



Transportation  
Safety Board  
of Canada

Bureau de la sécurité  
des transports  
du Canada

## MARINE INVESTIGATION REPORT M16A0327



### **Sinking and subsequent loss of life**

Small open fishing vessel *Pop's Pride*

Cape Spear, Newfoundland and Labrador

06 September 2016

Canada

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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 06 September 2016, at 1539 Newfoundland Daylight Time, the small open fishing vessel *Pop's Pride*, with 4 people on board, was reported overdue after it did not return to St. John's, Newfoundland and Labrador, from the fishing grounds off Cape Spear. Several vessels searched, and the bodies of 2 crew members were recovered. Both bodies were wearing personal flotation devices; however, the crew members' survivability had been reduced by the water temperature and the amount of time they had been in the water. The submerged vessel was recovered the following day. The other 2 crew members were not recovered and are presumed drowned.

*Le présent rapport est également disponible en français.*



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## 1.0 Factual information

### 1.1 Particulars of the vessel

Table 1. Particulars of the vessel

Name of vessel	<i>Pop's Pride</i> (formerly <i>Joyce</i> )
Vessel registration number	136808
Port of registry	Unregistered
Type	Small fishing vessel, open construction
Estimated gross tonnage	2.2
Length	6.7 m (22 feet)
Breadth	2.2 m (7 feet 3 inches)
Built	1989
Propulsion	Mercury 4-stroke outboard engine (60 hp, 45 kW)
Cargo	4 gillnets and cod fish (estimated 700 pounds)
Crew	4
Registered owner	Private owner

### 1.2 Description of the vessel

The *Pop's Pride* (Figure 1) is a small fishing vessel constructed of moulded, glass-reinforced plastic. It is propelled by a single 60 hp outboard motor aft. The vessel is used to fish multiple species, including cod and lobster.

Figure 1. The *Pop's Pride*



The hull of the vessel is of open construction, with a small enclosed compartment forward and 4 transverse bulkheads dividing the vessel into 5 sections (Figure 2). The forward section contains an aluminum table and hydraulic net hauler powered by a gas engine, which is mounted below the table. An aluminum roller and 2 uprights are mounted on the starboard gunwale outboard of the net hauler. The aft section immediately forward of the transom is narrow and, at the time of the occurrence, likely contained portable gas cans and a battery for the outboard engine. The 3 middle sections are empty and were used for stowing nets and catch as well as for a workspace for the crew.

The forward and aft bulkheads are fitted with 2 semi-circular openings (9 cm in diameter) at deck level, and the 2 middle bulkheads are fitted with 4 circular openings (5 cm in diameter) to allow water to flow aft toward the vessel's transom. The transom is fitted with a drain hole, 2.5 cm in diameter, with a removable plug (Appendix A).

The drain hole is 35 cm to port of the vessel's centreline, and is just above the vessel's inner bottom but below the waterline. To drain any water that has accumulated on board, the crew would normally accelerate the vessel until it was planing. The forward motion of the vessel and raising of the bow when planing forces the water on board to flow aft, toward the vessel's transom. When the drain hole plug is removed, the water accumulated at the stern then drains out of the drain hole until the plug is reinserted.

Figure 2. Interior of the *Pop's Pride*



The outboard engine is equipped with an electric start and electric trim that are powered by a 12-volt marine battery. The trim system consists of an electric motor powering a hydraulic pump. One end of a hydraulic actuator is attached to the leg of the outboard, and the other end is attached to the engine's transom mounting bracket. A switch mounted on the engine cowl controls the electric trim motor, causing the engine to trim up or down. The hydraulic actuator also holds the engine firmly in place to prevent it from lifting up if the engine leg contacts the bottom or another object. Similarly, the actuator will hold the engine in position so that the engine will not tilt under its own weight when inverted. The vessel's steering and throttle are controlled using the tiller handle on the outboard engine; no additional steering or throttle controls are fitted to the vessel.

The battery also powers a combined fish finder and global positioning system (GPS) unit fitted to the vessel's starboard gunwale near the stern. The vessel was not equipped with a very high frequency (VHF) radiotelephone or an emergency position-indicating radio beacon (EPIRB).

When the vessel was recovered, no safety equipment was found on board. Two paddles and a gaff, which were tangled in the vessel's nets, were recovered; 2 bailing buckets, which are presumed to have been on board the vessel, were recovered in the search area. It could not be determined what, if any, safety equipment was on board at the time of the occurrence. Vessels subject to Part II of the *Small Fishing Vessel Inspection Regulations* (SFVIR) and measuring less than 12.2 m in length, such as the occurrence vessel, are required to carry on board 1 approved lifejacket for each person on board, 1 approved lifebuoy fitted with 27 m of line, and 1 watertight can containing 6 approved self-igniting flares.<sup>1</sup>

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<sup>1</sup> Transport Canada, C.R.C., c. 1486, *Small Fishing Vessel Inspection Regulations* (last amended 01 July 2017), Part II, subsection 53(2).

### 1.3 History of the voyage

At about 0655<sup>2</sup> on 06 September 2016, the *Pop's Pride* departed the small boat basin at the mouth of St. John's Harbour, Newfoundland and Labrador, with the master and 3 crew on board. Two of the crew were wearing personal flotation devices (PFDs). Although it could not be determined if the other 2 crew were wearing PFDs, they did have them and wore them regularly. The vessel headed east toward the cod gillnets the crew had set previously<sup>3</sup> on Blackhead Bank, approximately 0.65 nautical miles (nm) north of Cape Spear and 2.9 nm southeast of the entrance to St. John's Harbour (Appendix B).

At about 0900, a passing fishing vessel sighted the *Pop's Pride* hauling nets off Cape Spear. A second passing fishing vessel sighted the *Pop's Pride* off Cape Spear at around 0930. Rather than being reset, the nets were kept on board the vessel to be taken ashore, as 2 of the crew were scheduled to be out of the province for the rest of the week.

At 1539, the *Pop's Pride* was reported overdue to the Joint Rescue Coordination Centre Halifax by concerned family members and other fishermen. Placentia Marine Communications and Traffic Services attempted to hail the vessel using VHF and did not receive a response; an Urgency<sup>4</sup> broadcast was then issued. At 1559, the first of several vessels was tasked to commence a search for the overdue vessel. The Joint Rescue Coordination Centre then tasked a search and rescue (SAR) Cormorant helicopter and Hercules aircraft to take part in the search.

At 1725, 1 of the fishing vessels participating in the search located and recovered a body wearing a PFD, 1.5 nm northeast of Cape Spear. At 1908, the same fishing vessel located and recovered a second body, also wearing a PFD, 3 nm east-southeast of Cape Spear. The search continued throughout the night, with other vessels and a fisheries patrol aircraft joining the search.

At 0722 the following morning, another fishing vessel participating in the search located a fishing gear marker buoy belonging to the *Pop's Pride* 1.7 nm southeast of the entrance to St. John's Harbour and 0.75 nm north-northwest of Blackhead,<sup>5</sup> which was not a common location for fishing gear. The search vessel recovered the buoy and found it to be attached to a gillnet. As the crew on board began to recover the net, they found that it was entangled with 3 other nets as well as with 2 paddles and a gaff, all belonging to the *Pop's Pride*. The end of the fourth net that they recovered was attached to the *Pop's Pride*. The Canadian Coast

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<sup>2</sup> All times are Newfoundland Daylight Time (Coordinated Universal Time minus 2.5 hours).

