



# National Transportation Safety Board

## Marine Accident Brief

### Capsizing and Sinking of Fishing Vessel *Destination*

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<b>Accident no.</b>	DCA17FM006
<b>Vessel name</b>	<i>Destination</i>
<b>Accident type</b>	Capsizing and sinking
<b>Location</b>	Bering Sea, 2.6 miles northwest of St. George Island, Alaska 56°39' N, 169°49.8' W
<b>Date</b>	February 11, 2017
<b>Time</b>	0610 Alaska standard time (coordinated universal time – 9 hours)
<b>Injuries</b>	6 fatalities
<b>Property damage</b>	\$2.5 million est.
<b>Environmental damage</b>	Oil sheen
<b>Weather</b>	Visibility 9 miles, light snow, cloudy skies, winds northeast at 23 knots with gusts up to 34 knots, seas northeast at 13 feet, surface current south at 0.78 knots, air temperature 18°F, water temperature 37°F, morning twilight 0915, sunrise 0955
<b>Waterway information</b>	The Bering Sea covers 885,000 square miles in the north Pacific Ocean, bordered by the following areas: Russia (Siberia), Bering Strait, mainland Alaska, Alaska Peninsula, and Aleutian Islands. The average depth of the sea is approximately 5,000 feet. The area around St. George and St. Paul Islands (Pribilof Islands) is much shallower, measuring 180–300 feet deep.

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At about 0610 local time on February 11, 2017, while transiting from Dutch Harbor to St. Paul Island, Alaska, to deliver bait and to fish for crab, the fishing vessel *Destination* capsized 2.6 miles northwest of St. George Island, Alaska, and sank several minutes later.<sup>1</sup> No mayday call was received. However, a signal from the vessel's emergency position-indicating radio beacon (EPIRB) alerted the US Coast Guard to the sinking. During search and rescue efforts, debris and an oil sheen were sighted, but none of the six crewmembers aboard were found and are thereby presumed to be dead. The value of the vessel was estimated at \$2.5 million.



**A screenshot from video of the *Destination* as it arrived in Dutch Harbor carrying 200 crab pots on February 9, two days before the accident. (Video courtesy of *April Lane* crewmember)**

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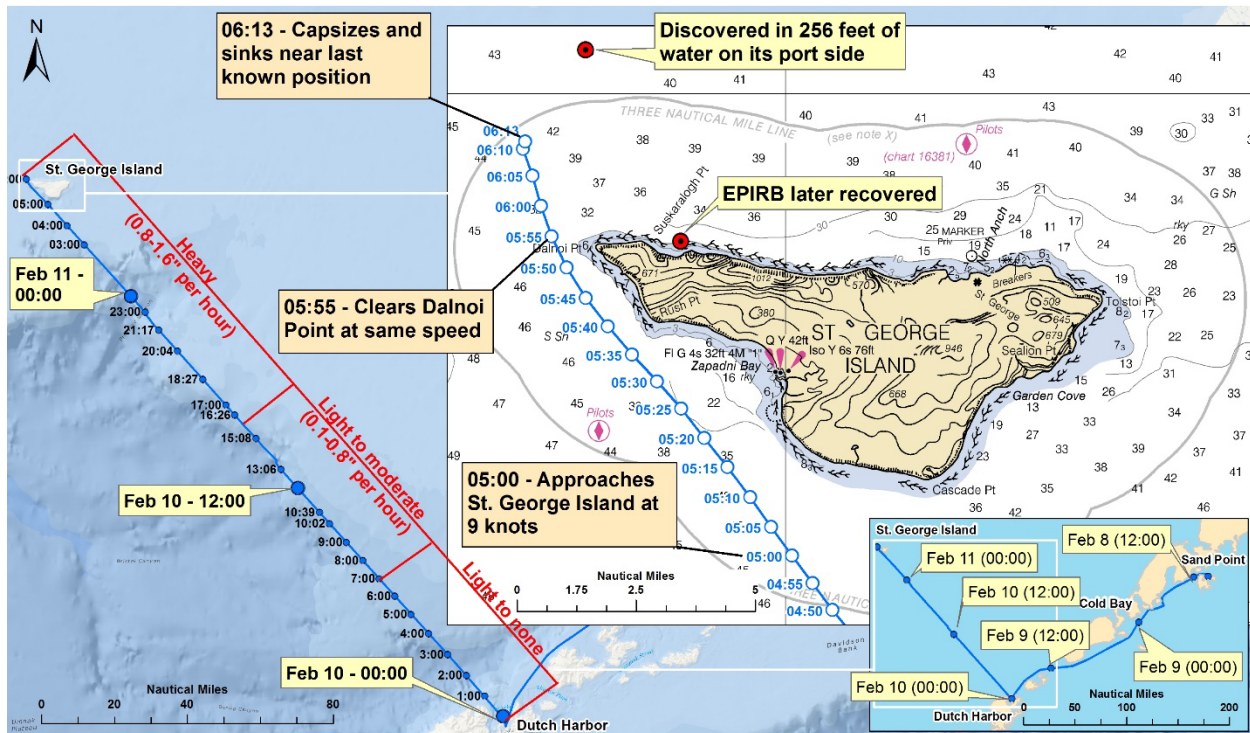
<sup>1</sup> Unless otherwise noted, all *miles* in this report are nautical miles (1.15 statute miles); *speeds* are speed over ground; and *courses* are course over ground.

## Capsizing and Sinking of Fishing Vessel *Destination*

With the participation of the National Transportation Safety Board (NTSB), the Coast Guard conducted a Marine Board of Investigation hearing in August 2017 to hear testimony and establish the facts about the sinking of the *Destination* and the loss of its crewmembers. Because there were no survivors, the marine board gathered evidence from 46 witnesses, which included testimony as well as video footage focusing on weather, human factors, and the mechanical state and stability of the vessel before and during its final voyage. The marine board also had access to satellite and automatic identification system (AIS) data providing the *Destination's* location, heading, course, and speed.

## Accident Events

For 27 days—between January 8 and February 3, 2017—the crewmembers of the *Destination* fished for cod near False Pass and Sanak Island, Alaska. On board the vessel were the captain and five deckhands, one of whom served as the engineer. During that time, they regularly unloaded to a fish tender vessel the catch on board from the 200 cod pots, which were rectangular-shaped, rigid-steel mesh cages with lines and buoys attached.<sup>2</sup> On February 4 at 0927, the *Destination* arrived at the Trident Seafoods plant in Sand Point, Alaska, where the crew worked to configure 190 of the 200 pots from cod fish to opilio (snow) crab in preparation for the crab fishing that would follow shortly thereafter near St. Paul Island, 390 miles away.



**AI trackline of the *Destination* leading up to the site of the sinking on February 11. From left to right: (1) estimated rates of icing along the voyage from Dutch Harbor to St. George Island; (2) last 83 minutes of the transit west of St. George Island, where the EPIRB was later recovered nearby; and (3) positions and corresponding times for the vessel's passage from Sand Point through Cold Bay and Dutch Harbor to ultimately St. George Island near where the vessel was discovered in 256 feet of water (42 fathoms). (National Oceanic and Atmospheric Administration [NOAA] chart 16381)**

<sup>2</sup> A fish tender vessel commercially supplies, stores, refrigerates, or transports fish to or from a fishing, fish processing, or fish tender vessel or a fish processing facility.

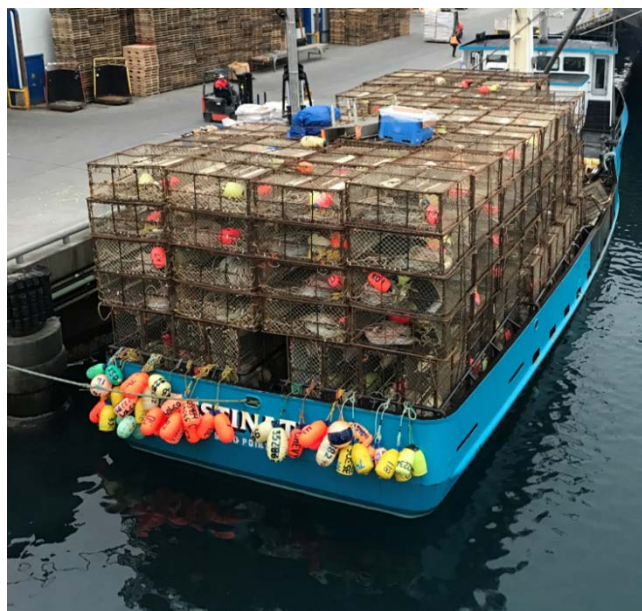
## Capsizing and Sinking of Fishing Vessel *Destination*

The *Destination* was one of six vessels hired by a cooperative known as the Alaska Fishermen's Voting District that had been assigned to harvest a total of 914,118 pounds of crab for the entire 2016–17 season (from October 15, 2016, to May 31, 2017).<sup>3</sup> Nearly one-half of that total quota (450,000 pounds) was expected to be delivered to Trident Seafoods on St. Paul Island for processing. The facility was scheduled to close for the season between February 20 and 25, by which time the *Destination* had to deliver its share of the quota: 191,000 pounds.

