



National Transportation Safety Board

Marine Accident Brief

Grounding and Sinking of Recreational Vessel *Silver Lining*

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|-----------------------------|--|-----------------------|
| Accident type | Grounding | No. DCA19FM044 |
| Vessel name | <i>Silver Lining</i> | |
| Location | Hood Canal, southwest of Hood Canal Bridge; Puget Sound, Washington 47°51.82' N, 122°38.24' W | |
| Date | July 23, 2019 | |
| Time | 1500 Pacific daylight time (coordinated universal time – 7 hours) | |
| Injuries | None reported | |
| Property damage | \$500,000 | |
| Environmental damage | None | |
| Weather | Clear, visibility 10 miles, winds west-southwest at 5 mph, air temperature 71°F, water temperature 56°F ¹ | |
| Waterway information | Hood Canal is a 70-mile-long-by-1.5-mile-wide fjord within Puget Sound with a mean depth of 177 feet. | |

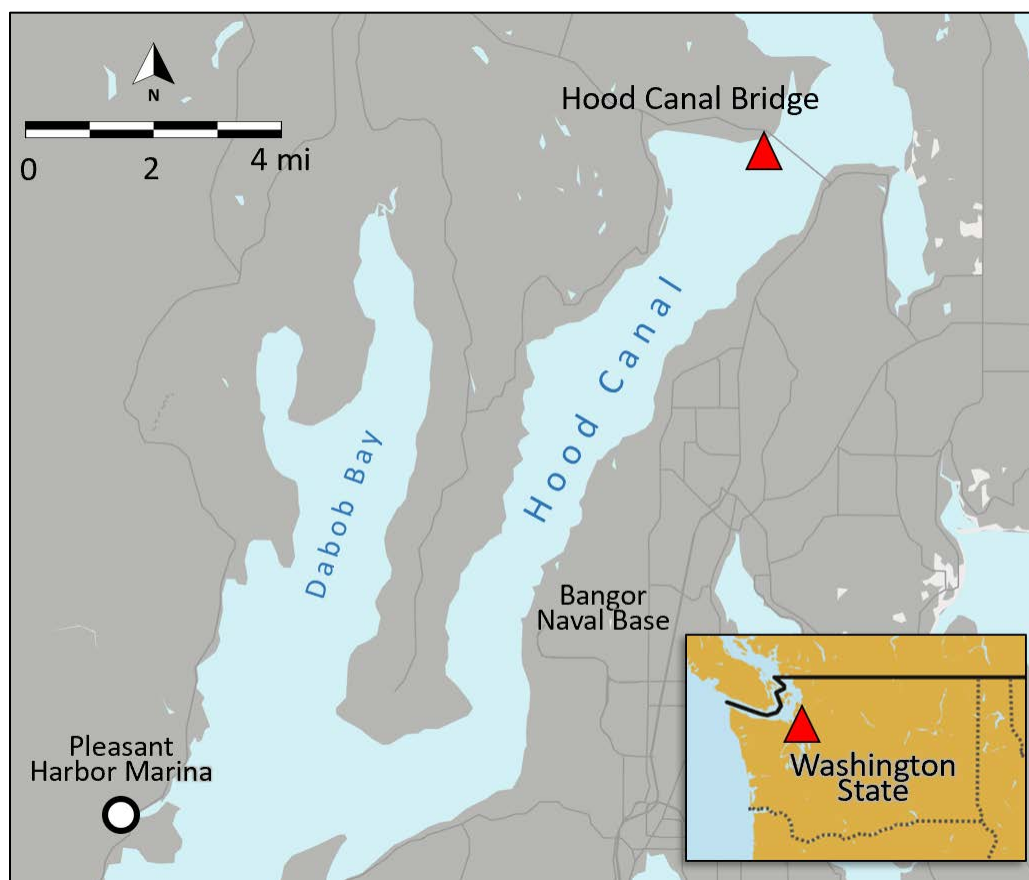
On July 23, 2019, at about 1500 local time, the recreational yacht *Silver Lining* hit a submerged rock southwest of the Hood Canal Bridge in Hood Canal, Washington. The vessel sustained damage to the hull, propellers, and rudders, and took on water. The eight people on board safely departed the vessel. The flooding could not be controlled, and a salvage company moved the vessel to shallow water, where it later sank. There were no reports of injuries or release of fuel oil into the marine environment. The property damage was determined to be \$500,000.