<sup>3</sup> The gillnets were likely set on Sunday 04 September 2016.

<sup>4</sup> An Urgency or PAN PAN broadcast signals a state of urgency related to the status of a vessel. It is different from a Distress or Mayday call, which signifies serious and imminent danger and requires immediate assistance.

<sup>5</sup> The charted water depth in this location is 75 m. (Source: CHS Chart 4846 – Motion Bay to/à Cape St. Francis.)

Guard (CCG) vessel *Sir Wilfred Grenfell* came alongside the search vessel and lifted the *Pop's Pride* on board (Figure 3).

At 2000 on 08 September, the search was reduced. On 12 September, the search ended, with nothing further found. Two of the crew were not recovered and are presumed drowned.

#### 1.4 Personnel certification and experience

The master had over 20 years of fishing experience and several years of experience as a deckhand on commercial vessels. He held a Marine Emergency Duties certificate and had been certified as a Level II professional fish harvester by the Professional Fish Harvesters Certification Board (PFHCB) of Newfoundland and Labrador since 1997.

He did not hold a marine certificate of competency, as was required by regulation.<sup>6</sup> The master had sufficient experience to obtain a declaration of at least 7 fishing seasons as master of a fishing vessel pursuant to subsection 212(8) of the *Marine Personnel Regulations*, which would have met the requirement for a certificate of competency for this vessel, but he had not pursued the declaration.

The first crew member had approximately 20 years of fishing experience. He held a Marine Emergency Duties certificate and had been certified as an apprentice fish harvester by the PFHCB since 1999. The second crew member had been certified by the PFHCB as an apprentice fish harvester since 2015. The third crew member held no professional certification as a fisherman.

In Newfoundland and Labrador, Fisheries and Oceans Canada (DFO) issues fishing licences only to fishermen who are PFHCB certified as a Level II professional fish harvester. To achieve this level of certification, a fisherman requires a minimum of 5 years' fishing experience and must have completed recognized training courses equivalent to approximately 120 days of training. This requirement is in place to ensure that commercial fishermen have a minimum level of experience and training.

Figure 3. Recovery of the *Pop's Pride* (Source: Canadian Coast Guard)



<sup>6</sup> Transport Canada, SOR/2007-115, *Marine Personnel Regulations* (last amended 03 February 2017), Part 2: Crewing, paragraph 212(1)(e).

## 1.5 Vessel registration

Any commercial vessel with an engine of 10 hp (7.5 kW) or more, which includes fishing vessels such as the *Pop's Pride*, is required to be registered with Transport Canada (TC).<sup>7</sup> The *Pop's Pride* was not registered with TC. As a small fishing vessel not exceeding a gross tonnage of 15, the *Pop's Pride* was subject to Part II of the SFVIR. The vessel would therefore not be required to undergo periodic inspections by TC if registered.

All commercial fishing vessels must also be registered with DFO<sup>8</sup> to carry out their commercial fishing operations. The *Pop's Pride* was registered with DFO. Before approving or renewing a vessel registration, DFO does not require the vessel to be inspected or assessed for safety compliance through its own department. DFO also does not verify that the vessel has been registered with TC or has undergone any TC inspections.

In 2015, there were 7590 commercial fishing vessels of less than 10.67 m in length registered with DFO in Atlantic Canada.<sup>9</sup> In comparison, as of 2015, TC's registry of fishing vessels less than 10.67 m in length in Atlantic Canada<sup>10</sup> listed 3357 vessels, a difference of more than 4000 vessels.

In 2013, in response to the sinking of a fishing vessel in British Columbia that was registered with DFO but whose registration with TC had expired, the Transportation Safety Board of Canada (TSB) issued Marine Safety Information Letter 05/13<sup>11</sup> addressing the need for the sharing of safety-critical information between DFO and TC. In 2013, DFO and TC worked together to identify 695 vessels that were registered with DFO but not registered with TC. As a result, DFO's Pacific Region amended its registration policy to confirm that vessels applying for registration as a commercial fishing vessel are also registered with TC, as is required by the *Canada Shipping Act, 2001* and associated regulations. A letter was sent to the owners of the 695 unregistered vessels informing them of the change in policy and inviting them to register with TC; 114 of the vessels registered with TC within 5 months of the letters being sent.

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<sup>7</sup> Transport Canada, SOR/2007-126, *Vessel Registration and Tonnage Regulations* (last amended 01 May 2015), Part 1: Registration, paragraph 1.1(1)(a).

<sup>8</sup> Fisheries and Oceans Canada, SOR/86-21, *Atlantic Fishery Regulations* (last amended 13 April 2017), Part II: Registration of Persons and Vessels and Licensing of Persons, paragraph 13(1)(a).

<sup>9</sup> Fisheries and Oceans Canada, "Vessel Information," at <http://www.dfo-mpo.gc.ca/stats/commercial/licences-permis/vess-embarc/ve15-eng.htm> (last accessed on 16 November 2017); latest data available is from 2015.

<sup>10</sup> Archival search of Transport Canada, "Vessel Registry Query System," as of 31 December 2015, at <http://www.wapps.tc.gc.ca/Saf-Sec-Sur/4/vrqs-srib/eng/vessel-registrations/search> (last accessed on 16 November 2017).

<sup>11</sup> TSB Marine Safety Information Letter 05/13 - Sharing of Safety Critical Inspection Information (01 August 2013).

## 1.6 *Environmental conditions*

The marine forecast<sup>12</sup> for the Cape Spear area indicated southwest winds of 20 knots with gusts of up to 35 knots near the coast. Wave heights of 1 to 2 m were forecasted for the morning of the occurrence. Actual conditions recorded<sup>13</sup> in the area were winds of 25 to 30 knots from the west-southwest throughout the morning, gusting to 33 knots in the early afternoon. Wave heights peaked at 2 m from the southwest at about 0730 and remained above 1 m throughout the afternoon and evening. Conditions were cloudy with good visibility. The air temperature increased from 15 °C to 19 °C through the morning, and the sea water temperature was 12 °C.

A localized effect between Cape Spear and St. John's causes the wind speed to increase as it funnels down through the valleys on either side of Blackhead. As a result, vessels crossing the small bays on either side of Blackhead experience wind gusts, rougher seas, and increased spray. On the day of the occurrence, crew on larger fishing vessels returning to St. John's from the fishing grounds around Cape Spear experienced the effect, taking spray across their wheelhouse windows in near gale force winds.

## 1.7 *Damage to the vessel*

Inspection of the vessel after its recovery determined that there was no damage to the vessel's hull. The drain hole plug was in the transom drain hole. The forward storage compartment cover was missing and the compartment was empty. The metal gas tank on the gas engine that powered the hydraulic net hauler was crushed, presumably from water pressure when the vessel was submerged in 75 m of water. A large portion of the outboard engine's skeg was missing from a previous incident unrelated to the occurrence. The top of the engine cowl was cracked; however, it could not be determined if this damage was pre-existing or a result of contact with the bottom after the vessel was submerged. The outboard motor was in the fully up and stowed position, and the 12-volt battery was connected by only 1 lead.