Although the *Destination* could carry a maximum of 224 pots per its stability instructions booklet, former crewmembers said that the captain nearly always carried 200 pots. The pots were stacked in five tiers: those in the first tier were stored on their sides, which left space for a 3-foot-wide-by-7-foot-high tunnel down the centerline of the vessel; the other pots in the four tiers were stacked horizontally, four across and approximately seven lengthwise. The tunnel allowed the crew access to the following: the manhole covers for wet-well fish hold nos. 1, 2, and 3 located on the centerline; the steering room, through a watertight door from fish hold no. 3; and the mooring cleats on deck at the stern. Two former crewmembers said that fish hold nos. 1 and 2 were typically full, “pressed” with seawater, and that hold no. 3 was empty and uncovered. “We always left the hatch off,” one of them added, in reference to the manhole for hold no. 3. The *Destination*'s stability instructions booklet that investigators reviewed required that the no. 3 hold be empty for the departure condition that most resembled the vessel's actual departure condition on the accident voyage and advised that “precautions shall be taken to ensure that the tank is completely empty.”

After reconfiguring the pots over the next 4 days and loading 15,228 gallons of diesel fuel on the *Destination*, the crewmembers departed Sand Point on February 8 at 0953. About 9 hours later, they arrived at the Peter Pan Seafoods facility in King Cove, Alaska, to load 3,080 pounds of bait. At 2200, they left King Cove for Dutch Harbor.

Under the *Alaska Administrative Code (AAC)*, fishing vessels carrying crab pots in a Bering Sea fishery are required to notify the Coast Guard at least 24 hours before departing port for the fishing grounds.<sup>4</sup> Before arriving in Dutch Harbor, the captain of the *Destination* notified the Coast Guard via radio of the crew's plans to depart Dutch Harbor. During the call, the Coast Guard offered to conduct an examination of the vessel called a stability and safety compliance check to



Crab pots that the *Destination* was carrying during its stopover at Dutch Harbor. (Photo courtesy of *Ocean Rover* crewmember)

<sup>3</sup> The Alaska Fishermen's Voting District was one of the crab-harvesting cooperatives in the Inter-Cooperative Exchange, a corporation that receives and allocates individual fishing quota under the Bering Sea and Aleutian Islands Crab Rationalization Program as well as negotiates agreements between crab harvesters and crab processors. Each cooperative, or “voting district,” holds a seat on the exchange's board of directors.

<sup>4</sup> Title 5 AAC Chapter 39, Section 670(c)(7) (7).



## Capsizing and Sinking of Fishing Vessel *Destination*

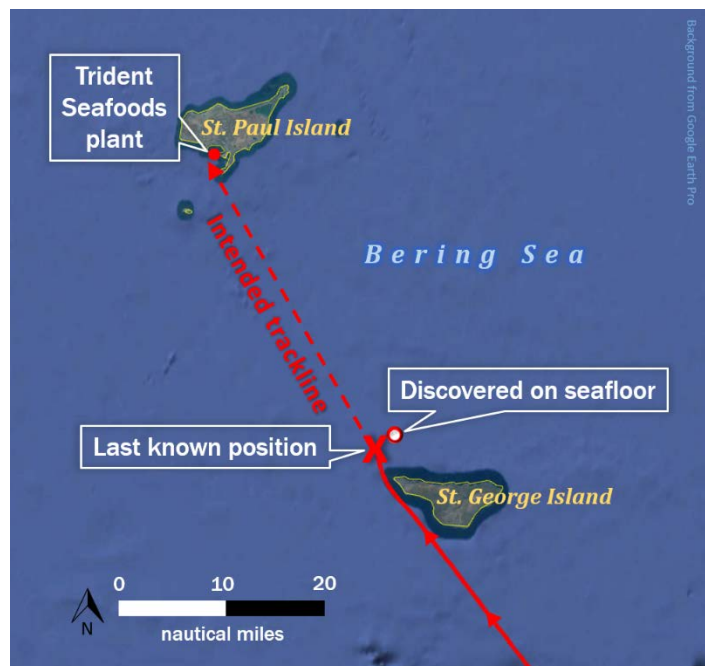
ensure that it was not overloaded, but the captain declined. As the Coast Guard officer recalled in her testimony to the marine board, the captain said that “if it wasn’t a requirement, then he didn’t want one.” When questioned if he completed the examination for a previous fishery, the captain acknowledged that he did 4 months prior in October and that he was currently carrying fewer pots. Typically, the 15-minute safety check would confirm that the number of pots being carried did not exceed the number allowed in the stability instructions booklet.

On February 9 at 1815, the *Destination* arrived into Dutch Harbor and proceeded to the Kloosterboer cold storage facility to load bait. Between 1835 and 1900, the crew loaded four pallets of bait weighing a total of 7,060 pounds. Former crewmembers estimated that the freezer for the bait would have been filled to capacity and that excess bait was stored either in totes or pallets on both the main deck forward of the pot stack and the 01 deck aft of the wheelhouse. Some of the bait was expected to be unloaded and stored on St. Paul Island before the *Destination* began fishing for crab.

At 1908, the *Destination* moored at the Trident Seafoods facility nearby.<sup>5</sup> While there, two former crewmembers visited the vessel and joined the crew for dinner at a local restaurant. Immediately afterward, the crew returned to the *Destination* and departed Dutch Harbor at 2315.

The fleet manager at Trident Seafoods on St. Paul Island informed the marine board that he received a satellite phone call from the captain of the *Destination* a day later on February 10 at about 1330. He was told that the captain and his crew would unload and store 5–6 pallets of bait there. The captain estimated that he was 14 hours away from St. George Island at that time and would arrive at St. Paul Island late on February 11 or 12. There was no mention of freezing spray or adverse weather conditions that would have delayed his expected time of arrival.

The captain of the fishing vessel *Aleutian Lady*, which was operating in the same cooperative as the *Destination*, stated that he had conversed several times with the *Destination*’s captain via satellite phone on the evening of February 10 during the voyage between Dutch Harbor and St. Paul Island in what would become the last-known communication transmitted from the *Destination*. They discussed the crewmembers having enough time to catch their quota, needing to carry extra bait, and devising a fishing “game plan” based on the hauls reported by other fishing vessel captains. Because the *Destination*’s captain was apprehensive about delivering his quota by February 20–25, they discussed having



<sup>5</sup> Trident Seafoods operates three fish processing facilities in the area of the Bering Sea located at Sand Point, Dutch Harbor, and St. Paul Island.

## Capsizing and Sinking of Fishing Vessel *Destination*

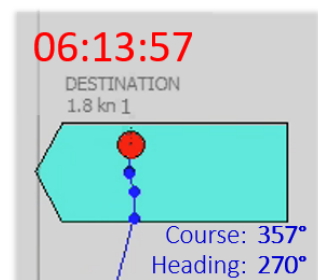
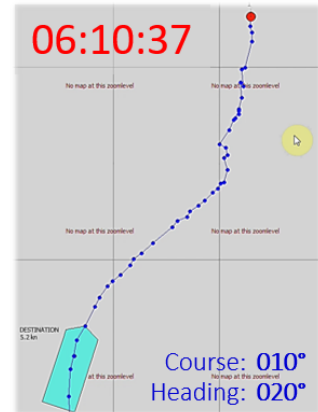
the *Aleutian Lady* harvest and deliver to St. Paul Island a larger share of the cooperative's north crab quota than originally planned and, alternatively, the *Destination* catch more of the south quota.

Trident Seafoods on St. Paul Island often ran low on bait later in the crab season. The captain of the *Aleutian Lady* said, "None of us were really happy about the lack of bait, or the fact that we had to bring out a lot of extra bait, because . . . there was not enough at the island . . . I, like [the *Destination's* captain], brought out a lot of extra bait." Following their first catch, the crewmembers of the *Destination* were planning to reload bait from the stock at St. Paul Island.

AIS data show that the vessel made good a course of 325 degrees toward St. Paul Island at a speed of about 8 knots after leaving Dutch Harbor. However, two course variations and reduced speeds were recorded between Dutch Harbor and St. Paul Island on February 10: the first transpired for 10 minutes, between 1331 and 1341; the second lasted for 60 minutes, between 2150 and 2250, as the *Destination's* course changed to 043 degrees and its speed slowed to 0.4 knots.

The two former crewmembers informed investigators that during their previous experience serving on board the *Destination* they stood a 1- or 2-hour wheelhouse watch alone when transiting at night, which involved keeping a lookout and monitoring radar, fathometer, gauges, and autopilot. The watchstander was also tasked with monitoring live video of the engine room and making rounds through the engine room each hour (during which time the wheelhouse was left unattended) to ensure that the level of water in the bilge was low, the fuel filter centrifuge was running, the fuel level in the day tank was adequate, and there was nothing out of the ordinary happening. Sometimes the round would include examining fish hold no. 3 for water. Every 6 hours (at 0000, 0600, 1200, and 1800) the watch would also lubricate the shaft bearings. To help keep the watchstander awake, the vessel had a wheelhouse watch alarm located 10 feet from the helm chair. The alarm was set between 5 and 15 minutes; if it was not reset, an audible alert sounded.

On February 11 at 0500, the *Destination* approached the southwestern side of St. George Island. According to AIS data, the fishing vessel continued its course at an increase of speed from 7.8 to 9 knots, placing the western side of the island about 2.5 miles off its starboard side. At 0555, the *Destination* passed Dalnoi Point, the northwestern tip of the island, shortly after adjusting its course to 340 degrees for the voyage to St. Paul Island. The winds and seas were 23 knots and 8.4 feet high from the northeast on the starboard beam, nearly at a right angle to the vessel.



## Capsizing and Sinking of Fishing Vessel *Destination*

At 0610, just after leaving the protection of the lee of St. George Island, the *Destination's* heading began to change dramatically approximately 2.6 miles northwest of St. George Island. Over the next 3 minutes, the vessel's heading pivoted drastically 256 degrees to starboard, as its speed dropped below 2 knots while traveling north 0.2 miles. During this time, the *Destination* likely capsized shortly before sinking.