Silver Lining prior to the accident. (Source: David Silver)

¹ All miles in this report are statute miles.

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Area of accident where the *Silver Lining* sank, as indicated by the red triangle. (Background source: Google Maps)

Background

The *Silver Lining* was a privately owned recreational vessel. The owner and his wife lived on the vessel year-round. The custom yacht was built in 1997, with a hull by Admiral Marine Works that was fitted out in Marysville, Washington. Since that time, it had five different owners. The 71-foot-long vessel was configured as a typical “cabin cruiser” and constructed of fiberglass reinforced plastic construction (FRP). The yacht had a partial keel with a 5.5-foot design draft and was powered by two Detroit diesel engines connected to two propeller shafts by reduction gears. The vessel had a max speed of 15 knots. The vessel could be operated from the enclosed bridge or the flying bridge on the deck above it, which could be open or protected by a canvas top and clear vinyl side curtains.

Accident Events

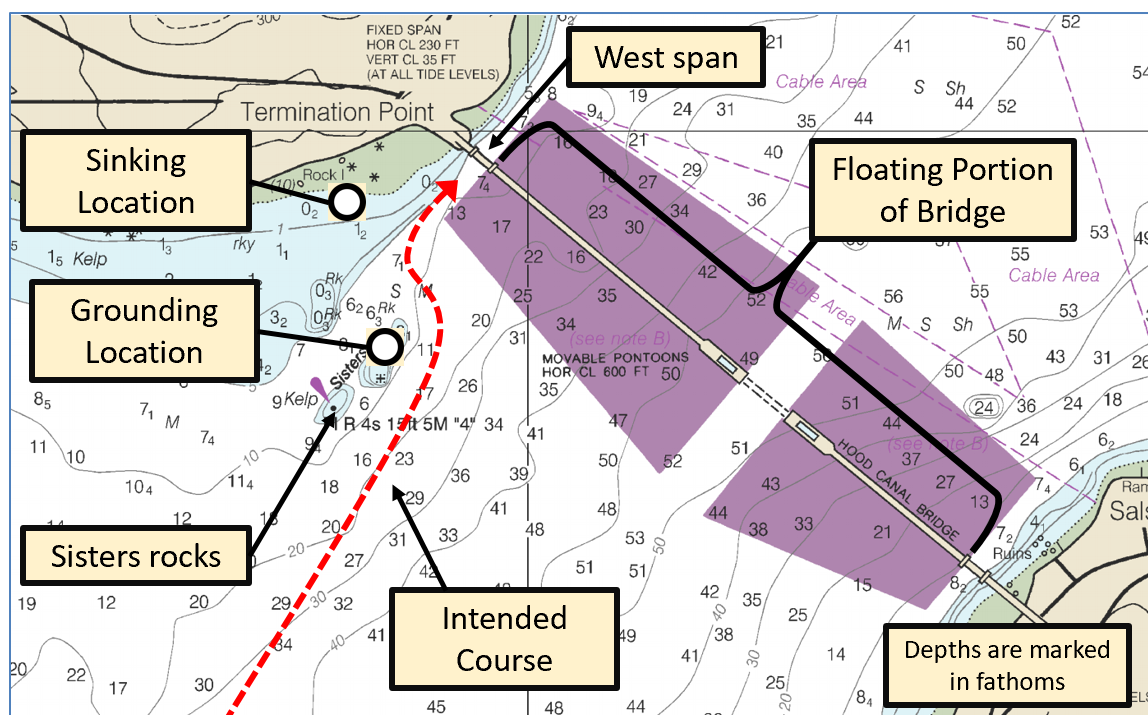
The *Silver Lining* departed Pleasant Harbor Marina on July 23 at about 1330 local time. The owner was at the helm, taking his family on a water tour of the Seattle area. His wife was on board, along with their daughter, son-in-law, and four grandchildren. The vessel proceeded up the west side of Hood Canal, avoiding the restricted Navy Operating Area for the Bangor Submarine Base, and putting the vessel closer to the western span of the Hood Canal Bridge.

