

Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

MARINE INVESTIGATION REPORT
M13M0102



GROUNDING AND SUBSEQUENT SINKING

SMALL FISHING VESSEL *MARIE J*
TABUSINTAC BAY, NEW BRUNSWICK
18 MAY 2013

Canada

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Summary

On 18 May 2013, at approximately 0530 Atlantic Daylight Time, the small lobster fishing vessel *Marie J* grounded on a sandbar while returning to McEachern's Point harbour in Tabusintac Bay, New Brunswick, in bad weather. The vessel remained awash on the sandbar for approximately 20 minutes before it was pushed over the sandbar into deeper water by breaking waves and subsequently sank. The 3 persons on board drowned.

Le present rapport existe également en français.

Factual information

Particulars of the vessel

Name of vessel	<i>Marie J</i>
Official/Licence number	809350/VRN 151414
Port of registry	Moncton, New Brunswick
Flag	Canada
Type	Fishing, trap
Gross tonnage	12.04
Length ¹	11.52 m
Draught	0.61 m
Built	1987: Alberton, Prince Edward Island
Propulsion	1 diesel engine (149 kW) driving a single fixed-pitch propeller
Cargo	Approximately 200 kg of lobster bait
Crew	3
Registered owner	Private owner (New Brunswick)

Description of the vessel

The *Marie J* was a Northumberland-style fishing vessel used for lobster fishing (Photo 1). The wheelhouse and accommodation were located forward, and the engine compartment was situated beneath a working deck. The wheelhouse could be accessed through a door on the starboard side, and the engine compartment could be accessed through a hatch on the working deck.

Photo 1. Sister vessel to the *Marie J*



The vessel's hull was constructed of fiberglass and was subdivided by 4 transverse bulkheads that enclosed, from forward, a void space, the crew accommodations, the engine room, and a

¹ Units of measurement in this report conform to International Maritime Organization (IMO) standards or, where there is no such standard, are expressed in the International System of Units.

lazarette. The engine room bilge was fitted with an automatically activated submersible bilge pump and a remotely activated engine-driven pump. The wheelhouse was equipped with navigation and electronic equipment, including a very high frequency (VHF) radiotelephone with digital selective calling capability, a radar, a chart plotter, a global positioning system (GPS), and an echo sounder.

The master had leased the *Marie J* on 08 May 2013, after his previous vessel had been destroyed by a fire at McEachern's Point harbour. The *Marie J* differed from his previous vessel, mainly in the increased weight of the hull and decreased visibility from the wheelhouse. The master had operated the *Marie J* for approximately 10 fishing days prior to this occurrence.

Description of Tabusintac Bay

Tabusintac Bay, located at the mouth of Tabusintac River, is fronted by a 14-km stretch of sandbars that contain numerous tidal gullies (Appendix A). A route within a gully that allows vessels to pass through to the open sea is in a constant state of flux as a result of predominant wind and wave action from the north/northeast. These winds, waves and tidal action, as well as winter ice thickness, also affect the structure of the stretch of sandbars, causing existing gullies to gradually or suddenly silt in and new gullies to open up in different locations. This flux makes it difficult to represent these changes on Canadian Hydrographic Services (CHS) charts. The tidal range is moderate, with less than a 1.5-m difference between high and low tides, but the tide may run at 6 to 7 knots.²

Approximately 45 fishing vessels operate out of McEachern's Point harbour. For about 30 years, the fishermen accessed the open sea by a tidal gully 5 km south of the harbour, through a channel³ marked by Canadian Coast Guard Aids to Navigation (CCG NavAids). In the spring of 2012, CCG NavAids buoyed the route, as was customary on an annual basis. However, the fishermen were using a different route at that time, through a gully that had newly formed 3.9 km north of the original south (old) gully, closer to the harbour. Their route was privately marked by a single line of orange fishing buoys and was based on their own soundings.

Over the winter of 2012–2013, the buoyed channel in the old gully and the privately marked route in the north gully completely silted in. During the same winter, a new gully opened up 300 m to the southwest of the silted-in north gully with the privately marked route. In the spring of 2013, CCG NavAids approved the placement of buoys to mark a route in the new gully (Appendix B). To mark the best-depth⁴ route, a single row of red starboard-hand buoys was placed on the leading edge of the shallow water on the northeast side of the channel, while

² CBCL Limited, Coastal Study for Harbour Access at Tabusintac Bay, New Brunswick (draft report), (07 November 2013).

³ When a route is marked with buoys by Canadian Coast Guard Aids to Navigation (CCG NavAids), it is designated as a channel.

⁴ Buoyed best-depth routes may be marked with a single row of buoys if a design and review has not been completed, or when a chart scale doesn't allow the depiction of port and starboard buoys marking a channel; they are then indicated on nautical charts as "Channel Buoyed." Canadian Hydrographic Services (CHS) Chart 4906 also contains a cautionary note: "Owing to changing conditions, the range lights and buoys may be moved to mark the best channel. Mariners should not attempt to enter without local knowledge. For subsequent changes to aids to navigation, the Notices to Mariner and the List of Lights, Buoys and Fog Signals must be consulted."

a single green port-hand buoy was placed on the southwest side. At its narrowest point, this channel was less than 30 m wide, with minimum depths of 0.5 m⁵ below chart datum⁶ in some places. Although this was the only navigable channel currently available, the new gully was also perpendicular to predominant wind and wave action, and thus was subject to silting/bottom-shifting similar to the old and north gullies. Having used those gullies over the previous fishing seasons, the local fishermen were familiar with the silting/bottom-shifting within this gully. They were aware as well of the possibility that, because of the silting/shifting and the shifting positions of the buoys, the buoys may not accurately mark the best-depth route, leading to the common occurrence of bottom contact. They had determined through experience that the preferred track along this route was to make a tight turn around the red seaward buoy and then navigate as close as possible to the red buoys.