At 0613, the *Destination's* EPIRB transmitted its initial satellite distress alert. A minute later, at 0614, the vessel's AIS stopped transmitting, with its last transmission indicating a course and heading of 357 and 270 degrees, respectively, and a speed of 1.8 knots.

Investigators did not discover any evidence indicating that the crewmembers used radio communication to issue a mayday call. The Coast Guard first learned of the *Destination's* distress at 0615, when its Joint Rescue Coordination Center (known also as the Seventeenth District Command Center) in Juneau, Alaska, received the satellite EPIRB message. The message indicated a beacon position of approximately 2.7 miles west of Dalnoi Point, along with information listing the vessel's name, radio equipment, owner's name, and contact phone numbers.

Following receipt of the distress alert report, the Coast Guard's communications center in Kodiak attempted to contact the *Destination* on both VHF and HF radio and on Inmarsat C, a satellite notification system.<sup>6</sup> With these broadcasts, the Coast Guard also asked vessels in the vicinity to radio the *Destination* and assist in searching for it.

At 0634, the Coast Guard Search and Rescue (SAR) mission coordinator, the official responsible for making decisions for search and rescue operations, was briefed. Ten minutes later, a request was sent to Coast Guard Air Station Kodiak for deployment of an HC-130 fixed-wing aircraft and a MH-60 helicopter, which was stationed at forward operating location in Cold Bay, Alaska.<sup>7</sup> Kodiak and Cold Bay were approximately 570 and 255 miles, respectively, from the last known position of the *Destination*. At 0745, the Coast Guard launched an HC-130 fixed-wing aircraft from Kodiak, which, after an almost 2.5-hour flight, arrived west of St. George Island at 1013 to begin search efforts.

At 0809, a Coast Guard MH-60 helicopter attempted to launch from Kodiak to serve as an "escort" for the MH-60 from Cold Bay. Because of the open expanse of water, the helicopter from Cold Bay could not launch until the one from Kodiak appeared within 2 hours of its position, a safeguard for the crews in case one of the two aircrafts ditched into the near-freezing waters. However, the departure from Kodiak was delayed because the helicopter's engine inlets accumulated ice as it taxied on the runway. The pilots returned to the hangar to de-ice the engine inlets and then launched at 0840.

Good Samaritan fishing vessels were the first to arrive on scene after hearing the Coast Guard's broadcasts for assistance. At 0930, the crew on the *Silver Spray* located buoys and an oil sheen 4.5 miles from the *Destination's* last known AIS position. Twenty minutes later, the *Bering Rose* arrived but reported no sight of the vessel; it then proceeded to the *Destination's* last known

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<sup>6</sup> *Inmarsat-C SafetyNET* is an internationally adopted, automated satellite system for promulgating weather forecasts and warnings, marine navigational warnings, and other safety-related information to all types of vessels and is part of the Global Maritime Distress and Safety System (GMDSS). SafetyNET is the international service for the broadcast and automatic reception of maritime safety information (MSI) as well as information related to search and rescue via the Inmarsat satellite system.

<sup>7</sup> During busy fishing seasons, Coast Guard Air Station Kodiak temporarily locates its rotary-wing aircraft in Cold Bay to reduce the flight time to Bristol Bay, the Bering Sea, and the Aleutian Islands during responses to maritime emergencies.

## Capsizing and Sinking of Fishing Vessel *Destination*

EPIRB position. At 1140, the crew on the *Silver Spray* recovered a life ring bearing the name “F/V DESTINATION.”

As the escort helicopter from Kodiak neared, the MH-60 helicopter that was launched from Cold Bay (at 1004) arrived at the *Destination*’s last known position at approximately 1200. Upon arriving on scene, the Cold Bay helicopter located the EPIRB 0.4 miles off St. George Island and directed the *Silver Spray* to its location, where the vessel’s crew recovered the EPIRB at 1225.



Screenshots from video captured by the *Silver Spray* crew of items recovered from the *Destination*: a life ring (at left), along with a line and the vessel’s EPIRB (at right).

The following morning, on February 12 at 1000, the 378-foot Coast Guard cutter *Morgenthau* arrived on scene from Dutch Harbor to assist in the search.

After spending more than 3 days searching 5,731 square miles, the Coast Guard suspended search efforts for the six mariners on February 14 at 1700 due to the diminished chance of crewmember survival. The decision was based primarily on the time that had elapsed, which exceeded the survival time of 10.65 hours predicted for crewmembers wearing a survival suit. Neither the crew of the *Destination* nor the vessel’s liferaft were located. The Coast Guard’s assets included: two HC-130 Hercules airplanes, two MH-60 Jayhawk helicopters, one MH-65 Dolphin helicopter, and the Coast Guard cutter *Morgenthau*.

Following the accident, the Coast Guard Marine Board of Investigation requested assistance from the National Oceanic and Atmospheric Administration (NOAA) to locate and examine the *Destination* on the seafloor. About 5 months after the accident, on July 8, the crew of the NOAA vessel *Fairweather* began surveying the area near the *Destination*’s last known position using side-scan sonar.<sup>8</sup> A target matching the description of the *Destination* was located approximately 7 miles north of Dalnoi Point. The commanding officer of the *Fairweather* told the marine board that the sonar imagery showed the vessel resting on its port side facing southwest in 256 feet of water and a scour line extending 330 feet southwest from the vessel.<sup>9</sup>

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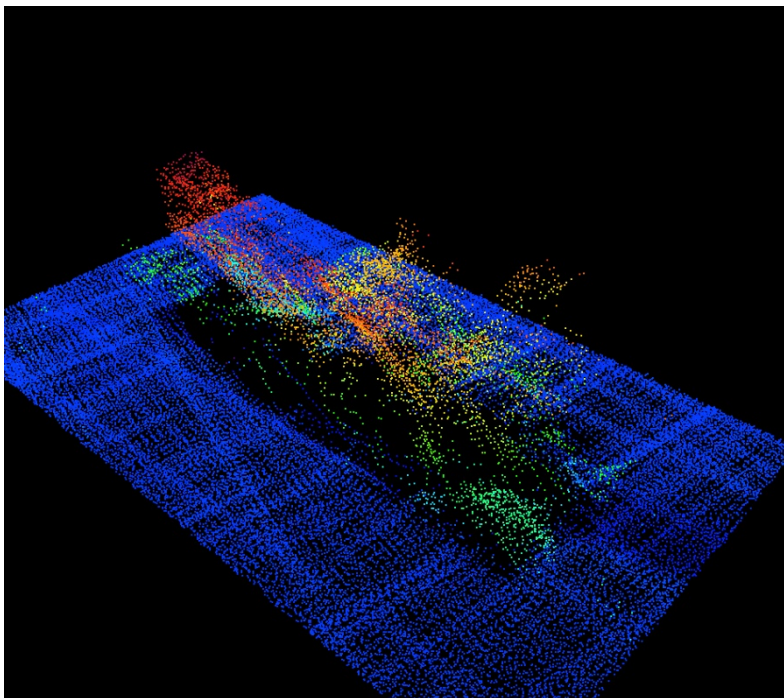
<sup>8</sup> Side-scan sonar creates an image of the seafloor by measuring the volume of the return echo and drawing a picture accordingly.

<sup>9</sup> A scour line indicates where the vessel scraped across the seafloor.



## Capsizing and Sinking of Fishing Vessel *Destination*

On July 25, the Coast Guard cutter *Healy* deployed a remotely operated vehicle (ROV) to examine the target that NOAA located. The *Destination* was able to be identified but strong subsurface currents prevented the Coast Guard from maneuvering the ROV closer to the vessel for a detailed examination of its hull.



Side-scan sonar image of the *Destination* on its port side. (Image courtesy of NOAA)

## Vessel History

The *Destination* was built in 1981 as the *Compass Rose*, a house-forward vessel with three fish holds. Four years later, the current owner purchased the *Compass Rose* and renamed it the *Destination*.

Investigators gathered evidence from witnesses, shipyard billing records, and other documents that chronicled the history of construction and repairs completed on the *Destination* to determine if there were any modifications that would have added weight and thereby affected its stability. However, few plans (drawings) were found describing changes to the vessel over the years.

In 1992, while the *Destination* was in Seattle, Washington, the owner had a shipyard lengthen the vessel by 16.8 feet (from 81.8 to 98.6 feet) and increase its breadth by 6.2 feet (from 26 to 32.2 feet). The vessel was cut in half; a prefabricated hull section that included new fish holds and piping aft of the engine room was installed; and the wheelhouse was raised 3 feet.