About 1500, the owner was operating the yacht from the flying bridge and preparing to change the vessel’s course to port to proceed through the 230-foot-wide channel opening under the

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western span of the Hood Canal Bridge. He waited until the yacht's 12-foot-long dinghy, towed astern of the *Silver Lining* on a 100-foot line, passed the number 4 navigational marker on the southern part of the Sisters rock formations before he turned the vessel to port by 10 to 20 degrees and started to slow the vessel from 15 to 12 knots.

Shortly after the vessel started to slow and turn to port, the starboard engine stopped and its shutdown alarm sounded. While the owner focused on the engine shutdown alarm for several seconds, the vessel started to vibrate, and three loud banging noises came from the hull. The vessel came to a stop, and the port engine then shut down also. The automatic bilge alarm indicated that the vessel was taking on water, which the owner confirmed in the engine room. The vessel had grounded on the Sisters, a charted group of two rock formations, and then started to drift. He directed his family to put on life jackets and depart the vessel; the son-in-law took them to shore on the dinghy. The owner then contacted the Coast Guard via the vessel's radio at 1546; a Coast Guard boat, the local marine police, and a salvage company responded.



Map of the Hood Canal Bridge, including an estimated trackline of the *Silver Lining*'s intended course. (Source: National Oceanographic and Atmospheric Administration [NOAA] Chart No. 18476, annotated by NTSB)

The owner restarted both engines in an attempt to move the vessel closer to shore, but the engines shut down when he put them in gear to the propellers. He then restarted the port engine (keeping it in neutral), which could operate as an emergency bilge pump to dewater the vessel's engine room by changing the saltwater suction for the engine cooling from outside the hull to inside the engine room. Initially, the owner felt that the port engine was keeping up with the water ingress, and he left the vessel to join his family on shore.

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***Silver Lining* following the accident. (Source: US Coast Guard)**

When the Jefferson County Sheriff Marine Unit arrived about 1615 time, the owner returned to the sinking vessel. They discovered that the port engine had stopped operating and the *Silver Lining* was lower in water. The Coast Guard station boat arrived on scene at 1637 and tried to dewater the vessel with a gasoline-powered portable pump. The owner and sheriff went to retrieve a pump from the Hood Canal Bridge, but before they could get it, the Coast Guard boat crew informed them that dewatering efforts would not keep the vessel afloat. The vessel

owner and sheriff returned to the *Silver Lining* and saw that it was even lower in the water, and there was no way to enter it.

About 1700, about 2 hours after the vessel started taking on water, it sank with just the bow still visible above the surface and still adrift. A salvage company arrived approximately 1800 and moved the vessel to a shallower area of water closer to shore by Rock Island so that it could be salvaged and refloated.

Additional Information

At the time of the accident, the weather was clear, the dayboard marking the Sisters was fully visible to the vessel's owner, and he was able to use it as a reference point as he navigated the canal. The tide was rising. The area's high tide for July 23 occurred at 1633, making the water depth in the shallow part of the Sisters rocks approximately 5 to 5.5 feet when the incident occurred at 1500.