## 1.8 *Post-occurrence examination*

Subsequent examination of the recovered outboard motor included the following observations:

- The engine had fresh fuel and the proper volume of engine oil.
- Mechanically, the engine was in working order at the time of the occurrence.

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<sup>12</sup> Marine forecast for Newfoundland issued by Environment Canada at 0300 Newfoundland Daylight Time, Tuesday 06 September 2016.

<sup>13</sup> A SmartBay meteorological and oceanographic buoy operated by the Marine Institute of Memorial University of Newfoundland is located 1.2 nm northeast of Cape Spear, and 1 nm east of Blackhead Bank.

- The 15 amp fuse that protects the tilt/trim unit showed separation in the bridge portion consistent with circuit overload. This was considered to be the end result of a short in the tilt/trim system due to submersion in salt water, which caused the engine to tilt to the fully raised position. When the engine reached the fully raised position, the hydraulic pump continued to run because there is no limit switch in the system and an overload condition was created, causing the fuse to blow.

As part of the post-occurrence examination, the engine was partially tilted from its normal operating position, then inverted to simulate its position on an overturned vessel and left for several days. No movement of the engine under its own weight was observed.

The GPS fitted to the vessel was also examined; however, attempts to recover position and track information stored in the unit's memory were unsuccessful due to post-occurrence corrosion damage.

## 1.9 Survivability

Falling into cold water involves an initial cold shock, which is most dangerous and potentially lethal when a person is suddenly immersed in water below 15 °C.<sup>14</sup> This can be quickly followed by exhaustion while the person attempts to stay afloat. This exhaustion increases rapidly without the assistance of a PFD. Hypothermia can occur within 35 minutes in cold water; bodily functions slow down, and this can eventually lead to death. A rapid recovery of the person in the water is critical to increase the person's chances of survival. Thermal protection provided by immersion suits and similar devices reduces the effects of initial cold shock and delays the onset of hypothermia, increasing the chances of survival.

In this occurrence, both of the bodies recovered were wearing PFDs; however, the crew members' survivability had been reduced by the water temperature and the amount of time in the water.

As a result of the 1990 sinking of the fishing vessel *Straits Pride II*, with the loss of 3 lives,<sup>15</sup> the TSB 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**

<sup>14</sup> C.J. Brooks, K.A. Howard, and J. Jenkins, "Drowning is Not a Helpful Diagnosis Written on the Death Certificate," in: *Survival at Sea for Mariners, Aviators and Search and Rescue Personnel* (Neuilly-sur-Seine Cedex, France: Research and Technology Organization of NATO, February 2008), at [https://www.sto.nato.int/publications/STO%20Technical%20Reports/RTO-AG-HFM-152/\\$\\$AG-HFM-152-ALL.pdf](https://www.sto.nato.int/publications/STO%20Technical%20Reports/RTO-AG-HFM-152/$$AG-HFM-152-ALL.pdf) (last accessed on 16 November 2017).

<sup>15</sup> TSB Marine Investigation Report M90N5017.

The new *Fishing Vessel Safety Regulations* (FVSR), which came into effect after the occurrence, on 13 July 2017, require a vessel of any length operating in sheltered waters or within 2 nm of shore, such as the occurrence vessel, to carry the following on board:

- a) one or more life rafts or recovery boats with a total capacity that is sufficient to carry the number of the persons on board; or
- b) the following equipment:
  - i) an EPIRB or a means of two-way radio communication, unless the vessel is carrying on board an EPIRB required by the *Ship Station (Radio) Regulations, 1999*, and
  - ii) if the water temperature is less than 15°C, an immersion suit or an anti-exposure work suit of an appropriate size for each person on board.

### 1.10 Fisheries resource management

DFO's Ecosystems and Fisheries Management is responsible for fisheries management.

A key process in fisheries management is the development and implementation of an Integrated Fisheries Management Plan (IFMP). The purpose of this document is to define and communicate the objectives of a specific fishery and the specific management measures to be taken to maintain the sustainability of the resource. The development of an IFMP is carefully done through a consultation process, taking into account scientific, industry-based, and socio-economic factors. Final approval of an IFMP is given by the regional director general if the fishery is specific to their region. For multi-regional and international fisheries, approval is given by the deputy minister or minister of DFO.

DFO Ecosystems and Fisheries Management provides a guidance document entitled "Preparing an Integrated Fisheries Management Plan"<sup>16</sup> for developing IFMPs. It indicates what sections to include in the IFMP and the content required for each section. In 2011–12, DFO updated the guidance document to include the consideration of several emerging issues, including safety at sea.<sup>17</sup> The guidance document directs managers to identify and avoid situations that can create pressures on fishermen to fish under conditions they would otherwise avoid, including taking a vessel out farther, fishing longer, or fishing in poor weather conditions.<sup>18</sup> The document states that if these conditions are unavoidable, mitigating measures should be considered:

Fisheries where time constraints for harvesting are a significant factor and with no accommodation for unfavourable weather [...] can create serious safety concerns. To participate fully in such a fishery, fish harvesters may fish

<sup>16</sup> Fisheries and Oceans Canada, "Preparing an Integrated Fisheries Management Plan," at <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/guidance-guide/preparing-ifmp-pgip-elaboration-eng.htm> (last accessed on 16 November 2017).

<sup>17</sup> Ibid., Section A.3.

<sup>18</sup> Ibid., Appendix 6.

in poor weather and/or overload their vessel with catch and/or gear, etc. Where these conditions exist, IFMPs should attempt to mitigate these effects and avoid them wherever possible.<sup>19</sup>

DFO has also made an IFMP template available.<sup>20</sup> The template includes a “Safety at Sea” section with information on general fishing safety topics, including fishing vessel stability, emergency drill requirements, cold water immersion, weather, and the buddy system common to all fisheries.

The TSB *Safety Issues Investigation into Fishing Safety in Canada*,<sup>21</sup> published in 2012, identified fisheries resource management as one of the 10 significant safety issues associated with fishing accidents. The report indicated that “meeting resource management measures can contribute to risk-taking” and expressed the “concern that the safety risks associated with fisheries management measures are not adequately identified and addressed.”<sup>22</sup>

In some fisheries, DFO Newfoundland and Labrador has taken action to improve the safety of fishermen with specific management measures. Some examples of the measures include opening fisheries after 0600 and closing before 2000, which helps to prevent vessels from operating with a load of gear in the darkness as well as reducing the risk of fatigue, and permitting buddy-up arrangements<sup>23</sup> that allow “fish harvesters in smaller vessels to buddy-up with another fish harvester who has a larger, safer vessel to operate in these fisheries.”<sup>24</sup>

### 1.10.1 Conservation Harvesting Plan

IFMPs that expire in 1 year contain detailed information on fisheries management measures. However, IFMPs that do not expire and are instead periodically updated refer to another document, the Conservation Harvesting Plan (CHP), for specific measures. CHPs state how and when fish is to be harvested, with specific details on season start and end dates, gear types, and catch amounts and limits. The plans are developed annually through a

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<sup>19</sup> Ibid.

<sup>20</sup> Fisheries and Oceans Canada, “IFMP Template,” Appendix D: Safety at Sea, at <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/guidance-guide/template-app-a-ann-modele-eng.htm#n5> (last accessed on 16 November 2017).