A naval architect was hired to evaluate the effect of the new modifications on the vessel's stability. He developed vessel drawings reflecting the modifications, conducted an inclining test, and generated both a letter documenting his stability assessment and a trim and stability booklet



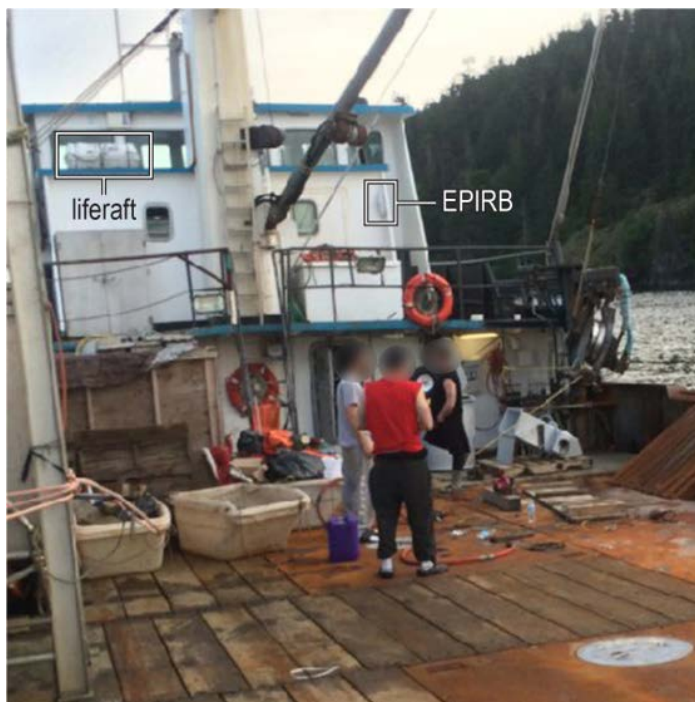
## Capsizing and Sinking of Fishing Vessel *Destination*

dated October 27, 1993.<sup>10</sup> This assessment confirmed that the vessel met the fishing vessel criteria for stability found in Title 46 *Code of Federal Regulations (CFR)* Part 28 and could carry up to 249 pots.

Nearly 2 decades later, during a May 2011 shipyard period in Seattle, the bulwark was raised with the installation of 3,366 pounds of steel plate. Investigators, however, found no evidence confirming an assessment of the vessel's stability following this modification, which would have affected the *Destination's* lightweight characteristics and therefore its stability.

The following year, in November 2012, the *Destination* entered dry dock for repairs after it sustained hull damage while operating in sea ice earlier in the fall season. At that time, the shipyard also installed a bulbous bow, for which a naval architect was again hired to design and conduct a vessel stability assessment. In a January 28, 2013, letter to the owner reporting his stability assessment, the naval architect referenced the stability information provided in the 1993 trim and stability booklet rather than update the booklet with the latest and past modifications. Based on his calculations, he determined that the installation of the bulbous bow had a "negligible" reduction to the vessel's stability.

Investigators also reviewed records of the *Destination's* steering system, gathering information from as far back as May 2011. The owner of the shipyard said that the crewmembers of the *Destination* told him that "there was a case where the steering had got stuck hard over, for some reason" but they were able to steer the boat using the auxiliary system. To address the issue, during a dry dock period at a shipyard in Seattle from April through July 2016 the steering system was overhauled, for which shipyard employees "fabricated a new hydraulic tank and went through all the components." The mechanics found contamination particulates in the hydraulic spool valve that would have caused it "to stick." When a sea trial was conducted afterward, shipyard employees observed the steering system in operation, including the electronics technician who confirmed that the vessel's autopilot was interfacing with the mechanical steering system as designed.



An undated photo of the *Destination* taken by a former crewmember reveals the locations of the liferaft (at left) and EPIRB (at right) that were on board the vessel aft of the wheelhouse.

<sup>10</sup> Developed and updated after modifications to a vessel, a *trim and stability booklet* provides the operator with instructions for maintaining the stability of the vessel, such as listing the loading amount and location of fish pots, fuel, and water.

## Capsizing and Sinking of Fishing Vessel *Destination*

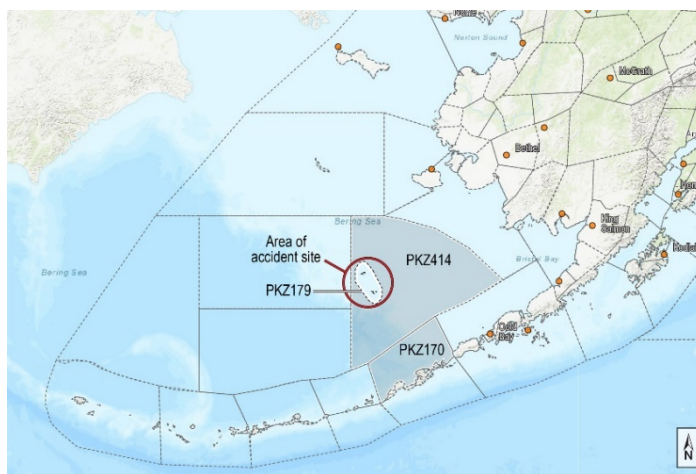
As a vessel that harvested crab, fished for cod, and operated part-time in the summer months as a fish tender vessel, the *Destination* was subject to the requirements for uninspected vessels in the commercial fishing industry found in Title 46 *CFR* Part 28.

In addition, the owner voluntarily participated in the Coast Guard's commercial fishing vessel safety examination program, which primarily focuses on lifesaving equipment on board the vessel, not the hull or machinery as required for Coast Guard-inspected vessels. These exams are valid for 2 years. During the last safety exam that was conducted on the *Destination* in June 2016, the vessel was found to be in compliance and carrying the required lifesaving equipment: an A406 EPIRB; an eight-person liferaft; six immersion suits, six personal flotation devices; and two life rings.

## Weather and Icing

### Marine Forecasts

The National Weather Service (NWS) provides weather forecasts and warnings to help mariners “make decisions that save lives and protect property.”<sup>11</sup> Investigators could not determine what, if any, weather information was received or reviewed by the captain or crew before they departed Dutch Harbor. A former crewmember testified that on previous trips the captain had directed them to prepare for upcoming weather conditions.



The NWS forecast office in Anchorage, Alaska, issued the official marine forecasts for the route to St. Paul Island that the *Destination* had planned to sail. The vessel would pass through three separate marine forecast zones—PKZ170, PKZ414, and PKZ179—between the time of departure from Dutch Harbor on February 9 at 1800 and the time of the accident on February 11 at 0610. The marine forecasts included wind speed, wave heights (seas), and freezing spray warnings.

The first freezing spray warning applicable to the voyage was issued in the marine forecast of February 8 for the small zone encircling the two Pribilof Islands (St. George and St. Paul), PKZ179. Issued at 1524, the forecast warned of heavy freezing spray for the overnight hours of February 9 through February 10, a timeframe ending 3 hours before the *Destination* would have entered that zone. The marine forecast issued on February 9 at 0345 for the zone PKZ414, where the vessel would be transiting on February 10 at 0800, also warned of heavy freezing spray for the same time period.

The last forecasts available to the captain of the *Destination* prior to departing Dutch Harbor were issued on February 9 at 1515 and effective through February 10, as follows:

<sup>11</sup> See NWS's website at <https://www.weather.gov/about/forecastsandservice>.

## Capsizing and Sinking of Fishing Vessel *Destination*

	PKZ170	PKZ414	PKZ179
<i>Winds</i>	North-to-northeast at 25–35 knots; gale warnings	Northeast at 15–25 knots, increasing to 30 knots by morning	Northeast at 15 knots, increasing to 30 knots; small craft advisory through overnight hours
<i>Seas</i>	7–13 feet	7–12 feet	7 feet, increasing to 9 feet
<i>Icing</i>	Heavy freezing spray warning for evening and overnight hours	Heavy freezing spray warning through overnight hours	Heavy freezing spray warning

(Source: NTSB and Department of Navy)

Two days later, when the vessel was 10 miles south of St. George Island, the marine forecast zones for the *Destination*'s position at the time the forecast was issued and at the time when it sank were updated at 0345 and 0353, respectively. The forecast for the vessel's current position (zone PKZ414) included a heavy freezing spray warning through February 12, and the forecast for the sinking location when it occurred (zone PKZ179) included a small craft advisory as well as a warning of freezing spray conditions through February 12.<sup>12</sup>

Freezing spray leads to ice accumulation on exposed vessel surfaces and can have negative stability consequences. The NWS issues warnings of freezing spray or heavy freezing spray in the headlines of weather forecasts to alert mariners of the hazards they may face in their voyage, explained the deputy chief for the Alaska region of the Environmental and Scientific Services Division to the marine board. He also stated that the marine forecasts should become part of mariners' "situational awareness" and be deliberated on in the decision-making process when planning their voyage, particularly in determining whether to make "go" or "no-go" decisions. Currently, the NWS does not have a guide specifically for captains on how to apply heavy freezing spray or freezing spray forecasts.

### Weather Data

The data describing the meteorological and marine conditions likely experienced by the *Destination* from Dutch Harbor until the time it sank were gathered by a meteorologist at the NTSB. Several sources were used for compiling the data, which included NOAA sea-surface charts and two weather computer models, one of which was administered by the US Department of Navy and the other by the NTSB.

The accumulation of sea spray icing graduated through three levels: *light to none* (0.1 inches or less per hour), *light to moderate* (0.1–0.8 inches per hour), and *moderate to heavy* (0.8–1.6 inches per hour).<sup>13</sup> The rate of icing increases as the temperature drops and the wind speed and sea height increases. In general, the *Destination* was likely subjected to increased icing for the

<sup>12</sup> For Alaska, the NWS defines the criteria for a *small craft advisory* as "sustained winds or frequent gusts of 23 to 33 knots." For "rough seas," the advisory may be issued for "sea/wave conditions deemed locally significant, based on user needs, and should be no lower than 8 feet."

<sup>13</sup> National Oceanic and Atmospheric Administration, *Mariners Weather Log* 49, no. 3 (December 2005), [http://www.vos.noaa.gov/MWL/dec\\_05/ves.shtml](http://www.vos.noaa.gov/MWL/dec_05/ves.shtml).