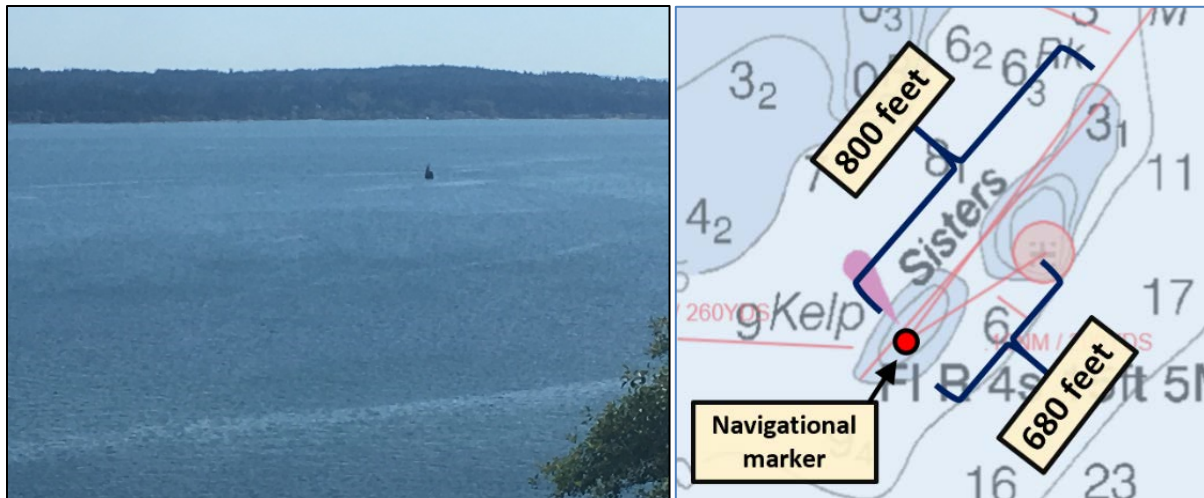
The Hood Canal Bridge, opened in 1961, connects the Olympic and Kitsap Peninsulas across Hood Canal of Puget Sound. The bridge was 7,869 feet long in total, and the floating portion of the bridge was 6,521 feet. There were three points along the bridge where vessels could transit: One was at the center of the bridge and required a section of the floating portion to submerge for vessels to pass. The other two points were open bridge spans where smaller vessels, such as the *Silver Lining*, could pass. They were



Hood Canal Bridge from Termination Point looking northeast. The east span is shown on the left.

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located on the east (Salsbury Point) and west (Termination Point) sides of the fixed part of the bridge.



Aids to navigation marker for the Sisters rocks from Termination Point (left). Close-up chart of the Sisters formation (right). (Source: NOAA Chart No. 18476, annotated by NTSB)

The Sisters, identified on NOAA chart 18476, are located 0.57 miles southwest of the Hood Canal Bridge. Two separate pinnacle rock formations make up the Sisters: the northern Sister and the southern Sister. The southern Sister rock is marked with a fixed day board and a flashing red navigation light maintained by the Coast Guard. Both rock formations were marked on nautical charts. The water around the Sisters was between 11 and 18 fathoms (66 and 108 feet).²

The total length of both Sisters rocks is approximately 0.2 miles: The distance between the navigational aid of the southern Sister and the center of the shallow part of the northern sister is approximately 680 feet, and the distance from the navigational aid of the southern Sister to the northern edge of the rock is approximately 800 feet. The water in the shallow area immediately around the Sisters has a depth between 0.5 and 6 feet depending upon the tidal and weather conditions.

Vessel Damage. Three days after the accident, the *Silver Lining* was refloated and drydocked at a local marina. Investigators attended the vessel in drydock on July 29, 2019, and examined the hull and interior spaces. The bow and the forward part of the hull showed no indication of hull damage from a collision or grounding; however, the vessel had significant damage to the aft section of the keel and hull. The rudders and propellers were also extensively damaged. The



Photo of the bow of the *Silver Lining* following the accident.

² Per the *US Coast Pilot*, the Sisters, "...two rocks 200 yards apart, .5 mile south of Termination Point, are awash at about half tide. A light is on the south rock." NOAA. https://nauticalcharts.noaa.gov/publications/coast-pilot/files/cp7/CPB7_C13_WEB.pdf

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insurance company estimated that the vessel was a total loss valued at \$500,000.

The keel, with a draft of 5.5 feet, was approximately 12 inches deeper in the water than the rest of the vessel, excluding the propeller and rudder. The damage to the keel started just aft of the vessel's midships and continued aft to its termination forward of the propellers. The keel damage was determined to have compromised the watertight integrity of the hull and would have allowed water to enter the vessel.