History of the voyage

On 18 May, at approximately 0440,⁷ the *Marie J*, along with 18 other lobster fishing vessels, departed McEachern's Point harbour to check the weather conditions and suitability for fishing outside of the bay.^{8,9} The master, a deckhand, and a third person who was not a crew member were on board. The vessels transited the buoyed channel (Appendix B) and exited into the Gulf of St. Lawrence, where the fishermen decided that the weather and sea conditions were not conducive to fishing. The vessels then began to return to the harbour via the same channel. At this time, it was just past low tide; the northeast winds were at approximately 25 knots, and waves of 3 to 4 m from the northeast were breaking across the area at the entrance to the channel. At approximately 0505, the *Marie J*, along with 3 other vessels, approached the entrance to the channel in single file. The first vessel entered the channel at approximately 0515 and successfully crossed past the sandbars. At 0520, the second vessel also made a successful transit, although this vessel did make contact with the bottom on the southwest side of the channel.

At approximately 0525, the *Marie J* was observed to have approached the channel entrance in a similar manner to that of the first 2 vessels, passed with a wider turn around the seaward red buoy, and then reduced speed to coordinate the timing of the vessel's entry into the channel with a lull in the waves. Moments later, as the *Marie J* increased speed to enter the channel, a wave came over a sandbar on the northeast side and struck the vessel broadside. A second wave, which followed shortly after, set the vessel to port and onto an unmarked, submerged sandbar on the southwest side of the channel. Both breaking waves shipped water onto the vessel's working deck, causing it to lean to port once awash on the sandbar.

The master on another lobster fishing vessel called the 9-1-1 centre in Miramichi and reported that the *Marie J* was sinking, and that 3 people were on board. The message was relayed to the Joint Rescue Coordination Centre (JRCC) in Halifax, Nova Scotia. JRCC Halifax provided

⁵ According to a Public Works and Government Services Canada (PWGSC) sounding survey conducted between 02 and 07 May 2013

⁶ Chart datum refers to the lowest level that water is expected to reach during normal tides.

⁷ All times are in Atlantic Daylight Time (Coordinated Universal Time minus 3 hours).

⁸ Approximately 20 other lobster-fishing vessels remained in the harbour.

⁹ The 2013 lobster fishery opened at 0600 on 29 April and closed on 29 June. The lobster fishery is managed with a limited open period to manage harvesting/catch efforts.

Sydney Marine Communications and Traffic Services (MCTS) with an initial rough position marking the centre of Tabusintac Bay. (JRCC Halifax used electronic raster charts¹⁰ to determine this position.) At 0536, a mayday broadcast was issued by MCTS in Sydney, Nova Scotia, that identified a vessel sinking in the Tabusintac gully area. Ten minutes later, MCTS reported that there had been no response to the mayday.

Meanwhile, the breaking waves continued to set the *Marie J* further onto the sandbar. The other fishing vessels made several attempts to reach the *Marie J*, but these attempts were prevented by the breaking waves and shallow water.

At 0541 and again at 0550, the CCG cutter from Shippagan, New Brunswick, was paged, and was then tasked at 0554. At approximately 0542, the JRCC tasked the Department of National Defence (DND) helicopter from Greenwood, Nova Scotia. At approximately 0543, two of the persons on board the *Marie J* were observed to be standing on the starboard side bulwark and holding onto the wheelhouse. The waves continued to break against the vessel for about 10 more minutes, at which time the *Marie J* was pushed over the sandbar and out of the sight of the other vessels.

At 0612, MCTS issued a mayday that provided a second updated position, following a report to JRCC from a fisherman on site that described the vessel's position as being between buoys TA-4 and TA-12. JRCC determined this second position by the location of buoy TA-2, using a combination of CHS charts, and established the location to be in the entrance of the old buoyed channel in Tabusintac Bay.

Using the position of floating objects reported at 0647 and the position of the buoyed channel indicated on CHS charts,¹¹ it appeared to JRCC that the drift pattern was to the north.

At 0739, the position of the overturned hull was reported to JRCC by a searcher on the beach that provided GPS coordinates.

At 0745, en route from the north, the CCG cutter *Cap Breton* passed the fishing vessels assisting in the search, and arrived in the vicinity of the vessel's overturned hull. At the same time, the DND helicopter was tasked to the third updated position by JRCC via MCTS, and arrived on scene at 0759. The search boundaries for the helicopter were centred around the third updated position, 2 km northeast of the mouth of the old buoyed channel, as marked on CHS charts.

At 0749, MCTS issued a mayday that provided a third updated position, after having received a report of the latitude and longitude from a searcher with a GPS where the vessel's overturned hull was located. This position was approximately 1.5 km southwest of the actual occurrence location.

At 0756, the Department of Fisheries and Oceans (DFO) Fast Rescue Craft (FRC) arrived from Neguac, New Brunswick, and searched an area where an object in the water was located (south of the old buoyed channel).

¹⁰ Electronic raster charts convert paper charts to a digital image using a geographic interface system (GIS).