## Capsizing and Sinking of Fishing Vessel *Destination*

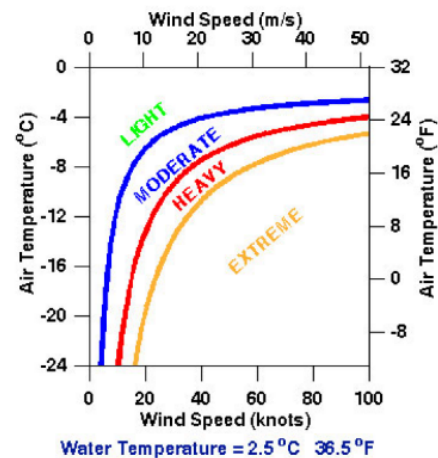
last 23 hours of its voyage, except for the brief period between 0430 and 0545 on February 11 when the vessel was in the lee of St. George Island. The high elevations of the island would have provided the vessel protection from the onslaught of freezing spray, by blocking the winds and reducing the fetch (the straight distance the wind has traveled over the sea surface) and thus reducing the sea height to only 2–4 feet on the lee side. However, once the *Destination* left the lee of the island, the seas returned to roughly 10 feet and the ice accumulation again reached moderate-to-heavy proportions for nearly half an hour before the vessel capsized and sank.<sup>14</sup>

The NTSB determined that the possible weather conditions along the *Destination*'s route were as follows:

	February 9–10	February 10	February 10–11	February 11	
	18:00–06:00	06:00–15:00	15:00–04:30	04:30–05:45	05:45–06:15
	PKZ170	PKZ170, PKZ414	PKZ414, PKZ179	PKZ179	PKZ179
<i>Winds</i>	Northeast at 15–25 knots	Northeast at 25–35 knots	Northeast at 25–35 knots	Northeast at 15–25 knots	Northeast at 20–30 knots
<i>Seas</i>	Northeast at 8–10 feet	Northeast at 10–13 feet	Northeast at 10–14 feet	Northeast at 2–4 feet	Northeast at 8–10 feet
<i>Icing</i>	Light to none	Light to moderate	Moderate to heavy	Light to none	Moderate to heavy
<i>Surface current</i>	085 degrees at 0.85 knots	081 degrees at 0.99 knots	085 degrees at 0.65 knots	150 degrees at 0.78 knots	169 degrees at 0.78 knots

## Sea Spray Icing

Sea spray icing has long been a serious hazard to marine vessels, because the ice accumulates over exposed decks and exterior surfaces of a vessel, thereby adding weight that may ultimately capsize a vessel. As defined by NOAA, sea spray icing occurs in environmental conditions where cold, wave-generated spray contacts exposed surfaces and air temperatures are below freezing. Factors affecting sea spray icing include wind speed, air temperature, water temperature, freezing temperature of water, relative wind direction, and sea and swell wave characteristics (height, period, and propagation direction). Contributing factors based on characteristics of the vessel include speed, heading (with respect to wind, waves, and swell), length, and amount of freeboard (distance between the waterline and uppermost watertight deck). In general, under similar environmental conditions, more sea



<sup>14</sup> Wave height, length, and period depend upon a number of factors, such as the speed of the wind, the length of time it has blown, and its fetch.

## Capsizing and Sinking of Fishing Vessel *Destination*

spray reaches the deck and superstructure when the vessel travels faster into the wind and waves, particularly for smaller vessels and vessels with less freeboard.<sup>15</sup>

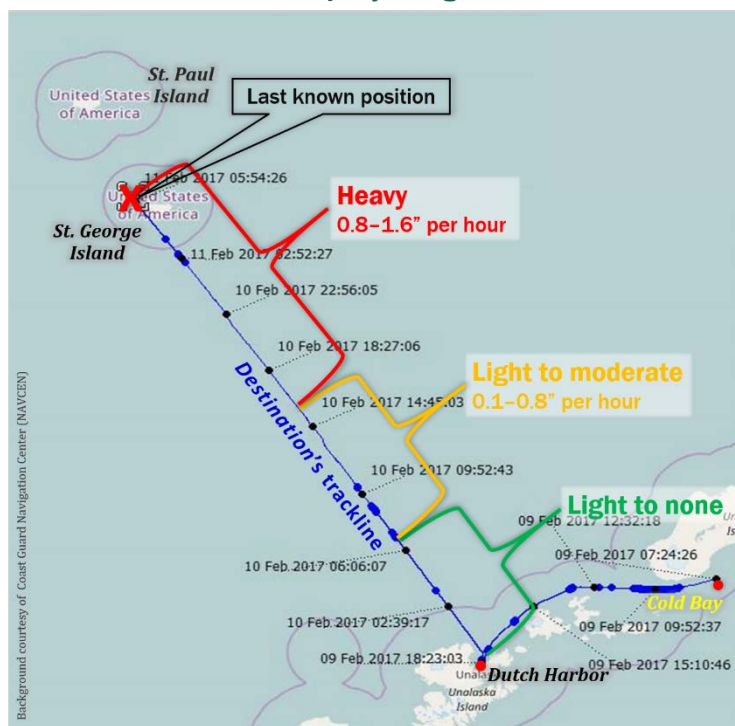
The NWS provides charts estimating the accretion of sea spray ice on vessels measuring between 65.6 and 229.7 feet (between 20 and 70 meters) in length based on various water temperatures. The *Destination*'s length overall was 110 feet, and the water temperature at the time of the accident was 37 degrees Fahrenheit.

To estimate the amount of sea spray ice accretion, the NWS forecast office in Alaska employs the Overland method to forecast situations of freezing spray and heavy freezing spray.<sup>16</sup> Based on this method, along with the information from marine stations in Village Cove, St. Paul Island, and Dutch Harbor, investigators calculated rates for sea spray ice accumulation for the period prior to the *Destination* leaving Dutch Harbor through the accident time. Between 1430 on February 10 and 0630 on February 11, the *Destination* faced the potential of accumulating ice as thick as between 11.6 and 27.0 inches.

However, given that the Overland method was developed nearly 30 years ago, investigators sought a more current method for estimating sea spray icing. Memorial University conducted simulations on the icing conditions that the *Destination* encountered, factoring in many more variables than did the Overland algorithm calculations. The university's icing simulations used data from the Navy Global Hybrid Coordinate Ocean Model (HYCOM), the vessel's AIS track, an NTSB weather research and forecasting model, and a computer model of the *Destination* based on its loading configuration during the accident voyage. With ice accumulation calculated in tonnes per 15 minutes, the results revealed that the highest rate of accumulation—2.7 tonnes (5,951 pounds) per 15 minutes—occurred at 1700 on February 10.<sup>17</sup> Between 92.4 and 154.0 tonnes (203,650 and 339,416 pounds) of ice would have accumulated and been distributed across the entire vessel's surface by the accident time.

The captain of the fishing vessel *April Lane*, who had observed the *Destination* entering Dutch Harbor on February 9, was aware of the NWS's freezing spray warnings for the voyage to the Pribilof Islands and the hazards of

### Accumulation of Sea Spray Icing



<sup>15</sup> *Mariners Weather Log*.

<sup>16</sup> James E. Overland, "Prediction of Vessel Icing for Near-Freezing Sea Temperatures," *Weather and Forecasting* 5 (March 1990): 62-77.

<sup>17</sup> Memorial University measured the ice accumulation using *metric tonnes*, one of which equals 1,000 kilograms or 2,204 pounds.

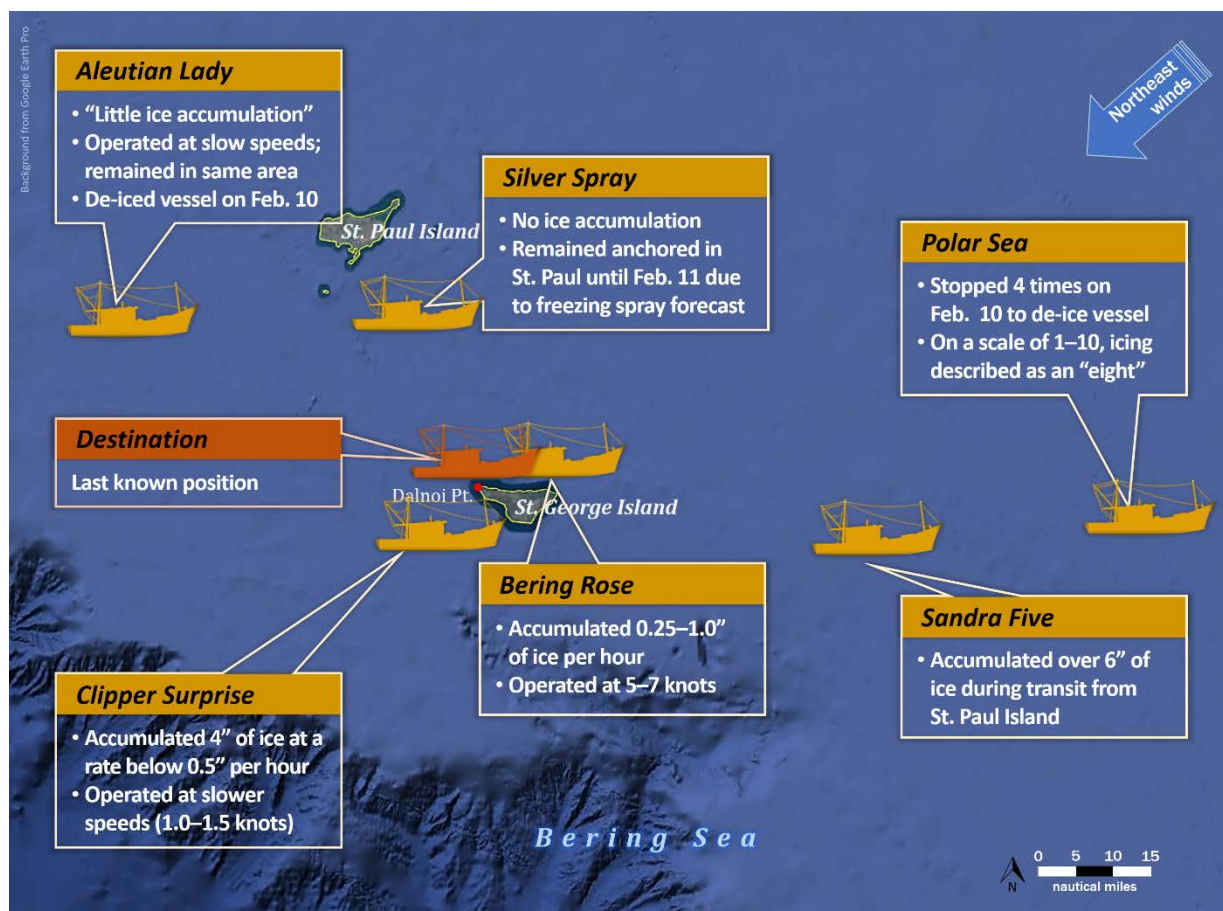
## Capsizing and Sinking of Fishing Vessel *Destination*