Damage sustained to the port propeller and rudder (left) and starboard propeller and rudder (right) of the *Silver Lining* following the accident.

The *Silver Lining* had a global positioning system (GPS) on board the vessel located in the enclosed bridge. There was no GPS repeater on the flying bridge where the owner was operating the vessel at the time of the accident. The vessel did not have an automatic identification system (AIS), and the GPS unit did not have any function to record the voyage of the vessel.

During the interview with investigators, the owner stated that he had not sailed on the Hood Canal for approximately 7 years. He said that he was using paper charts to assist him with determining his vessel's position and that he "[doesn't] tend to actually use electronic very much." The charts were lost during the sinking, and the owner did not know if the charts were current or updated. The owner told investigators that he also used visual points on land to assist him with determining the vessel location (dead reckoning). Before turning to port when the vessel was parallel to the Sisters, the owner used the dinghy towed behind the vessel as a reference point to determine if the vessel had passed the shoal.



Damage to the keel of the *Silver Lining* postaccident.

Analysis

The owner of the *Silver Lining*, who was at the helm of the vessel on the flying bridge, stated in the interview that he used dead reckoning when the vessel was approaching the Hood Canal Bridge. There was no GPS unit on the flying bridge, and he had a paper navigation chart for reference. He used the dinghy that was being towed astern as a reference point to verify that the *Silver Lining* had passed the Sisters rocks. After he saw that the dinghy had passed the number 4 navigation aid marker, he thought it was safe to turn to port to line the vessel up to pass under the west side of the Hood Canal Bridge. However, the 100-foot tow line, in addition to the location of the flying bridge where he was driving the vessel, put the owner approximately 140 feet away from the 12-foot dinghy. Therefore, based on the charts of the Sisters, when the owner turned the vessel after the dinghy passed the navigation marker, the *Silver Lining* had not yet completely passed the southern Sister, and the northern section of the Sisters was still ahead of the vessel to the port side. Per the *US Coast Pilot*, he would have needed to advance 600 feet (an additional 460 feet) to pass both rock pinnacles.

The vessel had a listed draft of 5.5 feet, which was the maximum estimated depth of the area it grounded in at the time, accounting for the tide. Investigators found that the damage to the propellers and rudder was consistent with the vessel grounding. They also found that the propeller contact caused the shafts and the external strut bearings to be pushed into the hull, causing hull damage that would have allowed water to enter the vessel, in addition to the flooding from hull damage.

Based on the owner's interview and the propeller damage, it is most likely that the *Silver Lining* turned between the southern and northern Sisters, and that its starboard propeller first came into contact with the northern Sister rocks, which shut down the starboard engine. As the vessel proceeded, the keel from midships to the stern came in contact with the rocks at least three times, causing the vessel to rapidly slow down and the damaged hull to start taking on water. At the same moment, the port propeller also contacted the rocks, causing additional damage and shutting down the port engine.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the grounding and sinking of the recreational yacht *Silver Lining* was the vessel's operator not properly determining the *Silver Lining*'s position approaching the west span of the Hood Canal Bridge from the south, resulting in damage and uncontrolled flooding after striking the charted Sisters underwater shoal.

Vessel Particulars

| Vessel | <i>Silver Lining</i> |
|----------------------------|---|
| Owner/operator | Private citizen |
| Port of registry | Seattle, Washington |
| Flag | United States |
| Type | Recreational yacht |
| Year built | 1997 |
| Official number | 1050225 |
| Classification Society | N/A |
| Construction | Fiberglass |
| Length | 71 ft (21.64 m) |
| Draft | 5.5 ft (1.68 m) |
| Beam/width | 17.5 ft (5.33 m) |
| Tonnage | 68 GRT |
| Engine power; manufacturer | 2, Detroit diesel engines 270 hp (200 kW) |
| Persons on board | 8 |

NTSB investigators worked closely with our counterparts from Coast Guard Sector Puget Sound, Washington, throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA19FM044.

Issued: May 5, 2020

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

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

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