<sup>21</sup> TSB Marine Investigation Report M09Z0001.

<sup>22</sup> Ibid., “Safety Significant Issues – Fisheries Resource Management,” pp. 38, 40.

<sup>23</sup> A buddy-up arrangement is a DFO-approved arrangement between 2 fish harvesters who hold licences for the same species, fishing area, and gear type. The vessel used by both harvesters is registered by one of the harvesters in the arrangement.

<sup>24</sup> Fisheries and Oceans Canada, Newfoundland and Labrador Region, Safety Initiatives Presentation to Newfoundland and Labrador Fish Harvesting Safety Association, 2016. The Newfoundland and Labrador Fish Harvesting Safety Association was established in 2012 to promote safety education and awareness and to reduce injuries and fatalities in the fishing industry.

consultation process that involves an iterative review of a harvesting proposal submitted to DFO by industry stakeholders.

### 1.10.2 2016 Northern Cod Stewardship fishery

The *Pop's Pride* was participating in the Northern Cod Stewardship fishery. The term “stewardship” indicates that it is not a typical commercial fishery: because the commercial fishing of northern cod had been suspended since 1992, commercial harvesting of this fish stock was not permitted. In 2006, in response to the concern expressed by fishermen that the science estimates of the fish stock were not accurate, a small fishery with limitations on gear, catch, and allotted time to fish was opened.

The 2016 Northern Cod Stewardship fishery in the Northwest Atlantic Fisheries Organization (NAFO) divisions 2J3KL (Appendix C) is managed under the NAFO Division 2+3KL Groundfish IFMP (effective 2013). Its “Safety at Sea” section, found in Appendix 6,<sup>25</sup> is a copy of the general information contained in the IFMP template provided by DFO; it contains no items specific to the cod fishery or other groundfish fisheries. The IFMP refers to the annual CHP for specific details about the management of the fishery.

In 2014 and 2015, the CHP gave an individual quota<sup>26</sup> of 5000 pounds for all licensed fishermen, to be taken at the harvester’s discretion anytime within a defined 3-week season.<sup>27</sup>

A Northern Cod Stewardship fishery advisory meeting was held on 01 June 2016 in St. John’s. The agenda included scientific and socio-economic presentations, a presentation on the fishery rebuilding plan, and the perspectives of the stakeholders at the meeting. None of the agenda items addressed the safety of fishermen, and no representatives from TC were in attendance.

In 2016, the CHP was changed from the individual quota with the fixed-length season of previous years to a weekly harvest limit, with no end-of-season date identified. The 2016 CHP was based on a proposal presented by the Newfoundland and Labrador Groundfish Industry Development Council, a collaboration between the Fish, Food and Allied Workers Union and local seafood processors.<sup>28</sup> The Groundfish Industry Development Council was formed with the primary objective of producing a market-driven strategic plan for the groundfish industry by maximizing the value of groundfish products to

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<sup>25</sup> The summary of this IFMP is available at <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/groundfish-poisson-fond/groundfish-poisson-fond-div2-3KL-eng.htm> (last accessed on 16 November 2017). However, it does not contain the details of the “Safety at Sea” section. This information can be obtained by requesting the complete IFMP from DFO.

<sup>26</sup> An individual quota is a specific quantity of fish allocated annually to a licence holder.

<sup>27</sup> In NAFO Division 3L in the area of Cape Spear, the 2014 season ran from 24 August to 13 September. In the same area, the 2015 season ran from 06 September to 26 September.

<sup>28</sup> Fisheries and Oceans Canada, “2016 Northern Cod Stewardship / By-catch Fishery 2J3KL management approach,” at <http://www.dfo-mpo.gc.ca/decisions/fm-2016-gp/atl-14-eng.htm> (last accessed on 16 November 2017).

improve the economic viability and sustainability of fishing enterprises and processing plants.

According to the CHP, for a 3-week period from 15 August to 04 September, fishermen were permitted to catch 2000 pounds of cod each week, starting at 0001 on Sunday and ending at 2400 the following Saturday. For an undefined period starting on 05 September until the end of the season, which had not yet been determined,<sup>29</sup> the weekly harvest limit was increased to 3000 pounds per week. Once the weekly harvest limit was reached, the fisherman was required to remove all fishing gear from the water until 0001 the following Sunday. If the fisherman was unable to catch the entire weekly harvest limit, the uncaught portion could not be carried over and added to the following week's harvest limit.

The occurrence happened on a Tuesday, and the weekly quota period ended on Saturday. In previous weeks, the vessel had been able to catch only a maximum of 1858 pounds of the allowable 2000 pounds during 1 week and averaged approximately 700 pounds of catch per day. To catch the new weekly quota of 3000 pounds at the rate they had been landing in the previous weeks, the crew would need to fish all of the remaining days in the week to catch the entire weekly quota or lose the income associated with it.

The rules of the fishery are communicated to fishermen in a fishing licence conditions document that is issued to each licensed fisherman. This document details the contents of the CHP as well as any other requirements the fisherman must meet. In this fishery, the fishing licence conditions document included the condition that fishermen "shall not leave fishing gear unattended in the water for more than 48 consecutive hours."<sup>30</sup> This requirement is also referenced in the *Newfoundland and Labrador Fishery Regulations*, which state,

Where a person has set fishing gear in any waters of the Province, he shall not leave that gear unattended for a period of more than three consecutive days, excluding the date of the setting of the gear, unless prevented from attending the gear by circumstances beyond his control.<sup>31</sup>

Although the regulation states 3 days, DFO has the option to shorten this time period, as was seen in this fishery. However, the "circumstances" referred to in the regulations are not defined or explained further, and neither are the actions that a fishermen should take if they occur. Furthermore, the licence conditions provided to each licensed fisherman do not reference "circumstances beyond his control": this specific reference is found only in the regulations.

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<sup>29</sup> The season closing date is determined by Fisheries and Oceans Canada in consultation with Newfoundland and Labrador Groundfish Industry Development Council (2016 Conservation Harvesting Plan, 2J3KL Stewardship Cod Fishery, Section 5, "Season").

<sup>30</sup> 2016 fishing licence conditions for cod, NAFO Areas 2GHJ, 3KL.

<sup>31</sup> Fisheries and Oceans Canada, SOR/78-443, *Newfoundland and Labrador Fishery Regulations* (last amended 13 April 2017), Part I: General, Section 8.

Although it is not indicated in the fishing licence conditions, the CHP prohibits buddy-up arrangements within this fishery.

On 24 November 2016, DFO announced, through a Notice to Fish Harvesters, that the 2016 Northern Cod Stewardship fishery in NAFO divisions 2J3KL would close at 2200 on 16 December 2016.

### *1.11 Collaboration between national organizations*

While DFO is responsible for the management of fisheries to ensure the sustainability of the resource and an economically viable industry, it is not responsible for the safety of fishermen or fishing vessels. The safety of vessels, including fishing vessels, is the responsibility of TC, while the safety, security, and accessibility of Canada's waterways is the responsibility of the CCG, including marine SAR.

All 3 organizations are directly involved in the fishing industry through the regulations and programs they provide. Before 2006, this normally happened without their coordinating with one another. For this reason, it is possible that actions taken by one organization to fulfill its mandate may have an impact on another component of the fishery and affect the safety of fishermen.