ice accumulation. He stated that he was “alarmed” by the number of pots the vessel was carrying while heading north and questioned the height of the crab pot stack. A mariner with 30 years of experience in the Bering Sea crab fisheries, the captain said that he would have “peeled off the top two tiers” because the vessel would be “in the ditch” with the seas on the vessel’s starboard side causing ice to accumulate all the way to the islands. He also said that ice would accumulate not only on the top and sides of the crab pots but also inside of them.

When asked if he ever considered loading fewer pots on deck prior to leaving port when weather forecasts called for heavy freezing spray, the captain of the *Aleutian Lady*, another fishing vessel that was operating near the Pribilof Islands at the time the *Destination* was there, stated, “Absolutely.”

## Ice Accumulation on Nearby Vessels

The NWS does not record actual ice accumulation rates at sea. Investigators therefore interviewed the captains of five fishing vessels that were operating in the area around the Pribilof Islands in the Bering Sea at the same time as the *Destination*. These vessels were the *Aleutian Lady*, *Bering Rose*, *Clipper Surprise*, *Polar Sea*, and *Silver Spray*. Photographs and AIS data were used to document conditions experienced by the *Sandra Five*, another vessel operating nearby. The captains’ recollection of the fishing conditions—ice accumulation, weather, and sea heights—supplemented the satellite data and weather computer models investigators used to determine the conditions experienced by the *Destination*.



Approximate locations of other fishing vessels near the accident site during the days leading up to February 11.



## Capsizing and Sinking of Fishing Vessel *Destination*

The *Aleutian Lady*—a 154-foot house-forward crab fishing vessel—was approximately 50 miles both west and northwest of St. George Island 3 days prior to February 11. While operating at slow speeds, the vessel accumulated little ice from freezing spray. However, by February 10, the crew stopped to break ice.

The *Bering Rose*—a 125-foot house-forward trawler—started fishing on the southeast side of St. George Island by the early morning hours of February 10. There, ice accumulated between 0.25 and 1.0 inches per hour as the vessel operated at 5–7 knots. Based on the captain’s viewpoint, a vessel should remain in port when a forecast includes winds exceeding 40 knots and heavy freezing spray. Given also that the crew must spend many hours clearing ice on the decks, he suggested proceeding slowly to avoid ice buildup.

The *Clipper Surprise*—a 130-foot house-forward longliner—eventually accumulated approximately 4 inches of ice from freezing spray at a rate below 0.5 inches per hour despite operating at slower speeds of 1–1.5 knots in the lee of St. George Island. The captain stated that he knew of the freezing spray warnings “days in advance,” having used primarily the vessel’s onboard satellite Internet to view the NWS’s weather forecasts. Also, after hearing the February 10 forecast call for heavy freezing spray, he decided to conduct fishing operations in the shelter of the leeward side of St. George Island. According to the captain, several vessels in Zapadni Bay, on the west shore of the island, were closer to the shore “hiding out from the weather.” He said that vessels, during northeast or steady northerly winds in the winter, can run up into the bay’s protection and “jog around” while waiting for the weather to clear. When the captain observed on his AIS receiver the *Destination* transiting northwest about a mile off the west coast of St. George Island, he assumed that it was seeking a lee to prevent ice buildup. “I don’t know whether they stopped to knock the ice off,” he added, “but I would have.”

The *Polar Sea*—a 105-foot house-forward crab fishing vessel with no pots on board—was approximately 85 miles east of St. George Island on February 10 en route to St. Paul Island. The vessel stopped four times during the transit so that the crew could break the ice that had accumulated from the freezing spray; each stop lasted about 5 hours. The captain told investigators that he continually evaluated weather conditions by using the onboard computer numerous times a day to obtain weather forecasts and reports from Web pages and emails. On the morning of February 11, the captain heard the Coast Guard’s marine broadcasts requesting assistance to contact the *Destination* and tried to hail the vessel via radio. However, after evaluating the weather conditions and ice accumulation, he decided not to assist with the search based on the risks to his vessel.

The *Sandra Five*—a 113-foot house-aft crab fishing vessel—departed St. Paul Island on February 10 and arrived in King Cove 2 days later. Upon its arrival, the vessel had accumulated over 6 inches of ice while traveling at speeds above 6 knots from the time it departed St. George Island. Sailing in opposite directions, the *Sandra Five* and the *Destination* were about 37 miles apart at 0155 on the morning of February 11, approximately 4 hours before the accident.

## Capsizing and Sinking of Fishing Vessel *Destination*



(1, 2, and 3) *Polar Sea*: ice covers the decks and anchor chain during the vessel's transit to St. Paul Island on February 10 and remains on the wheelhouse while it was docked there the following day. (4) *Bering Rose*: accumulation of ice on deck aft of the wheelhouse during the early hours of February 11. (5) *Sandra Five*: while in King Cove on February 12, crewmembers examine the ice that accumulated during their transit from St. Paul Island.

## Capsizing and Sinking of Fishing Vessel *Destination*

The *Silver Spray*—a 116-foot house-forward crab fishing vessel—departed the fishing grounds 40 miles east of St. George Island on February 9 and arrived the following day at St. Paul Island, where it remained anchored until February 11 due to the freezing spray forecast warning. In the days preceding its arrival at St. George Island, the vessel experienced a stretch of weather with no ice accumulation. The captain told investigators that, based on the weather forecasts issued on February 10 calling for heavy freezing spray conditions, he decided to anchor at St. Paul Island after unloading his cargo and delay his departure for the fishing grounds until the morning of February 11 because, as he explained, ice buildup tends to increase during the evening and decrease in daylight hours. When asked about measures to reduce the effects of icing caused from sea spray, the captain said that it was important to constantly pay attention to the elements: air and water temperatures and the wind speed. His crew would take extra precautions by plastic-wrapping apparatus to shed water to keep them from freezing. He also said that he would slow the vessel, but if he felt that he could not control the ice accumulation, then he would seek shelter.

### Vessel Stability

#### Coast Guard Guidance

The Coast Guard published *A Best Practices Guide to Vessel Stability* for commercial fishermen that provides a general overview of fishing vessel stability and addresses icing caused by winds and waves.<sup>18</sup> “Overall stability is critical to surviving severe storms,” it states. The guide defines stability as the ability of a fishing vessel to return to its upright position after being heeled over by any combination of winds, waves, or forces from fishing operations. As noted, a fishing vessel’s stability constantly changes during its voyage, and an originally stable vessel can become unstable from changes in the winds, the seas, loading or fishing operations. The guide states that the key to a stable vessel is ensuring that the vessel always has sufficient positive stability to counter the present capsizing moments from the wind, waves, and fishing conditions. Conversely, a fishing vessel is considered unstable when it does not have enough positive stability to counter the current external forces and consequently capsizes (negative stability).

Operating in icing conditions significantly reduces a fishing vessel’s stability because the weight of the accumulating ice results in two critical changes:

(1) *The center of gravity rises* rapidly from the weight of ice added high on the vessel, especially on vessels carrying crab pots. The higher and wider the stack, the more surface area is exposed for freezing spray to accumulate as ice both on and inside the pots.

(2) *The freeboard is reduced* by the additional weight of ice. As ice accumulates, the vessel sits lower in the water and thereby the deck edge submerges at smaller heel angles. Accumulating ice has the same effect on a crab fishing vessel as if it was overloaded with pots that had been stacked above the main deck (above the vessel’s original center of gravity).

The loss of stability from ice may be hidden because, similar to overloading a vessel, initial stability levels at small angles of heel are only slightly reduced, which the crew may not notice as the vessel heels at smaller angles and returns. However, initial stability does not indicate the vessel’s overall stability, which icing can significantly reduce, as the Coast Guard’s guide

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<sup>18</sup> See a copy of the guide at [www.fishsafe.info/USCGbestpracticeguidetovesselstability2004.pdf](http://www.fishsafe.info/USCGbestpracticeguidetovesselstability2004.pdf).

