flooding scenarios: (1) flooding begins in the lazarette and progresses through a drainpipe to the engine room; (2) the vessel takes water over the stern and retains water on the aft deck; or (3) only the engine room floods. Scenarios 1 and 3 were eliminated because the vessel would have lost electrical power sooner had the engine room flooded early in the sinking sequence.

The analysis found that under scenario 2, the *Lady Mary*'s main deck would have been quickly awash under about 1 foot of water. As noted above, the photographic evidence of the wreck shows the lazarette cover off, which would have allowed water on deck to enter the lazarette. Once the lazarette had flooded completely, the main deck would have been under 2.5 feet of water, and the vessel's interior spaces would have been within inches of flooding through the shucking house aft door (whose sill was raised about 6 inches above the main deck). The Marine Safety Center concluded that the sinking could have resulted from the combination of water on deck flooding the lazarette through its open hatch and progressing forward along the open deck, through the aft door, and into the engine room.

<sup>13</sup> "Post Sinking Stability Analysis for the Lady Mary O.N. 520834," memorandum from commanding officer, Marine Safety Center, to chairman, Marine Board of Investigation (Washington, DC: U.S. Department of Homeland Security, U.S. Coast Guard, February 17, 2010).

## Discussion

### Other Vessel Traffic

After the accident, speculation arose that the *Lady Mary* might have been struck by another vessel. To evaluate that possibility, investigators considered three classes of commercial vessels—large deep draft vessels engaged in international and/or coastwise trade, oceangoing but generally smaller vessels (such as tugs and barges) engaged in coastwise trade, and commercial fishing vessels. Investigators examined automatic identification system (AIS)<sup>14</sup> data from deep draft vessels and VMS data from commercial fishing vessels to determine the location of nearby vessels around the time the *Lady Mary* sank. As noted earlier, investigators found no evidence of radio transmissions from the *Lady Mary* after the vessel began to drift (about 0033), and the Coast Guard received no Mayday calls the morning of the sinking, though two fishing vessel masters reported hearing an unidentified emergency call on distress channel 16 about 0500.

According to AIS data, three deep-draft vessels were in the vicinity of the *Lady Mary*'s last known position between 0510 (the time of the *Lady Mary*'s last VMS transmission) and 0540 (the time of the *Lady Mary*'s first EPIRB transmission) on March 24.<sup>15</sup> Two vessels—the cargo ship *APL Arabia*, heading northeast, and the bulk carrier *Energy Enterprise*, heading southwest—were at least 20 miles from the *Lady Mary* during the period in question, too far away to have been involved in the accident. According to the AIS data, between 0510 and 0540, a third vessel, the cargo ship *Cap Beatrice*, passed about 1 mile south of the *Lady Mary* on a west–southwesterly course. On May 24, 2009, a team of divers from the New Jersey state police examined the *Cap Beatrice*'s hull and found no evidence of a vessel strike, such as damage to the bow or paint transfer.

Further, though other commercial vessel traffic in coastwise trade may have been in the area, these vessels either were not equipped with AIS or were too far offshore for their AIS transmissions to have been received ashore. In these instances, the vessels could not have been identified, and their presence in relation to the *Lady Mary* would not have been known.

Data from the VMS, as analyzed by NOAA, show about 20 fishing vessels within a 6-mile radius of the *Lady Mary* between 0510 and 0540 on the day of the accident. The closest vessel was about 1.5 miles away when the *Lady Mary* sank. A Coast Guard marine inspector examined that vessel at the dock and found no indication that it had been involved in a collision. VMS tracking data did not show any other fishing vessel's track intersecting the *Lady Mary*'s during the hour before the sinking. Fishing vessels not engaged in scalloping could have been in the area, but unless they were required to carry VMS equipment, they would not have been tracked by the VMS.

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<sup>14</sup> AIS is a shipboard broadcast system, operating in the very-high-frequency maritime band, that sends and receives ship information such as identity, position, course, and speed. Signals can be monitored both by other vessels and by land-based systems. All ships of 300 gross tons or more engaged on international voyages are required by the International Convention for the Safety of Life at Sea to be fitted with an AIS. In U.S. waters governed by vessel traffic service or vessel movement reporting systems, certain commercial and towing vessels and all passenger vessels carrying 150 or more passengers are required to carry AIS equipment. Fishing vessels are exempt from the AIS carriage requirements.

<sup>15</sup> The U.S. Navy reported no U.S. submarine activity in the area at the time of the accident.

## Flooding

Postaccident photographs of the *Lady Mary* wreckage show that the cover to the lazarette access hatch was off, with a hose emerging from the open hatch and tied overboard. According to testimony, the hose was attached to a pump in the lazarette. The survivor did not recall whether the lazarette hatch was open or closed when he went to bed. He said, however, that the crew normally kept the cover closed, as is consistent with safe shipboard practice, unless they were pumping out the lazarette.

According to the National Weather Service, the weather intensified after midnight, with winds increasing to 35 knots and wave heights exceeding 7 feet. Tracking data show that around 0033, the *Lady Mary*'s heading changed to south–southwest and the vessel drifted with the winds and current until it sank. As the weather worsened, the drifting vessel could have taken water over the sides, across the deck, and into the lazarette through the open hatch. The water accumulating in the lazarette would have sunk the vessel's stern deeper into the sea, allowing even more water onto the deck and into the lazarette.

## Probable Cause

The National Transportation Safety Board determines that the probable cause of the sinking of the *Lady Mary* was flooding originating in the lazarette through an access hatch that had been left open during rough weather, contrary to safe shipboard practice. Contributing to the delay in the dispatch of rescue assets was the inability of the EPIRB to transmit position data following activation.

## Recommendation

On March 11, 2010, the National Transportation Safety Board issued the following safety recommendation to the Federal Communications Commission<sup>16</sup>:

### M-10-1

For commercial vessels required to carry 406-MHz emergency position-indicating radio beacons (EPIRBs), mandate that those EPIRBs broadcast vessel position data when activated.

In a response to the NTSB dated July 1, 2010, the Federal Communications Commission stated that it planned to propose a regulation to implement the NTSB's recommendation. Recommendation M-10-1 was classified "Open—Acceptable Response" on August 19, 2010. A proposed regulation has not yet been published.

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<sup>16</sup> The recommendation letter can be found on the NTSB's website <<http://www.nts.gov/Recs/letters/2010/M-10-001.pdf>>.

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