

**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594**

Marine Accident Brief No. DCA03MM028

Adopted: April 22, 2004

Vessel: U.S. Passenger Vessel *Safari Spirit* O.N. 631818, 105 feet long (LOA), 24.5 feet wide, 6.5-foot draft, 190 gross tons (domestic), 231 gross tons (International Tonnage Convention [ITC]), uninspected, built in 1981

Accident Type: Grounding and sinking

Location: Kisameet Bay off Fisher Channel, about 20 miles southeast of the towns of Bella Bella and Shearwater, Denny Island, British Columbia, Canada (latitude 51°57.9' N, longitude 127°53.2' W)

Date: May 8, 2003

Time: 0725 local (Pacific daylight saving time)

Owner: American Safari Cruises, Lynnwood, Washington

Property Damage: \$2,920,000

Injuries: None

Complement: Crew 6
Passengers 10

The Accident

Events Preceding the Grounding

On May 2, 2003, the uninspected U.S. passenger vessel¹ *Safari Spirit*, owned and operated by American Safari Cruises, left Seattle, Washington, en route to Juneau, Alaska (figure 1), with 6 crewmembers and 10 passengers on board. The 15-day luxury yacht cruise focused on enabling passengers to observe marine and land wildlife and featured such activities as kayaking, hiking, snorkeling, sailing, and exploration by motorized skiffs. The voyage itinerary was unstructured in that, with the exception of the cruise terminus, the company did not require the *Safari Spirit* to be at a specific location by a specified time. American Safari Cruises allowed the vessel master the latitude to alter the route to maximize wildlife and scenic viewing opportunities and to select the stopping points. Because the *Safari Spirit* was required to have only one licensed vessel operator

¹ According to Title 46 *Code of Federal Regulations* (CFR) Part 70.05-1(a), a passenger vessel of 100 or more gross tons that does not carry more than 12 passengers for hire is not required to be inspected by the U.S. Coast Guard. Federal requirements at 46 CFR 15.605 stipulate the manning requirements for uninspected passenger vessels. Only the operator of the vessel, the master, must be licensed.

(the master), the vessel operated only during the day and docked or anchored in a sheltered location at night.²

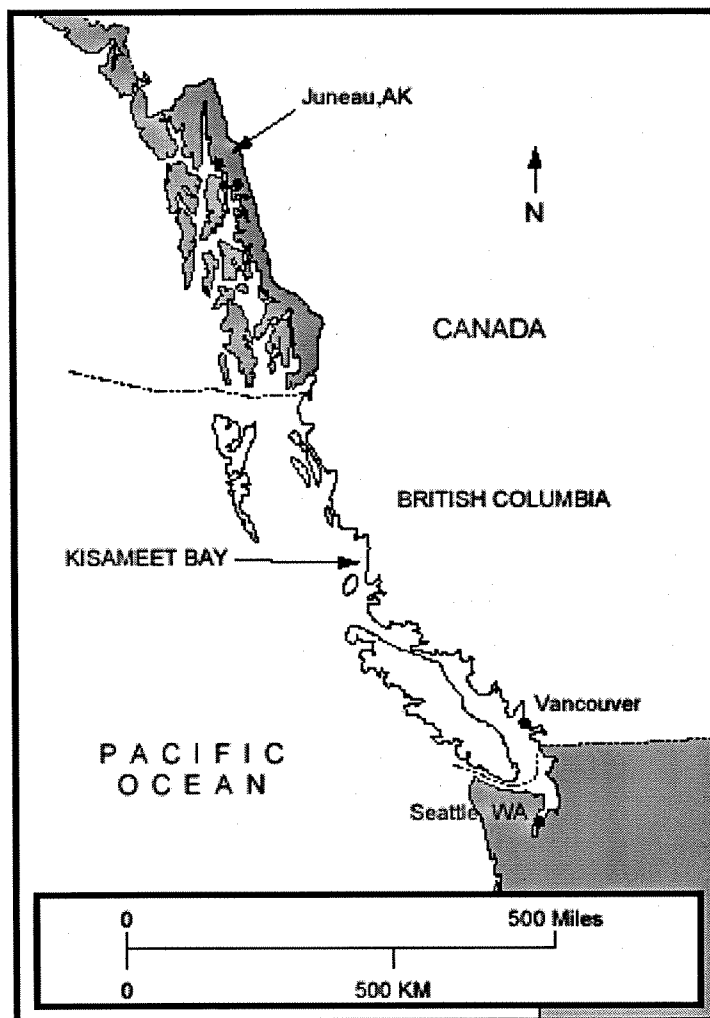


Figure 1. The voyage began in Seattle and was scheduled to end in Juneau. Kisameet Bay, where the master decided to anchor on May 7, is about 400 miles north of Seattle.