¹¹ The Joint Rescue Coordination Centre (JRCC) uses a GIS utilizing all available CHS charts.

At 0758, MCTS relayed a message from JRCC to the *Cap Breton* to search along the coast, north of the buoyed channel. The *Cap Breton* complied by turning around and travelling north, away from the accident site and overturned hull and in the opposite direction of the actual drift pattern.

One body was recovered in the afternoon, and the other 2 bodies were recovered the following day.

Damage to the vessel

The *Marie J* sank and was not recovered, with the exception of the wheelhouse, which was later located on the beach.

Personnel certification and experience

The master had 18 years of fishing experience in the Tabusintac Bay area and had served as a master for the last 8 years. In 2001, he completed marine emergency duties (A1) training and, in 2011, completed small-vessel operator proficiency training.

The experienced deckhand and the third person on board held no marine certifications.

The buoy contractor had 52 years of fishing experience and had been surveying the gullies and placing the buoys in Tabusintac Bay since 1964. He had held the buoy tending contract for the last 37 years.

Environmental conditions

At the time of the occurrence, a strong north wind warning was in effect. The wind was from the northeast at approximately 25 knots, and the wave height was 3 to 4 m. The current was flooding into Tabusintac Bay and was opposing the wind and sea conditions in the Gulf of St. Lawrence. The DFO prediction for low tide on 18 May in the Tabusintac gully was 0430.

Lifesaving appliances

Under the *Small Fishing Vessel Inspection Regulations*, the *Marie J*, as a vessel not exceeding 12.2 m in length, was required to carry the following lifesaving appliances:

- 1 approved life jacket for each person on board
- 1 approved lifebuoy fitted with 27 m of retrieval line
- 1 watertight can containing 6 approved self-igniting flares.

The vessel was equipped with 3 lifejackets, 1 fire extinguisher, 6 flares, and 3 personal flotation devices (PFDs). There was no life raft or emergency position-indicating radio beacon (EPIRB) on board, and they were not required by regulation.

None of the 3 persons on board the *Marie J* were wearing lifesaving appliances at the time of the occurrence. As well, within the fishing community of Tabusintac, it was not common practice

for fishermen to wear PFDs or carry additional lifesaving equipment beyond that required to be carried by regulation.

Search and rescue

In the case of an emergency, the CCG is responsible for conducting, coordinating, and controlling maritime search and rescue (SAR) operations in Canadian waters. This work is conducted through the JRCCs and Maritime Rescue Sub-Centres (MRSCs). MCTS¹² centres assist JRCCs and MRSCs by managing communications with the vessels in need of assistance and with those involved in the SAR response. MCTS also collects information necessary for the successful resolution of a case and relays it to the rescue centre.

JRCC Halifax is the rescue coordination centre for Tabusintac Bay. The JRCC Halifax watch officers (maritime SAR coordinators) collect positions from a variety of sources, including 9-1-1 centres, MCTS, vessels in need of assistance, and vessels involved in the SAR response. The maritime SAR coordinator uses the best means, procedure, or method available at the time for collecting the occurrence position.

Management of Tabusintac Bay

CCG NavAids and the DFO's Small Craft Harbours (SCH) program are the 2 principal entities involved in managing the navigational aspects of Tabusintac Bay. CCG NavAids oversees the placement of aids to navigation to mark a channel, and is responsible for communicating changes about these aids, while SCH oversees the regulatory and administrative control of the harbour, as well as operations and maintenance.

In order to identify and maintain a navigable channel into Tabusintac Bay, CCG NavAids contracts a private buoy contractor each spring, as soon as the weather and ice cover allows. The contractor performs initial soundings to identify the best-depth route for navigation. Once a best-depth route is identified, the buoy contractor obtains an initial sounding of its existing depths and width. SCH then arranges for a dredging needs survey to be carried out, and contracts dredging as needed. Ideally, the route is dredged before it is marked with aids to navigation; however, for various reasons,¹³ dredging often does not occur before the channel is marked. In the spring of 2013, SCH had contracted dredging services for the new gully.

Short-range aids to navigation systems

Short-range aids to navigation systems, such as buoys, are used in a variety of situations, such as within harbours that predominantly serve commercial fishermen. The aids are provided and installed by CCG NavAids in accordance with the *Procedures Manual for Design and Review of Marine Short-Range Aids to Navigation Systems* (TP 9677).

¹² Sydney Marine Communications and Traffic Services (MCTS) provides communication and traffic services for the marine community to ensure the safe and efficient movement of vessels.

¹³ Challenges to the timing of dredging include the short window of opportunity (after the ice goes out but before the fishing season opens) in which to do the necessary sounding surveys and dredging work, as well as frequent bad weather and limited availability of dredging contractors during the busy spring season.

TP 9677 was developed in 1989 to provide operational and technical procedures to give effect to 2 CCG NavAids directives.¹⁴ These 2 directives detail the responsibilities and procedural aspects to be followed in the design of a short-range navigational system, as well as the type and frequency of reviews to be conducted. One of the directives specifies the 3 types of reviews for short-range navigation systems. They consist of the following:

- a) Standard reviews, whereby 4 types of analyses (site, needs, operational, and cost effectiveness), as prescribed by procedures manual TP 9677, are evaluated to design a new system of aids to navigation and shall be used when a system has never been evaluated under the procedures manual;
- b) Cyclical reviews, by which an initially designed system of aids to navigation is reviewed every 5 years to ensure its continued relevance; and
- c) Ad-hoc reviews, a process involving review of an aid system or parts of a system based on requests or new information that could affect the configuration of an existing aid system. This type of review can be triggered by:
 1. the elapse of 5 years since the previous cyclical review
 2. the occurrence of a serious incident (damages, injuries, complaint)
 3. a request for a new system, modifications to an existing system, changes in traffic, activities, or threats
 4. technological advances or operational changes to CCG resources
 5. major maintenance or replacement of assets
 6. a change in the level of service
 7. a marine aids system where an initial review has never been performed.