In 2006, a Memorandum of Understanding<sup>32</sup> (MOU) was signed among TC, DFO, and CCG to ensure collaboration on commercial fishermen's safety at sea. The MOU states that each participating organization must establish principles to promote a safety culture and consider the safety of commercial fishermen when creating or revising rules, regulations, policies, and plans that affect commercial fishermen.<sup>33</sup> The MOU also states that the organizations will meet as required to discuss fishing vessel safety issues, and that TC and DFO are to meet in advance of the national Canadian Marine Advisory Council meeting. All participating organizations at the national and regional levels are to discuss safety issues through the advisory process, with decisions being reflected in the IFMP. Finally, the MOU indicates that DFO, at the national and regional levels, will also review the "Safety at Sea" sections in updated IFMPs.

Since January 2015, the majority of the meetings agreed upon in the MOU have been held. In addition, DFO in Newfoundland and Labrador has invited TC to attend the fishery advisory meetings held annually in advance of the season opening, and TC has participated when available.

Although DFO has identified national and regional representatives for the safety at sea of commercial fishermen, there is no record of a "Safety at Sea" section of an IFMP being reviewed at the national level.

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<sup>32</sup> Original signed on 06 November 2006, updated and re-signed on 31 March 2015.

<sup>33</sup> Memorandum of Understanding between Fisheries and Oceans Canada and Transport Canada regarding the safety at sea of commercial fish harvesters (March 2014).

TC has cited the MOU as a proactive element in its development of a safety culture in the commercial fishing industry in its response to 2 TSB recommendations from 2003 that address safety culture within the fishing industry, including fisheries management. The first recommends that

Transport Canada, in coordination with Fisheries and Oceans Canada, fisher associations and training institutions, develop a national strategy for establishing, maintaining and promoting a safety culture within the fishing industry.

**TSB Recommendation M03-02**

The action taken by TC in response to this recommendation was assessed as Fully Satisfactory, and the recommendation was closed in 2013. This assessment was partially based on the signing of the MOU between TC and DFO. No assessment of action taken by DFO was included in the assessment of this recommendation.

The TSB also recommended that

The Department of Transport, in collaboration with the fishing community, reduce unsafe practices by means of a code of best practices for small fishing vessels, including loading and stability, and that its adoption be encouraged through effective education and awareness programs.

**TSB Recommendation M03-07**

In 2006, the Board rated the actions taken by TC in response to this recommendation as Satisfactory in Part due to the signing of the MOU between TC and DFO concerning the safety of commercial fishermen.

## 1.12 *Emergency communications equipment*

An EPIRB transmits an emergency signal, either automatically or upon activation by the crew, to immediately alert SAR resources and initiate rescue efforts. At the time of the occurrence, EPIRBs were required for vessels of 8 m or more in length engaged on a Class I home-trade voyage, a Class II home-trade voyage, or a foreign voyage.<sup>34</sup>

There is no requirement for a fishing vessel of open construction of any length or of closed construction of 8 m or less in length to be equipped with a VHF radiotelephone.<sup>35</sup>

The occurrence vessel did not have an EPIRB or a VHF radiotelephone on board, nor was it required by regulation to carry either device. The only communications equipment on board was 4 cell phones.

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<sup>34</sup> Transport Canada, SOR/2000-260, *Ship Station (Radio) Regulations* (last amended 01 July 2007), paragraph 13(1)(c).

<sup>35</sup> *Ibid.*, paragraph 7(1)(a).

The new FVSR require a vessel of any length operating in sheltered waters or within 2 nm of shore, such as the occurrence vessel, to carry the following on board:

- a) one or more life rafts or recovery boats with a total capacity that is sufficient to carry the number of the persons on board; or
- b) the following equipment:
  - i) an EPIRB or a means of two-way radio communication, unless the vessel is carrying on board an EPIRB required by the *Ship Station (Radio) Regulations, 1999*, and
  - ii) if the water temperature is less than 15°C, an immersion suit or an anti-exposure work suit of an appropriate size for each person on board.

The new regulations would have required the occurrence vessel to carry on board some combination of the equipment listed above, which may not have included an EPIRB. The requirement for a means of two-way communication can be met with a cell phone carried on board, provided there is adequate cellular coverage.

### 1.13 *Stability, buoyancy, and flotation*

A vessel's ability to remain afloat and upright in all loading and operating conditions is fundamental to safety. To this end, it is essential that the vessel has sufficient reserve buoyancy and stability, as well as the means to prevent water from accumulating on deck or entering the hull. Freeboard, watertight integrity, downflooding height, and adequate drainage must also be maintained. To ensure safety at sea, these factors must be considered when designing, constructing, and operating decked and undecked vessels.

For a decked vessel, buoyancy and stability are mainly provided by the volume of the watertight hull below the deck.<sup>36</sup> Reserve buoyancy<sup>37</sup> and stability are a function of the freeboard measured to the position of the lowest downflooding point. Reducing the freeboard or the height of the downflooding point, therefore, reduces reserve buoyancy and affects stability, decreasing the margin of safety.

For an undecked vessel, such as the occurrence vessel, buoyancy and stability are provided by the watertight hull, which extends to the top of the gunwale. This type of vessel is vulnerable to swamping as a result of water coming over the sides. The risk may be mitigated by limiting operations to relatively calm waters, incorporating built-in flotation to improve survivability, and providing means to efficiently remove any water that is shipped over the side. As with decked vessels, reducing the freeboard or the height of the downflooding point reduces the reserve buoyancy and stability, decreasing the margin of safety.

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<sup>36</sup> A weathertight superstructure may provide additional buoyancy and stability.

<sup>37</sup> Reserve buoyancy is the volume of enclosed space above the waterline, which provides additional buoyancy as weight is added to the vessel.

Aside from an enclosed space within the after bulkhead, the *Pop's Pride* contained no additional flotation in the form of airtight compartments or buoyant material to provide the vessel with inherent buoyancy,<sup>38</sup> which would allow it to remain afloat if it were to capsize or be swamped. The ability of a swamped vessel to remain afloat can improve survivability, increasing survival times<sup>39</sup> when individuals are able to sit in a swamped vessel or on an overturned vessel instead of being completely immersed to their necks in water. A floating vessel also provides a larger visual target to help rescuers locate the area of the occurrence more quickly.

### 1.13.1 Small fishing vessels

Under the SFVIR in effect at the time of the occurrence, there were no standards addressing adequate buoyancy and flotation for open vessels.

Under the new FVSR, a stability assessment is required for any new vessel of more than 9 m in length as well as existing vessels fitted with an anti-roll tank and specified vessels involved in the herring and capelin fisheries.<sup>40</sup> A stability assessment is also required for any existing fishing vessel that is more than 9 m in length and, after 13 July 2017, has undergone a major modification or a change in activity that is likely to adversely affect its stability. This assessment includes the production of a stability booklet and a stability notice, which includes vessel- and operation-specific stability information to be carried on board.

New fishing vessels of not more than 6 m in length are required to conform to specified standards of buoyancy, flotation, and stability according to section 4 of Transport Canada TP 1332, *Construction Standards for Small Vessels*,<sup>41</sup> including the fitting of buoyancy material<sup>42</sup> to ensure that the vessel remains afloat<sup>43</sup> and upright<sup>44</sup> when swamped.