The *Safari Spirit* master had made the Seattle to Juneau trip several times. He later told Safety Board investigators that only one navigation chart, Canadian Chart No. 3936 (figure 2), was available for Kisameet Bay, British Columbia, Canada, the area where he decided to anchor on May 7. Canadian Chart No. 3936 uses a 1:40,000-scale. The master said that the official chart gave an “overview” of the area. In order to better discern some of the features, he would use a photocopy machine and “blow them up to a scale that was usable” on a sheet measuring 8 ½ by 11 inches. He said that he then made helpful notes on his chartlet, such as “good radar target, kelp, rock at 12 feet” to use as a cruising guide for a particular area.

² Title 46 CFR 8104 stipulates, “A licensed individual may not be required to work more than 9 of 24 hours when in port...or more than 12 of 24 hours at sea, except in an emergency.”

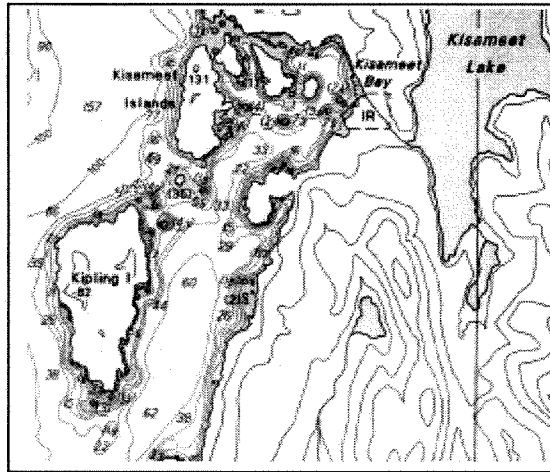


Figure 2. Actual-size portion of Canadian Chart No. 3936 showing Kisameet Bay.

The master told Safety Board investigators that he had anchored in Kisameet Bay on at least four previous cruises. He said that he was familiar with the area tides and the charted large rocks that were submerged during high tide. On the evening of May 7, he navigated the *Safari Spirit* into Kisameet Bay without incident and maneuvered to the center of the northeast section of the bay where, about 1700, he anchored. He noted that the depth at his anchored position was about 45 feet.

The Grounding

The following morning, May 8, the weather conditions were clear and sunny, with a visibility of 15 miles. The winds were calm, and the temperature was 50° F (10° C). In preparation for departure, the master turned on the navigational-aid computer and checked the tide charts.³ He said that he then conducted operational tests of the steering and the propulsion systems, running the engines slowly in both the forward and the astern directions. He said that the systems operated satisfactorily during the tests and that the anchor was raised and secured shortly after 0705. The master told investigators that he had intended to navigate south through the bay and then head in a westerly direction, passing between the largest Kisameet island and Kipling Island, to Fisher Channel. (See figure 3.) The master said that he was well aware of the submerged rock southwest of the islet that he would pass on his starboard.

The master stated that on his outbound transit of the bay, he used the variable range marker (VRM⁴) capability of the radar to gauge his turn to avoid the submerged rock. (Item D on figure 3.) Using his copy-machine enlargement of Canadian Chart No. 3936, he selected a single reference point, the islet southwest of his anchored position, and estimated the distance between its southern point (B) and the south side of the

³ The time of high water (tide) was 0541 and the height was 12 feet. Low tide was at 1252 and was 3.7 feet high. At 0725, the tide in Kisameet Bay was 10 feet and decreasing.