When CCG NavAids receives a request for short-range aids to navigation at a new site or decides to review an existing site, its procedure is to forward the request to the superintendent of NavAids as well as the CCG NavAids design and review specialists. The design and review specialists investigate the site to identify hazards and determine vessel routes, specifications of vessels that will use the channel,¹⁵ weather conditions, and sea conditions. CCG NavAids also considers information from harbour authorities (users) and from buoy contractors, and any other site information, such as groundings, to make a decision in the best interests of the mariner.

The design and review specialists calculate the minimum depth allowance that will determine physical threats that the vessel cannot pass over safely. Where there are insufficient depths at

¹⁴ Canadian Coast Guard (CCG), Aids to Navigation Directive 2.2200: Design of Short-Range Aids to Navigation Systems (issued March 2009) and Aids to Navigation Directive 2.2600: Review of Short-Range Marine Aids to Navigation Systems (issued November 2010).

¹⁵ These specifications include vessel type, size, and draught, and methods used to determine vessel position (i.e., electronic on-board navigation equipment or compass).

chart datum but sufficient depth at high tide, the harbour is reviewed as tidal assist,¹⁶ and a best-depth route is chosen that would enable a vessel to pass through to the open sea.¹⁷

On 25 April, CCG NavAids received a request from the Tabusintac Bay buoy contractor to move the buoys from the old channel in the previous gully (that was silted in) to the gully that had opened up over the winter. Initial soundings done by the buoy contractor indicated that there was no other route out of Tabusintac Bay with sufficient water depth. The request to mark a new route was not forwarded to the design and review specialists. A day later, CCG NavAids provided approval for the buoy contractor to mark the best-depth route with the initial soundings and with the aid of a sounding pole. On 26 April, a single line of 9 red starboard-hand buoys, 3 of which were lit, and 1 lit green port-hand buoy were placed to indicate the new channel. Although, at the time of the occurrence, CCG NavAids was aware of the placement of the buoys in the new gully, it had not received the buoy service report from the contractor and did not know their exact position.

Once aids to navigation have been placed, CCG NavAids is responsible for issuing a Notice to Shipping (NOTSHIP) to mariners and, if necessary, preparing a Notice to Mariners (NOTMAR) in conjunction with CHS.¹⁸ The process of applying changes to a chart takes approximately 4 months after the information is available. In situations where the navigational aid is not charted, a NOTSHIP is not required. However, when lit buoys (charted or uncharted) or any other charted buoys are relocated, production of a NOTSHIP and NOTMAR is required. No NOTSHIP or NOTMAR was issued to indicate that the buoys had been moved to a different channel until a NOTSHIP of 25 June 2013, which indicated that the buoys were unreliable in the new dredged channel. The latest update of CHS charts, which were published in July 2014, still depicted the previously buoyed channel in the old gully and included the annotation “Channel Buoyed.”¹⁹

The CCG NavAids design and review specialists performed an ad hoc review, instead of a standard review, of the aids to navigation in Tabusintac Bay on 25 June 2013. The review determined that buoys placed on both sides of the channel were required for the new channel, because the channel width is less than 30.5 m. Following this review, 5 additional green buoys were added to the channel.

¹⁶ In tidal areas where depths are not based on minimum water level, tidal action will be included in minimal depth calculations.

¹⁷ The *Procedures Manual for Design and Review of Marine Short-Range Aids to Navigation Systems* states that, in situations where the best depth is marked, mariners require a high degree of local knowledge, favourable weather, and favourable sea conditions to ensure the safety of navigation.

¹⁸ Notices to Shipping (NOTSHIP) are used to inform mariners about hazards to navigation and to share other important information. They are normally issued within 24 hours of the reporting of the information to the CCG. Notices to Mariners (NOTMAR) also inform mariners of important navigational safety matters and contain the necessary information to ensure that the publications *Sailing Directions; List of Lights, Buoys and Fog Signals; Annual Edition of Notices to Mariners; and Radio Aids to Marine Navigation* are kept up to date.

¹⁹ The term “channel buoyed” refers to an important waterway that lacks adequate charting (due to having, for example, too small of a scale, shifting channels, or too many aids to navigation in too small of an area to for proper display on the chart) but that is being used by a sufficient number of locally knowledgeable users.

As of April 2014, of the 434 channels in the Atlantic region, 364, or 84%, have been reviewed. An initial review, as prescribed by TP 9677, has been conducted on those 364 channels, while the other 70 have not had any type of review performed.