New fishing vessels of more than 6 m but not more than 9 m in length, similar in length to the *Pop's Pride*, are not required to conform to any one specific standard, but rather to any recommended practices and standards<sup>45</sup> that are appropriate to a fishing vessel and its operations.<sup>46</sup>

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<sup>38</sup> Inherent buoyancy is the ability of an object or vessel to float without assistance when it is submersed or swamped.

<sup>39</sup> Cold Exposure Survival Model, Joint Rescue Coordination Centre Halifax.

<sup>40</sup> Government of Canada, *Canada Gazette*, Part II, Vol. 150, No. 14 (13 July 2016), Regulations Amending the *Small Fishing Vessel Inspection Regulations*, subsection 3.48(1).

<sup>41</sup> Transport Canada, TP 1332, *Construction Standards for Small Vessels* (29 April 2010), Section 4, at <https://www.tc.gc.ca/eng/marinesafety/tp-tp1332-menu-521.htm#wb8> (last accessed on 16 November 2017).

<sup>42</sup> *Ibid.*, Section 4.4.1.2.1.

<sup>43</sup> *Ibid.*, Section 4.4.2.4.1.

<sup>44</sup> *Ibid.*, Section 4.4.2.6.1.

<sup>45</sup> As per Transport Canada's *Fishing Vessel Safety Regulations*, subsection 3.01(1), which defines recommended practices and standards as those "for marine use issued by a marine classification

Several industry standards and practices may be considered to assess stability or buoyancy and flotation for a vessel of this size and type. Adherence to the International Standards Organization standard 12217-1:2013 for a vessel of similar design and construction to *Pop's Pride* requires the vessel's intact stability to be assessed and ensures that the vessel has adequate swamped buoyancy/flotation and stability. The safety recommendations made by the Food and Agriculture Organization of the United Nations for undecked fishing vessels<sup>47</sup> and decked fishing vessels of less than 12 m in length require new undecked or open fishing vessels of similar design and construction to the *Pop's Pride* to meet established stability criteria<sup>48</sup> and ensure that the vessel will stay afloat and on an even keel if swamped.<sup>49</sup> Furthermore, these stability and buoyancy requirements for new vessels should, "as far as reasonable and practical," be applied to existing undecked or open fishing vessels such as the *Pop's Pride*.<sup>50</sup> However, Section 5.3 of Transport Canada TP 1332 requires non-pleasure craft similar to the *Pop's Pride* to meet established stability criteria, but does not assess the vessel's ability to remain afloat and upright when swamped.

With the exception of existing vessels fitted with an anti-roll tank and specific vessels involved in the herring and capelin fisheries,<sup>51</sup> all other existing fishing vessels to which the FVSR apply are not required to have their stability, buoyancy, or flotation assessed against any recommended practices and standards. However, the stability and buoyancy of an existing vessel must be adequate to carry out its operations safely.<sup>52</sup>

### 1.14 Safety Issues Investigation into Fishing Safety in Canada

In August 2009, the TSB undertook an in-depth safety issues investigation into fishing vessel safety in Canada. The *Safety Issues Investigation into Fishing Safety in Canada* (SII) report, released in June 2012, provides an overall national view of safety issues in the fishing industry, revealing a complex relationship and interdependency among these issues. The Board identified the following safety significant issues requiring attention: stability, lifesaving appliances, fisheries resource management, the cost of safety, safety information,

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society, standards development organization, industrial or trade organization, government, government agency or international body."

<sup>46</sup> Government of Canada, *Canada Gazette*, Part II, Vol. 150, No. 14 (13 July 2016), Regulations Amending the *Small Fishing Vessel Inspection Regulations*, subsection 3.46(1).

<sup>47</sup> Food and Agriculture Organization of the United Nations, International Labor Organization, and International Maritime Organization, *Safety Recommendations for Decked Fishing Vessels of Less than 12 metres in Length and Undecked Fishing Vessels* (2012), at <http://www.fao.org/docrep/017/i3108e/i3108e00.htm> (last accessed on 16 November 2017).

<sup>48</sup> *Ibid.*, Section 3.4.3.

<sup>49</sup> *Ibid.*, Section 3.11.1.

<sup>50</sup> *Ibid.*, Section 1.1.2.

<sup>51</sup> Government of Canada, *Canada Gazette*, Part II, Vol. 150, No. 14 (13 July 2016), Regulations Amending the *Small Fishing Vessel Inspection Regulations*, paragraphs 3.48(1)(b) and 3.48(1)(c).

<sup>52</sup> *Ibid.*, section 3.45.

safe work practices, the regulatory approach to safety, fatigue, training, and fishing industry statistics.<sup>53</sup>

## 1.15 Outstanding recommendations

### 1.15.1 Emergency position-indicating radio beacons

The occurrence vessel did not carry any distress communications devices. Between February 2010 and September 2016, there were 10 capsizing or sinking accidents in Canada,<sup>54</sup> including this occurrence, involving fishing vessels that measured less than 12 m and were not equipped with an EPIRB or successful in transmitting a distress message. These occurrences involved 28 crew members, 19 of whom lost their lives. Six of these accidents occurred less than 2 nm from shore; in at least 3 of the 10 accidents, crew members had cell phones.

In 1998, while crossing from Les Escoumins to Rimouski, Quebec, the scallop dragger *Brier Mist* swamped and sank approximately 10 nm offshore.<sup>55</sup> The wreck was never found; the bodies of 2 crew members were recovered, and the other 3 crew members were missing. The Board considered that all fishermen should have distress-alerting capability that should not rely on human intervention. It was further considered that fishermen forced into the water or survival craft should be able to continuously update their location to SAR coordinators for more rapid rescue. Therefore, in 2001, the TSB 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 M00-09**

TC's response to this recommendation indicated that the proposed new FVSR extend the requirement to carry an EPIRB on fishing vessels more than 12 m in length operating less than 25 nm from shore. Fishing vessels of not more than 12 m in length would have the option to carry an EPIRB in lieu of carrying a life raft or other survival craft.

According to the new regulations, opting to carry the EPIRB would require the vessel to also carry immersion or anti-exposure work suits if the water temperature is less than 15 °C. Also, fishing vessels of less than 12 m operating less than 25 nm from shore may opt to carry a means of 2-way communication in lieu of an EPIRB, such as a cell phone.<sup>56</sup> This same option

<sup>53</sup> TSB Marine Investigation Report M09Z0001.

<sup>54</sup> TSB marine investigation reports M10M0007, M10M0042, M11M0057, M12M0046, M12W0062, M14P0121, M14A0289, M15A0189, M16A0140, and M16A0327.

<sup>55</sup> TSB Marine Investigation Report M98L0149.

<sup>56</sup> The means of two-way communication must be effective; e.g., a cell phone must be in an area with cellular coverage.

is available to fishing vessels of any length operating in sheltered waters or in waters within 2 nm from shore.<sup>57</sup>

The new FVSR do not mitigate the risk identified in Recommendation M00-09. In March 2016, the Board reassessed the rating as Unsatisfactory, as the regulations did not include the requirement for all fishing vessels to carry an EPIRB or other appropriate equipment that floats free, automatically activates, alerts the SAR system, and provides position updates and homing-in capabilities. In June 2017, the Board maintained the rating as Unsatisfactory, as the TSB continues to record fatalities and occurrences on board fishing vessels less than 12 m in length that were not equipped with an EPIRB, and that could not or did not use any other means of signalling distress.<sup>58</sup>

### 1.15.2 Stability assessment and information for existing fishing vessels

The occurrence vessel had not undergone any stability assessment, nor was it required to do so under the SFVIR in effect at the time of the occurrence.