⁴ VRM is an adjustable range ring that rotates or sweeps around the center of the radarscope.

submerged rock (D). He then set the VRM distance equal to that estimated distance plus 120 feet, for a total distance of 0.15 nautical miles. He said that he did not select a second reference point and do comparable distance estimates, which he could have used on the VRM radar to check his range accuracy. Rather, he proceeded on a heading toward point E until his VRM ring tangent indicated the small islet was astern and about north-northeast of the *Safari Spirit*. He then turned to starboard and put the vessel on what he estimated was a west-southwest course to pass south of the submerged rock D.

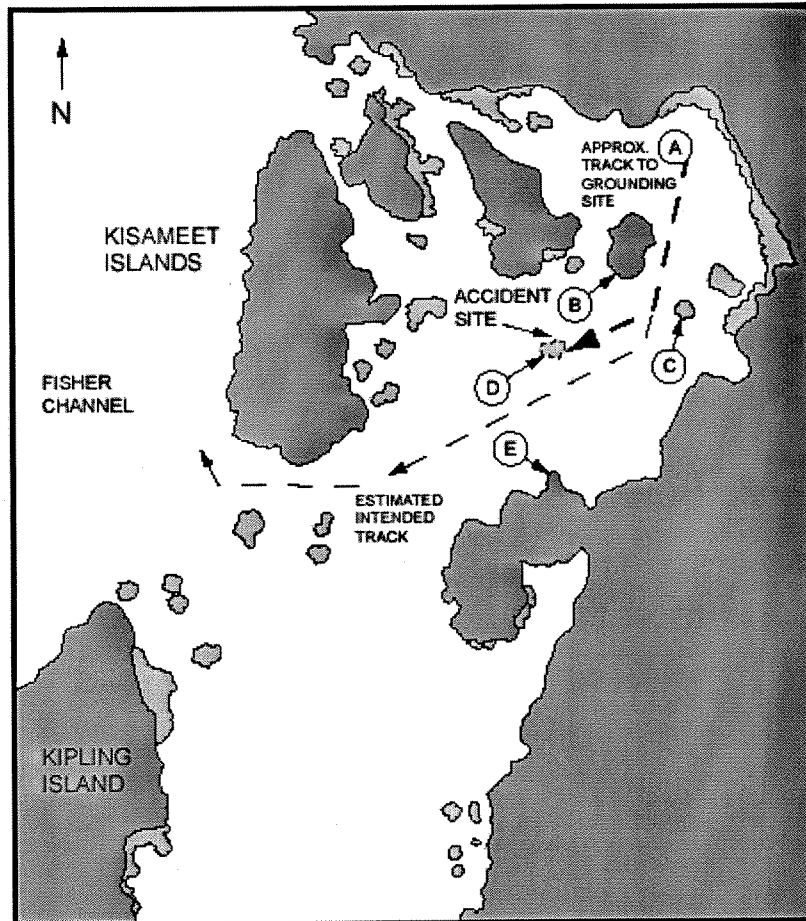


Figure 3. The above illustration represents an enlargement of the Kisameet Bay area that is about three times the size of Canadian Chart No. 3936. The *Safari Spirit* was anchored at A. The master gauged his turn using one reference point, the islet designated B. A small exposed rock that is east of the islet is designated C, and the submerged rock on which the vessel grounded is designated D. The point of land that the master used to judge the vessel's initial heading is designated E.

Shortly after making the course change, the master said that he noted the vessel's depthsounder indicated that the water depth was 70 feet. About 30 seconds later, about 0725 local time, the *Safari Spirit* struck the submerged rock D. Crewmembers and passengers alike said that the yacht smoothly rode up on the rock, with no rough or violent vessel motion, and then became hard aground.

The master instructed the mate/engineer to go below and check the engineroom and bilge spaces to determine whether a hull breach or damage had occurred, causing the vessel to take on water. At this time, most of the passengers were in their cabins getting ready for breakfast. While the mate/engineer was en route to make her hull damage assessment for the master, she notified the expedition leader to muster all crew and passengers. The expedition leader went to all of the passengers' cabins to inform them to retrieve their lifejackets and to meet in the main salon of the vessel.