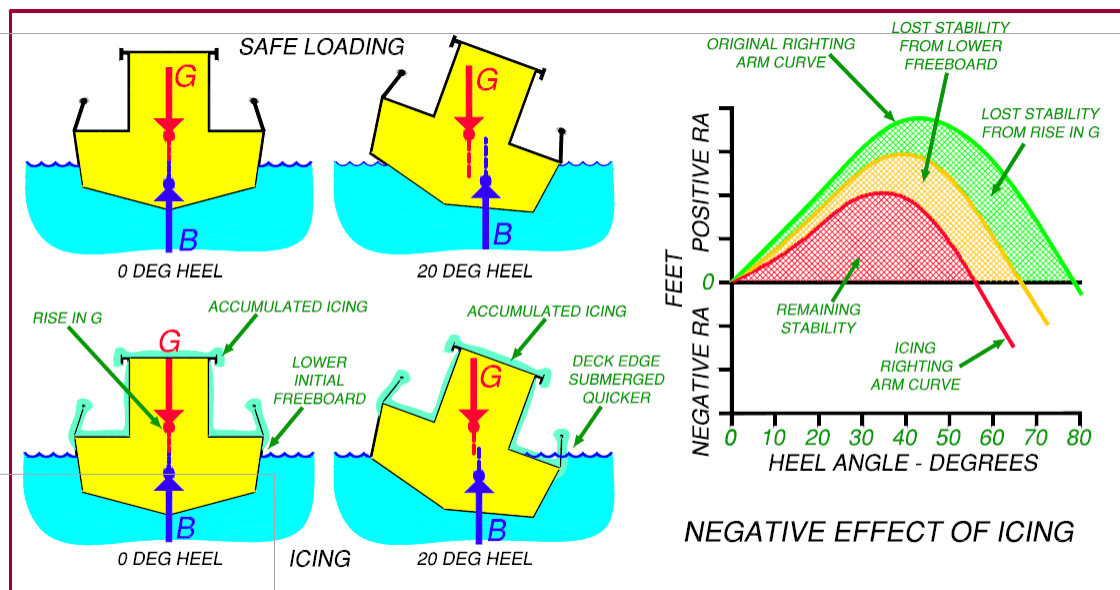


## Capsizing and Sinking of Fishing Vessel *Destination*

demonstrates in the diagram of a righting arm curve.<sup>19</sup> For example, a vessel that could return from a heel of 80 degrees without the added weight of ice can capsize at slightly lesser heel angles such as 60 degrees.

### Post-Sinking Stability Analysis

The Coast Guard's Marine Safety Center (MSC) conducted a stability analysis of the *Destination* using a computer-generated hull model from vessel plans dated November 16, 1992 (the plans for the lengthened vessel without a bulbous bow). The righting arm curves for incremental ice loads were included in the analysis. The MSC did not chart the righting arms for ice loads greater than 9 inches because they resulted in negative righting arms (negative stability indicating that the vessel would capsize).



A diagram from the Coast Guard's guide on vessel stability illustrates the negative effect of icing.

The righting arm curves were based on ice accumulating on the vessel as it was loaded when the vessel departed Dutch Harbor. The curves were developed using crab pot weights of 840 pounds, which was based on an actual weight of a *Destination* crab pot recovered after the accident, rather than the weight of 700 pounds referenced in the vessel's stability instructions booklet (the difference was an additional 28,000 pounds for 200 pots). The MSC also included a total of 19,706 pounds of bait (some of which were stored on deck) based on payment receipts, rather than the 6,048 pounds referenced in the stability instructions booklet (the difference was an additional 13,658 pounds). The analysis also included the 3,366 pounds of steel plate added to the bulwark, the bulbous bow, and other items not found in the stability instructions booklet that reflected the actual loading condition determined by investigators. As stated, vessels have negative stability when their righting arm is less than zero. For example, with 4 inches of ice, the

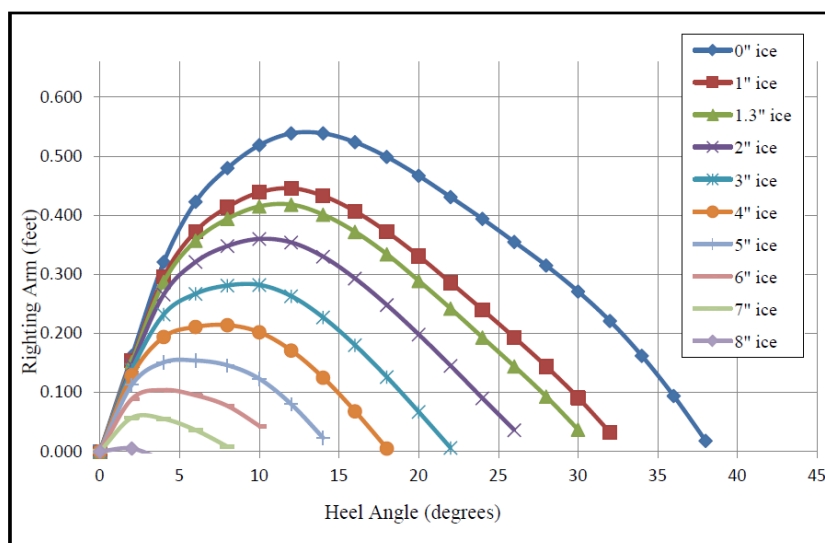
<sup>19</sup> *Righting arm curves* are plots of righting arms as a function of heel. This comparatively simple curve has been used as the primary means for assessing a vessel's seaworthiness. A vessel with a positive value of righting arm at a given heel angle has positive stability. The full range of positive stability—from the initial upright equilibrium position (zero heel) to the heel angle that the righting arm value becomes negative—indicates a vessel's overall stability.

## Capsizing and Sinking of Fishing Vessel *Destination*

*Destination* would have had negative stability at a heel angle of 18 degrees, and with 7 inches of ice negative stability at a heel angle of only 8 degrees.

The MSC did not assess the forces produced by wind or wave action on the vessel that would have caused the vessel to heel, commenting, “. . . it can be assumed that the vessel was significantly impacted by the severe weather conditions at the time of the casualty.” The MSC also said that the limited freeing port area would trap water on deck and thereby allow water to enter the no. 3 fish hold through its manhole cover on the main deck, which former crewmembers said was open during transits. Any additional water in the vessel or trapped on deck would lower the freeboard and increase the free surface effect, both factors reducing the vessel’s stability.

The MSC concluded that the vessel likely capsized in the large seas and winds as it came out of the lee of St. George Island due to prolonged icing conditions adding weight high on the vessel, leaving it with a lower freeboard and a decreased righting arm (lower stability). The AIS position data that indicated a rapid heading change as the vessel left the island’s lee support this capsizing scenario.



**Righting arm curves for incremental ice loads calculated by the Coast Guard’s Marine Safety Center for its stability analysis of the *Destination*.**

## Crew Experience

For 23 years the captain managed the *Destination* on behalf of the vessel owner and was entrusted to oversee much of the daily operations and planning. Testimony presented to the marine board characterized the captain as respected and, as the owner said, very capable and knowledgeable. The crew referred to him as “dad,” and other captains called him their “go-to guy.” The captain once held a Coast Guard-issued license as master of vessels up to 1,600 gross registered tons, which expired on June 1, 2015, but was not renewed.

All six crewmembers had previous experience fishing in the Bering Sea and serving on the *Destination*. The engineer had worked 21 years on board, and the years of service for the four deckhands ranged from 3 to 22.

## Capsizing and Sinking of Fishing Vessel *Destination*

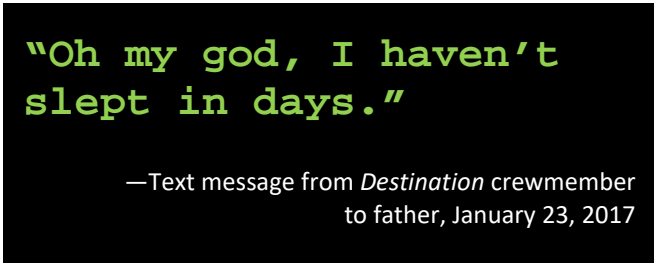
### Vessel Operations

The Coast Guard requires vessels of the *Destination*'s length to have a stability instructions booklet developed specifically for the vessel and expects captains to maintain their vessel in a satisfactory stability condition. In the case of the *Destination*, the captain could refer to the trim and stability booklet to determine how to load fuel and holds based on the number of pots he intended to carry. Former crewmembers said that the captain had carried 200 pots with holds no. 1 and 2 filled while no. 3 was empty, which complied with a loading condition in the vessel's stability instructions booklet. Regarding the danger of capsizing from freezing spray, the booklet cautioned against allowing ice to accumulate more than 1.32 inches on decks and 0.33 inches on sides. Investigators believed that, in general, the captain was aware that "heavy icing would capsize a boat, make it top heavy" because the owner and captain had discussed this shared concern, as the owner recalled. He also said that many times the captain would "hold up for weather" but could not remember if any of those delays was initiated by a concern for freezing spray. In describing the captain's experience with avoiding ice buildup, a former crewmember said that during the many times the *Destination* encountered icing from freezing spray the instructions from the captain to him included "going out and beating ice . . . [to] stay on top of it so that it doesn't get out of hand."