In a letter to the Transportation Safety Board (TSB) dated July 2014, CCG indicated that it is “working to modernize its risk-based methodology to design and review Aids to Navigation Systems. This methodology allows CCG to identify and assess the levels of risk in navigable waterways and ascertain the appropriate combination of aids to mitigate those risks.”²⁰

Safety Issues Investigation into Fishing Safety in Canada

In August 2009, the TSB undertook an in-depth safety issues investigation (SII) into fishing vessel safety in Canada. The resulting report, *Safety Issues Investigation into Fishing Safety in Canada*, released in June 2012, provides an overall, national view of safety issues in the fishing industry, and reveals complex relationships and interdependencies among these issues. The Board identified the following significant safety issues requiring attention: stability, fisheries resource management (FRM), lifesaving appliances, training, safety information, cost of safety, safe work practices, regulatory approach to safety, fatigue, and fishing industry statistics.²¹

Provincial oversight of fishing safety

The SII examined the various governance structures in place at the provincial level that provide oversight of safety in the fishing industry. In Canada, the jurisdiction of the provinces to regulate certain aspects of the commercial fishery, including those related to labour relations, workplace safety, and workers’ compensation, has been recognized by federal and provincial courts. There have been several cases across Canada in which the courts have ruled that the provinces have jurisdiction over certain aspects of fishing safety. However, provincial legislation varies with respect to these issues, with some provinces taking a more proactive and comprehensive approach than others.

For example, provincial oversight of workplace safety in the fishing industry differs significantly between the neighbouring provinces of New Brunswick and Nova Scotia.²² In Nova Scotia, the provincial Department of Labour regulates certain aspects of fishing, including those related to labour relations and workplace safety. In contrast, New Brunswick’s *Occupational Health and Safety Act* excludes fishing vessels from its definition of “place of employment.” As such, WorksafeNB does not have jurisdiction to inspect fishing vessels and enforce WorksafeNB regulations.

²⁰ Canadian Coast Guard (CCG), letter from CCG Commissioner Marc Grégoire to Transportation Safety Board (TSB) Chair Wendy Tadros (10 July 2014).

²¹ Transportation Safety Board (TSB), *Safety Issues Investigation Report M09Z0001, Safety Issues Investigation into Fishing Safety in Canada* (2012), available at <http://www.tsb.gc.ca/eng/rappports-reports/marine/etudes-studies/m09z0001/m09z0001.pdf> (last accessed on 03 November 2014).

²² In New Brunswick, the fishing industry comprises approximately 6600 fishermen on 1800 vessels. In Nova Scotia, it comprises approximately 13 000 fishermen on 4500 vessels.

Another difference between these 2 provinces exists with respect to the role of workers' compensation boards in promoting safety within the fishing industry. In Nova Scotia, the Workers' Compensation Board of Nova Scotia (WCBNS) actively supports an industry-led safety association model and, along with the Nova Scotia Fisheries Sector Council, developed and supported the Fisheries Safety Association of Nova Scotia (FSANS) in 2010. The mandate of FSANS is to enhance safety through education in prevention, and through research, advocacy, communication, and increased awareness. In contrast, due to its lack of legislated authority, the workers' compensation board in New Brunswick is not involved in matters related to fishing safety.²³

The Nova Scotia Fisheries Sector Council (NSFSC) is also working to educate fishermen on training and certification requirements, and is developing tools and a coordinated approach to help fishermen meet these requirements. The council has advisory members from DFO, the Nova Scotia Department of Fisheries and Aquaculture, and the Department of Labour and Advanced Education, as well as the Nova Scotia School of Fisheries. This council also coordinates the Scotia-Fundy Professional Fishermen's Training and Registration Association (SFPFTRA) Network Coordinator outreach program, which promotes and strengthens a training culture amongst fishermen. The association has 6 regional coordinators, who provide safety tools and information on training, certification, and safety at sea.

Outstanding recommendations

Past occurrences investigated by the TSB have raised similar safety issues as those identified with the *Marie J*. The Board recommendations that follow here were made in response to these past occurrences, and responses to them have not yet been assessed as Fully Satisfactory.

Lifesaving appliances

In 1992, following an accident involving the *Straits Pride II* (TSB Marine Investigation Report M90N5017), the Board noted the perennially high risk of fishermen being in a survival situation in extremely hostile waters, and recommended that

The Department of Transport expedite its revision of the *Small Fishing Vessel Safety Regulations*, which will require the carriage of anti-exposure worksuits or survival suits by fishermen.

TSB Recommendation M92-07

While Transport Canada (TC) has proposed changes to the existing regulations pertaining to fishing vessels to require the carriage of immersion suits and/or anti-exposure worksuits on certain fishing vessels, the publication of the new regulations has been delayed multiple times over the last 22 years. The proposed changes would require fishing vessels of 12 m or more in length operating less than 25 nautical miles (nm) from shore (Near Coastal Voyage Class 2) to carry anti-exposure worksuits and immersion suits when the water temperature is less than 15°C. Fishing vessels of less than 12 m that opt to carry an EPIRB or a means of 2-way communication rather than a life raft or other survival craft would also be required to carry

²³ The provincial government is planning to carry out consultations with the fishing community on this issue, and may make legislative amendments subsequent to these consultations.

immersion or anti-exposure worksuits if the water temperature is less than 15°C. This proposed regulation would apply to fishing vessels such as the *Marie J*.

The new proposed period for pre-publication of the *Fishing Vessel Safety Regulations* is targeted as the fall of 2014. The proposed requirement to carry immersion suits or anti-exposure worksuits, when fully implemented, may reduce the risks associated with cold water immersion. The Board's assessment of the response remains Satisfactory Intent.

In 2000, following an accident involving the fishing vessel *Brier Mist* (TSB Marine Investigation Report M98L0149), the Board recommended that

The Department of Transport require small fishing vessels engaging in coastal voyages to carry an emergency position indicating radio beacon or other appropriate equipment that floats free, automatically activates, alerts the search and rescue system, and provides position updates and homing-in capabilities.