Within 5 minutes of the yacht's grounding, the mate/engineer reported back to the wheelhouse that there was no sign of seawater entering the vessel, and that the hull integrity had apparently been maintained. The master then attempted to free the vessel from its strand by running the main engines full astern; however, he was not successful. He said that as the tide ebbed, the vessel became more firmly grounded.

At 0730, the master contacted the Canadian Coast Guard via VHF-FM radiotelephone, using Channel 16. He informed the Coast Guard that the *Safari Spirit* had run aground in Kisameet Bay, that all of the passengers and crew were safe, with no injuries, and that he was unable to free the vessel from its strand using ship's power. Immediately after calling the Coast Guard, the master called the American Safari Cruises office in Lynnwood, Washington, via satellite telephone to inform company officials of the situation.

In response to the call from the *Safari Spirit*, the Canadian Coast Guard radioed its 50-meter patrol vessel *Gordon Reid* at 0732 to proceed to the accident site, which was about 23 nautical miles away from the *Gordon Reid's* location in Norman Morison Bay, British Columbia. About the same time, personnel at the commercial marina Shearwater Marine on Denny Island, British Columbia, were monitoring Channel 16 and heard the radio call from the *Safari Spirit*. They immediately responded by sending two 19-foot aluminum workboats to the scene.

Meanwhile, the master stated that, at this time, the bow of the *Safari Spirit* was sitting firmly on the rock, and the vessel had assumed a slight port list. He said that he felt comfortable that the vessel was stable. However, as a precaution, he instructed the mate/engineer to launch the vessel's skiff⁵ so that the passengers could be disembarked for the duration of the tidal cycle. The master then went to the main salon and told the assembled passengers of the situation, that they would be transported in the vessel's skiff to Bella Bella, British Columbia, and that they could return to their cabins to retrieve any personal items that they might need for the day. He told them that after the *Safari Spirit* floated off the rock later that day and the vessel's hull integrity had been verified, they would be returned to the yacht and continue on their voyage.

The master stated that while the passengers were in their cabins retrieving their belongings, the vessel suddenly, and unexpectedly, listed hard over on its starboard side (figure 4). He then ordered everyone to evacuate the vessel at once. As they returned to

⁵ A 22-foot-long rigid-hull inflatable boat.

the upper deck, the passengers donned their lifejackets, and they and the crewmembers, with the exception of the master, transferred to the skiff.



Figure 4. According to crewmembers, the *Safari Spirit* listed to starboard at an angle of about 35° when it shifted on the submerged rock. Photograph courtesy of Shearwood Marine.

At 0845, after all of the passengers and the crew had safely boarded the skiff, the master radioed the Victoria Joint Rescue Coordination Center via VHF-FM radiotelephone and reported that all passengers and crew had been safely evacuated to the skiff and that there were no injuries to report.

According to Canadian Coast Guard logs, the *Gordon Reid* and the two vessels from Shearwater Marina reached the accident site by 0930. The 10 passengers and the 3 crewmembers were then transported first to the Shearwater Marina and then to Bella Bella. The master and 2 crewmembers remained in the *Safari Spirit*'s skiff to return and assist the Coast Guard at the accident site in attempting to stabilize the vessel on the rock.

The master and one Coast Guard crewmember boarded the *Safari Spirit* and rigged a kedge anchor⁶ and placed it off the port bow in an attempt to hold the vessel in place and prevent it from sliding off the rock. After securing the kedge anchor, the master and assisting Coast Guardsman left the *Safari Spirit*.

⁶ A kedge anchor is an anchor that a small boat can carry, drop overboard, and when secured, use the line to temporarily hold the vessel in position or control the direction of the vessel's swing when the tide changes.

The Sinking

According to the master and the Coast Guard crew, as the tide level dropped, water flooded the after deck and entered the lazarette⁷ through the manhole cover, the wire stuffing tubes, vents, and other such openings. As the lazarette filled, water flooded the engineroom. The weight of the floodwater in the stern of the vessel caused the aft draft of the vessel to increase, further submerging the after deck, which increased the rate of flooding into the vessel. As the yacht trimmed aft, the ground reaction force holding the vessel decreased, and at 1020, the *Safari Spirit* slipped stern first off the rock and sank in about 70 feet of water. The vessel came to rest with its stern resting on the bottom of the bay and its bow sticking out of the water.