Although the *Destination* carried nylon-head sledgehammers for ice removal, there was no guidance on addressing icing or freezing spray in the forecast or on breaking accumulating ice in the vessel's *Wheel Watch Duty* instructions posted in the wheelhouse that investigators obtained. The instructions included a "Wake the Captain If" section for addressing situations involving boats within 3 miles, a list, pot shifts, water on deck, engine problems, or navigation-related questions. According to the owner, "heavy weather and ice policies and procedures are very much a dynamic process dealt with by the captain of the vessel as the situation warranted." When the vessel operated in conditions of freezing spray, the person on watch in the wheelhouse had the pivotal role of detecting the icing. A former crewmember said that this watchstander would exercise "judgment" as to whether or not to alert the captain. He said that the watch-duty instructions stated that when the person on watch felt uncomfortable or perceived a danger the watchstander should wake the captain. The former crewmember also said that before deciding to wake the captain regarding icing conditions the person on watch would undertake two steps: from within the wheelhouse initially assess ice forming on the deck or bulwark in front of the wheelhouse and then determine whether to go outside the wheelhouse to look for icing in and on the pot stack. Based on both assessments, the watchstander would then determine whether to wake the captain.

Fatigue is a reduced mental or physical state that can impair a crewmember's alertness and ability to safely operate a vessel or perform safety-related duties. The International Maritime Organization describes the condition as "a state of feeling tired, weary, or sleepy that results from prolonged . . . physical work, extended

periods of anxiety, exposure to harsh environments or loss of sleep." For most of the month leading up to the accident, the *Destination*'s crewmembers were engaged in cod fishing, an operation described by former crewmembers as "grueling." Moreover, the duration was 17 days longer than they fished for cod during the previous year, a total of 27 days. In one of the text messages retrieved



"Oh my god, I haven't slept in days."

—Text message from *Destination* crewmember to father, January 23, 2017



## Capsizing and Sinking of Fishing Vessel *Destination*

by investigators, a crewmember informed his father, “Oh my god, I haven’t slept in days.” The crew cycled through the stack 1.5 times a day setting and hauling 300 pots, with 4- or 6-hour rotations to sleep, according to a former crewmember who spoke with the crew before they departed Dutch Harbor.

After completing their last delivery of cod and arriving in Sand Point the afternoon of February 4, the *Destination*’s crewmembers over the next 4 days prepared the vessel and configured the pots for crab. However, before beginning the crab harvest, the captain still needed to pick up bait at both King Cove and Dutch Harbor and then unload the bait at Trident Seafoods at St. Paul Island following the departure from Sand Point on February 8 at 1000. During these transits between ports, crewmembers were said to have taken care of “odds and ends” for finalizing the preparation of the vessel for crab fishing and to “catch up on sleep time,” but their sleep would be interrupted when it was their turn to stand a 1- or 2-hour watch in the wheelhouse. From the time the *Destination* departed Dutch Harbor to the time of the sinking, the crew had about 30 hours of underway time, during which they could sleep when not on watch duty. Investigators nevertheless could not determine exactly how much sleep the captain or crew obtained, considering the severe weather and sea conditions during the transit.

## Analysis

Due to prolonged icing conditions, the *Destination* likely capsized in the relatively larger seas and stronger winds as it left the lee of St. George Island. The vessel sailed with 200 pots, which provided both interior and exterior surface area for ice to accumulate in the freezing spray. An analysis by the Coast Guard Marine Safety Center revealed that added weight high on the vessel from icing left it with a lower freeboard and decreased righting arm (lower stability) and ultimately vulnerable in the severe conditions.

A varied amount of other evidence suggests that the vessel capsized. The forecasts from the National Weather Service predicted heavy freezing spray at the time of the sinking, which other vessels in the vicinity of the *Destination* experienced. However, automatic identification system data did not show a significant course change or reduction in speed after 2250 on the night before the accident, indicating that the *Destination* crew did not take measures to mitigate the ice accumulation during the last 7 hours of the transit. The rough sea and strong wind conditions at the time of the sinking would have caused the vessel to heel. As AIS data show for the last few minutes before the sinking, the vessel experienced a rapid heading change and speed reduction. In addition, no one escaped from the vessel or made a mayday call, indicating that the capsizing occurred quickly and without warning. The investigation considered steering gear failure as a cause of the capsize, but there was no indication that the recently overhauled steering system contributed to the cause of the accident.

The investigation also considered pressure, both self-imposed and from the commercial fishing industry, that the captain and crew of the *Destination* may have faced. Former crewmembers speculated during testimony that the captain may have chosen to fish for cod longer than usual primarily as an economic incentive: to establish a “catch history” that would increase the vessel’s future share allocated to them, should cod become a fishery regulated by a quota system similar to opilio crab, and extend the season to maximize the crew’s earnings.<sup>20</sup> With no cod quotas for individual vessels, the crew could catch as much as possible before the season

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<sup>20</sup> When establishing a limited entry fishery as an individual fishing quota, regulators use “catch history” to allocate shares of the quota to the individuals or legal entities allowed to participate.

## Capsizing and Sinking of Fishing Vessel *Destination*

ended. The pay that the captain and crewmembers earned for the cod and crab fisheries was based on a percentage of the net proceeds from the sale of the catch; thus, the more they harvested, the greater their income.

The extended time for catching cod reduced the time the *Destination* had for catching the vessel's assigned crab quota and for delivering it to Trident Seafoods before the facility closed for the season. The pressure felt by the captain to meet the delivery date would have mounted toward the end of the cod season, as each additional day spent cod fishing became one less available day for harvesting crab. Further delaying his start for crab fishing, the captain had to bring his own bait to St. Paul Island, as he learned on February 2, a late request that would have required him to detour to King Cove and Dutch Harbor to pick up the bait and then stop at St. Paul Island to unload it before he could even begin fishing. Members of the fishing industry also stated that opilio crab was hard to find that season, which meant crews had to spend more time to harvest their quota. Furthermore, sea ice in late February can shut down St. Paul Island harbor, either slowing deliveries or halting them altogether. All of these factors would have weighed on the captain's decision-making during the transit to St. Paul Island.

During his last-known communication to the captain of the *Aleutian Lady* on the evening before the sinking, the *Destination's* captain expressed concern about failing to meet Trident Seafoods's delivery deadline to St. Paul Island (although testimony indicated that the facility would have remained open until the last vessel unloaded). The two captains discussed exchanging portions of each other's catch for the *Destination* to save time and meet the closing date, an arrangement that the vessel's owner described as routine. However, the *Destination's* captain did not pursue that alternative plan, which could have alleviated the stress of having to meet the facility's deadline. According to the owner, the captain never missed a delivery date in his 23-year history of operating the vessel. The *Destination's* captain, therefore, may have determined that time was running out to deliver his crab to St. Paul Island and may have ultimately placed pressure on himself to maintain his perfect record.

AIS data show two significant heading changes from the original course to St. Paul Island during the last 17 hours of the voyage. The first one was 10 minutes, and the second was a 60-minute slowdown from 2150 to 2250, about 8 hours before the sinking. Investigators do not know why the vessel slowed for this hour; the slowdown could have been indicative of a mechanical problem, the crew securing pots, or perhaps the vessel turning into the wind to allow the crew to mechanically break ice.

If the captain was not awake at night, the lone watchstander would have to judge the danger of icing and alert the captain. If the captain was alerted of the icing before leaving the lee of St. George Island, he could have used the protection of the lee to mitigate the icing. Yet, AIS data show that the vessel kept a steady course after 2250 and its speed increased to 9 knots while in the lee. The data did not reveal the vessel slowing down, during which time the crew could have broken ice or heaved-to behind the island.

Testimony from other captains of fishing vessels in the Bering Sea indicated that they were familiar with the weather forecasts for the Bering Sea at the time of the accident as well as the hazards of freezing spray and its threat to the stability of their vessel. Based on these testimonies, investigators believe that the experienced captain of the *Destination* knew of the freezing spray and heavy freezing spray forecasts along his route.

## **Capsizing and Sinking of Fishing Vessel *Destination***

### **Probable Cause**

The National Transportation Safety Board determines that the probable cause of the capsizing and sinking of the fishing vessel *Destination* was the captain's decision to proceed during heavy freezing spray conditions without ensuring the vessel had a margin of stability to withstand an accumulation of ice or without taking sufficient mitigating action to avoid or limit the effects of icing.

## **BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

**ROBERT L. SUMWALT, III**  
Chairman

**EARL F. WEENER**  
Member

**T. BELLA DINH-ZARR**  
Member

**Adopted: June 20, 2018**



## Capsizing and Sinking of Fishing Vessel *Destination*

### Vessel Particulars

<b>Vessel</b>	<b><i>Destination</i></b>
<b>Owner/operator</b>	F/V Destination Inc.
<b>Port of registry</b>	Sand Point, Alaska
<b>Flag</b>	United States
<b>Type</b>	Fishing vessel
<b>Year built/shipyard</b>	1981/Rybco Shipyard, Brazoria, Texas
<b>Official/IMO number</b>	632374
<b>Classification society</b>	NA
<b>Construction</b>	Steel
<b>Length</b>	98.6 ft (30 m); 110 ft (33.5 m) overall
<b>Depth</b>	13.0 ft (4 m)
<b>Beam/width</b>	32.2 ft (9.8 m)
<b>Gross tonnage (GRT)</b>	196
<b>Engine power/manufacturer</b>	940 hp (701kW)/Cummins
<b>Persons on board</b>	6

**NTSB investigators worked closely with our Coast Guard counterparts from Marine Board of Investigation and National Center of Expertise (New Orleans).**

For more details about this accident, visit [www.nts.gov](http://www.nts.gov) and search for NTSB accident ID DCA17FM006.

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 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).