TSB Recommendation M00-99

In 2002, TC phased in EPIRB carriage requirements for all vessels of 8 m or more in length operating beyond the limits of home-trade voyage, Class III (20 nm). TC has proposed further EPIRB carriage requirements in the *Fishing Vessel Safety Regulations*, but they have yet to be published. The proposed changes would extend the requirement to carry an EPIRB on fishing vessels of 12 m or more in length operating less than 25 nm from shore (Near Coastal Voyage Class 2). Fishing vessels of less than 12 m would have the option of carrying a 406-megahertz (MHz) EPIRB, or a means of 2-way communication, in lieu of a life raft or other survival craft. However, in opting to carry the EPIRB or a means of 2-way communication, the vessel would also have to carry immersion or anti-exposure worksuits of an appropriate size for each person on board if the water temperature is less than 15°C.

Given the lower costs of purchasing, maintaining, and fitting an EPIRB and of having anti-exposure worksuits instead of a life raft, operators may opt for the least expensive option and forego carrying a life raft or other survival craft. Once TC's proposed regulations are in force, they will extend the requirements to carry EPIRBs to smaller fishing vessels in a much larger geographic area, and the risks associated with not carrying an EPIRB will be substantially reduced. Therefore, the Board's assessment of the response remains Satisfactory Intent.

Previous occurrences

In October 2012, the passenger vessel *Jiimaan* grounded while navigating around a private port-hand buoy that was used to mark a sandbar in the approaches to the ferry terminal in Kingsville, Ontario (TSB Marine Investigation Report M12C0058). In the *Jiimaan* occurrence, the responsibilities for safety-critical activities were divided among more than one entity in the port of Kingsville. Although harbour users were aware of the extent of silting and aware of the private buoy used to mark the sandbar, it was found that this information had not been communicated among them. As a consequence, the approach to the Kingsville harbour as it was depicted on Chart 2181 and in the *Sailing Directions* did not reflect the actual conditions. In the *Marie J* occurrence, the specific location of the new buoyed channel was not communicated to CHS and, therefore, was not depicted on any CHS chart. However, in both cases, the vessel masters were aware of the local conditions and of the practices required to navigate these areas.

Analysis

Events leading to the grounding

While returning from the fishing grounds in adverse weather conditions, the *Marie J* attempted to enter the only available channel leading into McEachern's Point harbour. This channel posed a number of challenges to navigation: it was narrow, shallow, perpendicular to the direction of the wind and waves, and subject to strong tides. Furthermore, on the day of the occurrence, the accuracy of the buoy locations was unknown; the channel was prone to silting and bottom shifting, the buoys themselves could shift in position, and it was near low tide, with breaking waves from the northeast.

In this occurrence, although the practice of fishermen was to make a tight turn around the first red seaward starboard-hand buoy, the master made a wider turn around the buoy. After making the turn, the *Marie J* was positioned further southwest of the red starboard-hand buoys, putting the vessel in proximity to a sandbar. Although the investigation could not determine conclusively why the wider turn was made, it is possible that

- the master had a limited visibility of the red buoys (either due to the configuration of the vessel's wheelhouse or because the breaking waves were obscuring the buoys);
- the master may have been unfamiliar with the vessel's handling characteristics, since he had only recently leased it; or
- the wind, waves, and cross tides on this particular day may have also contributed to the *Marie J*'s position.

After the turn, the *Marie J*'s position in the channel was such that 2 successive breaking waves from the northeast set the vessel to port onto the nearby sandbar and shipped water on deck. The vessel remained awash on the sandbar for approximately 20 minutes before it was pushed over the sandbar by the continuing waves into deeper water and sank. The 3 persons on board subsequently drowned.

Reviews of short-range aids to navigation systems

To ensure navigational safety, it is important that a review of a channel system is undertaken by Canadian Coast Guard Aids to Navigation (CCG NavAids) design and review specialists prior to the placement of aids to navigation at a new or existing site. This review provides an opportunity to detect and mitigate potential hazards, as well as to identify information about the site that may need to be communicated to mariners and other entities.

In the spring of 2013, when the buoy contractor sent a request to CCG NavAids to move the buoys from the old gully to the new gully, the request was not forwarded to the CCG NavAids design and review specialists, who, among other things, identify and rate risks at a site. CCG NavAids, aware that the lobster fishery was about to open and time was of the essence, expedited the approval process in order to have a navigable channel for fishermen to access the fishing grounds prior to the opening. CCG NavAids approved the new route without any review by the design and review specialists, and the buoy contractor placed the buoys to mark the best-depth route without any risk analysis.

Of 434 channels in the Atlantic region, 70 have never been reviewed; however, they are being identified as priorities on yearly work plans.²⁴ The design and review specialists completed an ad hoc review of the Tabusintac channel approximately 2 months after the occurrence to determine the adequacy and best placement of the buoys. The review determined that 5 additional green port-hand buoys should be installed for increased navigational safety. The Aids to Navigation Directive 2.2600 indicates that a “standard review shall be utilized for a system that had never been evaluated under the procedures manual”;²⁵ however, this type of review was not performed. After the accident, an ad hoc review was conducted.

If short-range aids to navigation are placed in a channel without conducting a review, mariners may be exposed to unidentified hazards.