On 05 September 2015, the large fishing vessel *Caledonian* capsized 20 nm west of Nootka Sound, British Columbia. At the time, the vessel was trawling for hake with 4 crew members on board. Following the capsizing, the master and mate climbed onto the overturned hull and remained there for several hours. When the vessel eventually sank, the master and mate abandoned it, and the mate swam toward and boarded the life raft. The CCG subsequently rescued the mate and recovered the bodies of the master and the 2 other crew members. The Board considered that all fishing vessels should have a stability assessment. It was further considered that fishermen should have access to accurate stability information based on the stability assessment. Therefore, in 2016, the TSB recommended that

The Department of Transport require that all small fishing vessels undergo a stability assessment and establish standards to ensure that the stability information is adequate and readily available to the crew.

#### **TSB Recommendation M16-03**

In total, small fishing vessels represent approximately 99% of the entire Canadian fishing fleet of 23 878 TC-registered vessels.<sup>59</sup> For the majority of these small fishing vessels, there is no requirement to have stability assessments or for crew to be provided with adequate stability information based on a stability assessment.

<sup>57</sup> Government of Canada, *Canada Gazette*, Part II, Vol. 150, No. 14 (13 July 2016), Regulations Amending the *Small Fishing Vessel Inspection Regulations*, subsection 3.28(1).

<sup>58</sup> Detailed information regarding Recommendation M00-09, responses and reassessments, is available at [http://www.tsb.gc.ca/eng/recommandations-recommendations/marine/2000/rec\\_m0009.asp](http://www.tsb.gc.ca/eng/recommandations-recommendations/marine/2000/rec_m0009.asp) (last accessed on 16 November 2017).

<sup>59</sup> In any given year, approximately 60% of TC-registered fishing vessels are active. An active vessel is registered with DFO and has at least 1 recorded landed catch in a given calendar year.

TC recognized the risk to vessel safety associated with these issues and, when developing the FVSR, included a requirement for all new and existing commercial fishing vessels greater than 9 m in length to have a stability assessment. However, during public consultations, industry stakeholders considered the proposal to be impractical and to impose an undue financial burden.<sup>60</sup> As a result, TC amended the stability requirements such that, with a few specific exceptions, only new vessels greater than 9 m in length will be required to have a stability assessment.

The FVSR requires a competent person who conducts a stability assessment to develop a stability booklet and provide information (referred to in the FVSR as a “stability notice”) that describes the operational practices necessary to remain within the safe operating limits, as set out in the stability booklet. However, these requirements are limited to new vessels that are over 9 m in length.

The TSB believes that it will take focused and concerted action by federal and provincial government agencies and industry members to finally and fully address the safety deficiencies that persist in Canada’s fishing industry. Once all small commercial fishing vessels have undergone stability assessments that are appropriate to their size and operations, and fishermen have access to adequate stability information, the loss of life associated with inadequate fishing vessel stability will be substantially reduced.

### *1.16 Previous occurrences*

In Newfoundland and Labrador, there was an average of 2 fishing-related fatalities each year from 2006 to 2016. There were a total of 7 fatalities in 2015 and 2016. The TSB has previously investigated several small fishing vessel occurrences where issues related to fisheries management, emergency communications, and vessels of open construction have been identified.<sup>61</sup>

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<sup>60</sup> Transport Canada, “Regulatory Impact Analysis Statement” (06 February 2016), at <http://www.gazette.gc.ca/rp-pr/p1/2016/2016-02-06/html/reg1-eng.php> (last accessed on 16 November 2017).

<sup>61</sup> TSB marine investigation reports M00N0089, M14A0289, M14P0121, M15A0189, and M16A0140.

## 1.17 TSB Watchlist

The TSB Watchlist identifies the key safety issues that need to be addressed to make Canada's transportation system even safer.

**Commercial fishing safety has been a Watchlist issue since 2010.** As this occurrence demonstrates, concerns remain about the use and availability of lifesaving appliances on board, such as EPIRBs, and about unsafe operating practices. Although regulations that apply to fishing vessels less than 24.4 m in length (phase 1 of the FVSR) have been published and will likely lower some of the risks associated with outstanding safety deficiencies, there remain gaps when it comes to stability assessments and associated guidance, as well as carrying EPIRBs and immersion suits on these vessels. For phase 3 of the regulations, which will apply to large fishing vessels over 24.4 m in length, no work has begun.

## 1.18 TSB laboratory reports

The TSB completed the following laboratory reports in support of this investigation:

- LP303/2016 – Examination of Outboard Motor
- LP105/2017 – Lowrance Elite 4 – Data Recovery

### **Commercial fishing safety will remain on the TSB Watchlist until**

- new regulations are implemented for commercial fishing vessels of all sizes;
- user-friendly guidelines regarding vessel stability are developed and implemented to reduce unsafe practices;
- there is evidence of behavioural changes among fishermen regarding the use of PFDs, EPIRBs, and survival suits, as well as of on-board safety drills and risk assessments being carried out; and
- there is concerted and coordinated action by federal and provincial authorities, leaders within the fishing community, and fishermen themselves to put in place strong regional initiatives and develop a sound safety culture in the fishing community.

## 2.0 Analysis

The Transportation Safety Board of Canada's (TSB's) investigation into the sinking of the small open fishing vessel *Pop's Pride* determined that the vessel proceeded in weather conditions beyond the normal operating conditions of a vessel of open construction.

This analysis will focus on fisheries management, emergency communications, safety standards for vessels of open design, vessel registration, the Memorandum of Understanding between Transport Canada (TC) and Fisheries and Oceans Canada (DFO), and the interdependency of safety issues.

Although the engine was found in the fully up position, which might suggest that the crew raised it as a result of engine trouble, the investigation determined that the engine did not fail. When the vessel swamped, seawater created a short circuit in the outboard engine tilt/trim circuit, which caused the engine to raise and remain in the fully up position until the tilt/trim circuit fuse blew due to overload.

### 2.1 Factors leading to the sinking and loss of life

At the time of the *Pop's Pride's* departure, environmental conditions were poor: the wind was at approximately 25 knots and the seas were at 2 m in height.

The crew chose to depart in those adverse conditions, although they were beyond the normal operating conditions of the vessel. One factor that may have influenced that decision was that licence conditions required the gear in the water to be recovered every 48 hours. Although regulations allow for an extension of this period where there are circumstances beyond the fisherman's control, this information was not contained in the licence conditions for this fishery. Therefore, the master of the *Pop's Pride* likely did not know this information. It was also a priority to retrieve the catch for financial reasons, as the uncaught quota for that week could not be carried over to the following week.

After the gillnets were recovered, the vessel was heavily loaded with the 4 nets, an estimated 700 pounds of catch, and 4 crew members; this reduced the vessel's freeboard. On the way back, there was a 25- to 30-knot wind and seas of up to 2 m that hit the vessel on its port side.