Following the accident, Safety Board investigators asked the master what he could have done differently to avoid the grounding. He said that he should have checked his plotting more carefully and that he probably set the VRM inaccurately. As a result, he turned too soon and grounded on the submerged rock instead of passing clear of it.

Damages

Salvage and recovery of the *Safari Spirit* took place during the week following the accident. By 2100 on May 15, the vessel was fully raised to the surface. The next day, the *Safari Spirit* was towed to Shearwater Marine. The towing cost and the ancillary costs for docking fees and services totaled \$190,177.

Examiners found that the vessel had sustained extensive damage from its prolonged submersion in saltwater. According to the damage survey report, the costs associated in delivering the vessel to an approved repair facility and completing all of the necessary repairs to return it to its original condition would exceed \$2,920,000. The report declared the vessel a "constructive total loss."

The Canadian Coast Guard Environmental Response Division assessed American Safari Cruises \$37,673 for costs and expenses related to the accident. The costs for supplying and assisting in rigging an oil boom around the wreck site while the vessel was submerged were \$78,979.

In total, the costs related to the accident were about \$3,200,000.

Crew Information

General. The *Safari Spirit* crew consisted of a master, a mate/engineer, an expedition leader (cruise director), a hotel manager, a chef, and a steward. As an uninspected motor vessel, the *Safari Spirit* was required to have only a U.S. Coast Guard licensed master, whose work history is discussed below. The mate/engineer also held two U.S. Coast Guard licenses: master of steam and motor vessels of not more than 100 gross

⁷ A storeroom space below the main deck. On most vessels it is the last or the next-to-last compartment aft and normally contains the steering gear equipment.

tons on inland waterways and mate of steam or motor vessels of not more than 100 gross tons on near coastal waterways. The other 4 crewmembers did not and were not required to hold a U.S. Coast Guard license or document to work on the vessel.

Master. The *Safari Spirit's* master, 45, had a total of about 25 years of marine seagoing experience, including about 10 years as a vessel master. Before joining American Safari Cruises, the master had worked on a charter boat in Hawaii, on tugboats in and around Alaska, and on whale watch and research vessels in the San Juan Islands. Before this accident, he had worked for American Safari Cruises for 3-1/2 years, most of which as master of the *Safari Spirit*. In the winter of 2002, he had worked in Mexican waters for 2 months on another company vessel, the *Safari Quest*.

The *Safari Spirit's* master held a U.S. Coast Guard license as master of steam or motor vessels of not more than 200 gross tons (domestic tonnage), and of not more than 500 gross tons (ITC tonnage) on near coastal waterways. His license was endorsed to show that he was qualified as a radar observer (unlimited). He was further licensed by the U.S. Coast Guard to serve as master of uninspected towing vessels (not more than 200 gross tons domestic or 500 gross tons ITC) and of auxiliary sail vessels (not more than 100 gross tons domestic) on near coastal waters. His license was also endorsed to show that he qualified in accordance with the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), for a vessel the size of the *Safari Spirit*. The most recent issue of his master's license was on January 13, 2003. He was not due for renewal until January 13, 2008.

Operational Information

American Safari Cruises, founded in 1996, owns and operates a fleet of three cruising yachts, ranging from 105 feet to 120 feet long. The company provides deluxe yacht cruises lasting from a few days to 2 weeks in several areas, including Alaska, Mexico, California, and the Pacific Northwest. The company's main office and base of operations is in Lynnwood, Washington.

As noted earlier, management of the day-to-day operations on board vessels and the decision as to where to stop along the cruise's route are left largely to the vessel master, who alters the cruise itinerary based on the interests of the passengers and the activities that they choose during the day. The masters have several contingency anchorage areas along the cruise route that they customarily use within a given operating area. According to the company owner, American Safari Cruises did not have or require its masters to use a voyage planning and procedures manual containing anchorage selection criteria or safety guidelines to mitigate route risks and hazards.

Routine communication with the vessel is accomplished via e-mail and satellite telephone. Vessel crews are not required to submit a daily report to the office. According to company staff, in the normal course of business, personnel in the main office are usually in contact with each vessel at least once a day. An office staff member is on call at all times to handle voyage contingencies and emergency situations.