Communication of changes to short-range aids to navigation

To enable safe navigation, it is essential that changes to short-range aids to navigation are communicated to mariners and other entities, such as Canadian Hydrographic Services (CHS) and search and rescue (SAR) organizations, which rely on the accuracy of this information.

In the spring of 2013, the lit and unlit buoys were relocated from the old gully to the new route in the new gully. However, because CCG NavAids was unsure where the final location of the new channel would be after the dredging operation of the new gully, scheduled to take place in May 2013, neither a Notice to Shipping (NOTSHIP) nor a Notice to Mariners (NOTMAR) was issued to indicate this change. Without NOTSHIPS or NOTMARs, SAR organizations did not have the information necessary to make corrections to their charts for the Tabusintac Bay area, nor did CHS have the information necessary to update the location of the channel on the chart for the area.

In September 2013, a NOTSHIP was issued that contained the new positions of 2 lit buoys; however, no NOTMAR was issued. Without a NOTMAR, CHS did not have information about the new position of the 2 lit buoys and could not apply changes to the chart. On the latest (July 2014) version of the chart for Tabusintac Bay, the gully in Tabusintac and the annotation “Channel Buoyed” are still depicted in the old gully position.

At the onset of the SAR operation, the occurrence location was provided in relation to the buoy system in the Tabusintac gully. The Joint Rescue Coordination Centre (JRCC) believed that the position of the sinking was in the Tabusintac gully as it was depicted on CHS charts, which still depicted the buoyed channel as being in the old gully. However, the Halifax JRCC was unaware that the depiction did not reflect the actual location of the North buoyed channel. The coordinates that were provided to the search resources was just outside of the old gully, rather than in the new gully.

The inaccurate presumed position of the occurrence, in combination with the reported position of the overturned hull, led SAR coordinators to estimate a northerly drift pattern for the *Marie J*

²⁴ CCG NavAids decides which channels to review based on priorities, and plans its work for the year accordingly.

²⁵ Aids to Navigation Directive 2.2600: Review of Short-Range Marine Aids to Navigation Systems (issued November 2010).

and persons in the water. This estimation meant that the SAR resources started searching in an area 3.9 km south of the actual site of the occurrence in a northerly direction. Despite the inaccurate determination of the accident location and the appearance of a northward drift pattern, some of the SAR resources ultimately travelled and searched in the location of the actual occurrence.

Although it is unlikely that the inaccuracy of the original reported position of the vessel affected the final outcome of this particular SAR operation, knowledge of the precise location of a vessel in an emergency is often critical to the outcome of a successful SAR operation.

If information about changes to short-range aids to navigation is not communicated, there is a risk that SAR operations may be compromised.

Lifesaving appliances

Lifesaving appliances are essential tools that increase the chances of surviving an emergency at sea. Among fishermen, the carriage and use of lifesaving appliances is influenced by their attitudes toward and knowledge of safety on board a vessel, as well as by factors such as training, work practices, regulations, the availability of safety information, and cost.

The vessel was fitted with the required minimum of lifesaving appliances, including lifejackets. It was not fitted with any additional lifesaving appliances. In this occurrence, the 3 persons on board were not wearing personal flotation devices (PFDs) or lifejackets. The master had learned his trade locally within the Tabusintac fishing community, where it was common practice for fishermen not to wear PFDs and to carry only the lifesaving appliances necessary for regulatory compliance.

If lifesaving appliances are not used, there is increased risk of injury or death to crew members during an emergency.

Safety issues in the fishing industry

The Transportation Safety Board (TSB) safety issues investigation (SII) report, *Safety Issues Investigation into Fishing Safety in Canada*, categorized actions that affect safety into 10 significant safety issues, and found that there are complex relationships and interdependencies among them. These safety-significant issues are further analyzed in the SII.²⁶ As shown below, practices and procedures relating to 5 of the safety-significant issues identified in the SII are evident in this occurrence.

²⁶ Transportation Safety Board (TSB), Safety Issues Investigation Report M09Z0001, Safety Issues Investigation into Fishing Safety in Canada (2012), available at <http://www.tsb.gc.ca/eng/rapports-reports/marine/etudes-studies/m09z0001/m09z0001.pdf> (last accessed on 03 November 2014).

Fisheries resource management

Safety issues investigation findings	Relationship to this occurrence
Fishermen compete for their share of the resource, which may encourage risk-taking activities such as overloading vessels, working while fatigued, and operating in poor weather.	Given the limited open period of the lobster fishery, the <i>Marie J</i> travelled to and attempted to return from the fishing grounds in poor weather conditions.

Lifesaving appliances

Safety issues investigation findings	Relationship to this occurrence
Fishermen may fit their vessels with lifesaving appliances (LSAs) only for regulatory compliance.	The investigation determined that the <i>Marie J</i> was not fitted with any additional lifesaving equipment other than that which was required, and few other fishing vessels at McEachern's Point harbour were.
Fishermen resist wearing PFDs because many have accepted the risk.	It was not common practice in the Tabusintac Bay fishing community to carry or wear PFDs, and the crew on board the <i>Marie J</i> were not wearing PFDs.
Not all fishing vessels carry an emergency position-indicating radio beacon (EPIRB), despite TSB Recommendation M00-09.	The <i>Marie J</i> was not fitted with an EPIRB, and one was not required by regulation.
Not all fishing vessels carry suitable immersion suits for the complement, despite TSB Recommendation M92-07.	There were no immersion suits on board the <i>Marie J</i> , and none were required to be carried by regulation.