According to the American Safari Cruises operations manager, the company president and the operations manager each visit the vessels at least once during the operating season. Typically, one of these individuals will visit at the beginning of the season, while the other will visit later in the year. During these visits, they do a safety walk-through of the vessel and evaluate the performance of the master.

Medical and Pathological Information

No alcohol testing was performed on any *Safari Spirit* crewmembers. The master and the mate/engineer provided samples for postaccident drug testing at 1300 on May 9, 2003. All samples tested negative for the presence of illicit drugs.

Analysis

Based on the statements of those interviewed, all navigation equipment, propulsion systems, and steering systems on the *Safari Spirit* were in proper working order. The vessel's master stated that he was well rested. A review of his activities and sleep/rest cycles during the 72 hours before this accident supports his statement⁸.

The master stated that in the past, he had sailed into this bay four or five times and was well aware of the submerged rock and its location. He has seen it exposed at certain states of the tide. The master had radar, a Global Positioning System receiver, a paper chart, and an electronic chart plotter available to establish the vessel's position.

Before leaving his anchored position in Kisameet Bay, the master set his VRM to 0.15 nmi. This was the distance of a radar tangent from the south end of the island that he believed would allow him to safely pass the submerged rock as he altered his heading to a southwesterly course to proceed out of the bay. The vessel weighed anchor and began transiting out of the bay. One of the main engines was in idle and the other engaged, propelling the vessel at a slow speed of about 3.5 knots.

The master's intention was to come right to a southwesterly heading when the preset VRM tangent crossed the radar presentation of the south end of the island and then continue to open up or increase the distance away from the island. The master used a prominent point of land at the south end of the bay (point E, figure 3) to maintain the vessel's track line to the south. With the cursor on this prominent point, he navigated away from his anchored position and maintained this south-southwesterly course on the prominent radar bearing while he continued between the two visible obstructions (the islet and the visible rock). However, the master was using only point E to maintain the vessel's heading.

⁸ Fatigue reviews conducted by Safety Board accident investigators and Alertness Solutions, Cupertino, California.

The master could have used additional methods of navigation to safely navigate the vessel out of the bay. He could have set his radar's VRM to a range from the prominent point at the south end of the bay. By determining the distance from another radar range, he would have had an additional reference that he could have used to fix⁹ his vessel's position in order to pass safely clear of the submerged rock. The *Safari Spirit* master had predetermined a safe distance for passing the hazard by using his chart and then setting his VRM. He could have done the same for at least one, possibly two, other references. By comparing these references, ideally the two radar ranges previously mentioned, he would have seen that the preset numbers did not match and could have delayed the turn to the southwest or slowed his vessel to reassess the vessel's position.

Because he relied solely on one navigational reference point, the master had no alternative means of checking his vessel's position as the *Safari Spirit* made its way south out of the bay. The master had gauged the safe passing distance off the chart and then set the VRM on his radar before getting underway. Without using another navigational reference, two possible errors in the VRM could have gone unchecked. Either his chart measurement was wrong or the VRM was set to the wrong distance on the radar.

The chart shows much more navigable water south of the submerged rock and continuing on west into Fisher Channel, which was the vessel's intended course to open water. The master stated that he used Canadian Chart No. 3936, which has a 1:40,000-scale, for navigation in and around Kisameet Bay. Canadian Chart No. 3936 is the most up-to-date chart for Kisameet Bay. However, the suitability of the scale for the intended area is less than ideal when compared with the 1:20,000-scale insets available on the same chart for similar geographic inlets and bays. The probability of error in measuring distances of scale is greater on a 1:40,000-scale chart than on a 1:20,000-scale chart.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the grounding of the *Safari Spirit* was the failure of the vessel's master to use appropriate navigational procedures and equipment to determine the vessel's position while transiting Kisameet Bay. Contributing to the cause of the grounding was the failure of American Safari Cruises to have and require its masters to use a voyage planning and procedure manual detailing port/anchorage selection criteria, identifying hazards and risks in vessel operating areas, and setting forth safety guidelines for mitigating risks and hazards.

⁹ A fix consists of two or more intersecting lines or areas of position obtained at the same time.