Regulatory approach to safety

Safety issues investigation findings	Relationship to this occurrence
Some provinces have workers' compensation board policies that apply specifically to fishermen.	New Brunswick's WorksafeNB <i>Occupational Health and Safety Act</i> excludes fishing vessels as places of employment, and is not involved in matters related to fishing safety.

Training

Safety issues investigation findings	Relationship to this occurrence
Fishermen assess and manage risk based on experience.	The local experience was that vessels frequently touched bottom when navigating in the gully.

Safe work practices

Safety issues investigation findings	Relationship to this occurrence
Fishermen learn and reinforce their operating practices based on experience and exchanges with peers.	Few fishermen in the community wore PFDs or carried lifesaving equipment beyond the required minimum, including those operating the <i>Marie J.</i>

Interdependency of safety issues

In this occurrence, as demonstrated in the tables above, there were a number of interrelated unsafe conditions and safety issues. Within the fishing industry, past attempts to address these safety issues on an issue-by-issue basis have not led to the intended result, which is a safer environment for fishermen. The SII emphasized that in order to obtain real and lasting improvement in fishing safety, change must address not just one of the safety issues involved in an accident, but all of them, recognizing that there is a complex relationship and interdependency among those issues. Removing a single unsafe condition may prevent an accident, but would only slightly reduce the risk of others. The safety of fishermen will be compromised until the complex relationship and interdependency among safety issues is recognized and addressed by the fishing community.

Provincial fishing safety oversight

The SII identified the need for provincial governments and leaders in the fishing community to work collaboratively to establish regional governance structures aimed at ensuring that fishermen can and do work safely.

Across Canada, there are currently some promising coordinated initiatives aimed at instilling safe work practices, such as the efforts in Nova Scotia, where organizations such as the Fisheries Safety Association of Nova Scotia and the Nova Scotia Fisheries Sector Council work in partnership with the fishing community to further safety. These coordinated efforts in Nova Scotia are helping fishermen to realize that safety is an integral part of fishing operations.

By comparison, initiatives in New Brunswick are limited. While provinces have legal jurisdiction to enforce workplace safety in the fishing industry, WorksafeNB lacks the required provincial legislation to do so, and therefore cannot enforce matters related to occupational health and safety on fishing vessels. Furthermore, there are no provincial-level fishing safety organizations working to promote safe work practices among fishermen in New Brunswick.

If there is no focused and concerted effort at the provincial level to promote fishing safety, then fishermen may not employ safe working practices.

Findings

Findings as to causes and contributing factors

1. The *Marie J* made a wide turn around the first red buoy at the beginning of the channel, positioning the vessel closer to a sandbar.
2. The accuracy of the locations of the buoys and the position of the sandbar could not be determined, as the tidal gully was prone to silting and bottom shifting.
3. Two successive breaking waves struck the vessel, set it to port, and caused it to ground on the nearby sandbar.
4. Waves continued to strike the vessel, pushing it over the sandbar where it sank, and the 3 persons on board drowned.

Findings as to risk

1. If short-range aids to navigation are placed in a channel without conducting a review, mariners may be exposed to unidentified hazards.
2. If information about changes to short-range aids to navigation is not communicated, there is a risk that search and rescue operations may be compromised.
3. If lifesaving appliances are not used, there is increased risk of injury or death to crew members during an emergency.
4. The safety of fishermen will be compromised until the complex relationship and interdependency among safety issues is recognized and addressed.
5. If there is no focused and concerted effort at the provincial level to promote fishing safety, then fishermen may not employ safe working practices.

Safety action

Safety action taken

On 25 June 2013, an ad hoc review was conducted by the design and review specialists of Canadian Coast Guard Aids to Navigation (CCG NavAids) using the *Procedures Manual for Design and Review of Marine Short-Range Aids to Navigation*, due to concerns over the placing of the buoys in the Tabusintac gully. The specialists were requested to provide accurate recommended positions for the placement of the buoys in the channel. As a result of the review, 5 green port-hand buoys were added to the channel.

On 31 July 2013, Public Works and Government Services Canada, on behalf of Fisheries and Oceans Canada, commissioned a coastal study to assess alternative strategies for improving navigational safety to access McEachern's Point harbour at Tabusintac Bay. The study²⁷ identified the following options: continue to carry out adaptive dredging on a yearly basis, construct training walls at Brantville gully, construct training walls at the south channel of the new gully, or perform gully excavation and construct training walls north of the new gully. The study found that future environmental changes may cause additional breaches in the sandbars, decreasing tidal flow and increasing sedimentation, which would reduce the effectiveness of training walls.

This report concludes the Transportation Safety Board's investigation into this occurrence. The Board authorized the release of this report on 05 November 2014. It was officially released on 13 November 2014.

Visit the Transportation Safety Board's website (www.bst-tsb.gc.ca) for information about the Transportation Safety Board and its products and services. You will also find the Watchlist, which identifies the transportation safety issues that pose the greatest risk to Canadians. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.

²⁷ CBCL Limited, Coastal Study for Harbour Access at Tabusintac Bay, New Brunswick (14 March 2014).

Appendices

Appendix A – Tabusintac Bay

The configuration of gullies in Tabusintac Bay in the spring of 2013 (source: Google earth; overlay of gully configuration from the CBCL Limited draft report, Coastal Study for Harbour Access at Tabusintac Bay, New Brunswick [November 2013]).



Appendix B – Tabusintac Bay