At some point, the vessel swamped and sank, leaving the 4 crew members in the water. The investigation determined that this was likely caused by 1 of 2 scenarios:

- The vessel took significant spray as it travelled past Blackhead due to the localized effect that increased the wind and spray in that area. The spray would have caused water to accumulate in the vessel below the gillnets and fish on board. If the crew had attempted to use the planing method to remove water from the vessel, it would likely have been ineffective, given the vessel's loaded condition and the sea state. As the water on board increased, the vessel's freeboard would have been further reduced, causing it to eventually swamp and sink.
- The vessel may have suddenly taken a large wave over the gunwale, causing it to instantly swamp and sink.

The vessel did not float at the surface of the water, because it lacked inherent buoyancy in its design and construction.

Because no distress signals were transmitted, no rescue efforts were initiated until the vessel was reported overdue. There were 4 cell phones on board, but there was likely no time to issue a call. There was no emergency position-indicating radio beacon (EPIRB) or very high frequency (VHF) radiotelephone on board.

## 2.2 *Fisheries management plan*

Commercial fishing often creates economic pressures that can lead fishermen to take risks to maximize their catch. Complying with resource management measures can also contribute to risk taking. A 2008 report from the Food and Agriculture Organization of the United Nations found that “fisheries management has indirect and direct effects on fishing safety.”<sup>62</sup> Furthermore, in a study published by Memorial University of Newfoundland and Labrador, researchers found that

the actions and behaviors of fish harvesters are largely influenced by fisheries management regulations [...] [and] fisheries policies have traditionally been developed without regard for their potential impacts on health and safety.<sup>63</sup>

An awareness of the safety implications of fisheries management resource measures is reflected in the DFO guidance document “Preparing an Integrated Fisheries Management Plan.” However, the specific requirements in place in the cod fishery do not seem to reflect the same safety considerations.

In this occurrence, the crew decided to sail in adverse weather and sea conditions, likely due to several factors related to fisheries resource management. One was the specific requirement to ensure that nets were attended to every 48 hours. While the requirement is intended to ensure fresher product and minimize waste, there is limited consideration for situations in which attending to the gear would be unsafe, such as in periods of extended inclement weather conditions. Although the *Newfoundland and Labrador Fishery Regulations* include an exception for circumstances beyond the fisherman’s control, the circumstances are not defined and the licence conditions for this fishery did not inform the fishermen of the exception.

Because the closing date was not predetermined, the season could close at any time and, as a result, the crew were likely highly motivated, for economic reasons, to meet the weekly quota for the weeks they knew the fishery would be open. There is increased pressure on harvesters to catch their full weekly quota, with no exceptions for weather conditions. If there were a quota for the entire season, as was the case in previous years, fishermen might

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<sup>62</sup> Food and Agriculture Organization (FAO), “Report of the Expert Consultation on Best Practices for Safety at Sea in the Fisheries Sector” (Rome: FAO, 2009), p. iv (abstract).

<sup>63</sup> Safety Net, Memorial University of Newfoundland, “SafeCatch, Fishing Occupational Health and Safety: A Comparative Analysis of Regulatory Regimes” (2006), p. 16.

elect to fish on days when the weather is more favourable. A weekly quota typically leads to more trips to the fishing grounds and therefore an increased exposure to all of the risks associated with the commercial fishing industry.

Although DFO Newfoundland and Labrador had previously taken measures in other fisheries to improve the safety of fishermen with safety-oriented management measures—for example, requiring opening and closing in daylight hours and allowing for buddy-up arrangements—no similar steps are evident in the cod fishery. In fact, for this specific fishery, their requirements are directly in contradiction to those measures, prohibiting buddy-up arrangements and always starting the weekly quota at midnight.

Although fisheries resource management requirements do not supersede the master's responsibility and sound judgment in ensuring a safe voyage, these requirements should not increase pressures on harvesters that may lead to unsafe fishing operations.

When a specific fishery develops its Integrated Fisheries Management Plan (IFMP), the inclusion of the "Safety at Sea" section is intended to ensure that the safety of commercial fishermen is addressed in accordance with the guidance document provided by DFO. However, in this occurrence, the information contained in the "Safety at Sea" section is generic to all commercial fishing activities and does not address the specific requirements of how this specific fishery is carried out.

Safety must be considered at all levels, from theory to the practical requirements set in place, with consideration of the conditions of the specific fishery. Although DFO's guidance for the creation of IFMPs reflects the safety consideration of economic pressures that increase risk, as seen in this occurrence, IFMPs may not consider fishery-specific safety information and measures. The framework for the fishery, established by the IFMP, is most effective when it is established with the safety of fishermen in mind, as well as the awareness that fishermen may take risks for several reasons, including economic pressure.

If specific fish harvesting measures do not take into account the safety impact on fishermen, there is a risk that fishermen will fish in conditions they would otherwise avoid in the absence of a given measure and, in doing so, compromise the safety of the vessel and crew.

### 2.3 *Emergency communications*

In incidents involving fishing vessels of 8.5 m in length or less, there is rarely, if ever, a distress call. Emergency situations may unfold so rapidly that there is little or no time to verbally or manually transmit a distress call, which delays the initiation of search-and-rescue efforts and decreases the chances of survival. When vessels carry an EPIRB that is either manually activated by crew or automatically activated when it floats free of the vessel and continually transmits the vessel's location, the time people are in the water before help arrives can be greatly reduced.

In this occurrence, all 4 of the crew members had personal cell phones, but no distress call was received. As a result, the search-and-rescue response was delayed, being initiated only when family members and other fishermen became concerned and reported the vessel

overdue to the Joint Rescue Coordination Centre Halifax. The occurrence vessel did not carry a VHF radiotelephone or EPIRB, nor was either device required by regulation.

Previous TSB investigations have found that carrying an EPIRB can contribute to the saving of lives due to its ability to automatically send a distress signal that also indicates the location of the distress. Between February 2010 and September 2016, 10 capsizing or sinking accidents, including this occurrence, have been reported to the TSB. These accidents involved small fishing vessels of less than 12 m that were not equipped with an EPIRB, and in each occurrence no distress signals were received. These 10 accidents resulted in a total of 19 fatalities.

If fishing vessels do not carry communications equipment that is capable of sending an automatic distress signal, such as an EPIRB, search-and-rescue efforts may be delayed or not initiated, increasing the risk of fatalities.

## 2.4 *Safety standards for vessels of open design*

By virtue of their smaller size and absence of a watertight deck, open vessels, such as the *Pop's Pride*, are vulnerable to water shipping over the side or swamping. In the event of swamping, an open vessel must have adequate inherent buoyancy to keep it afloat and upright, providing a level of protection from the elements as well as a platform from which the occupants can signal a distress and wait for assistance.

As of 13 July 2017, the safety requirements for small open fishing vessels are established by the *Fishing Vessel Safety Regulations* (FVSR). The regulations require new fishing vessels of not more than 6 m in length to have the ability to remain upright in the event of swamping or flooding. However, new fishing vessels of more than 6 m but not more than 9 m in length, similar in length to the *Pop's Pride*, may be constructed in accordance with any of numerous recommended practices and standards. While the International Organization for Standardization standards and the Food and Agriculture Organization of the United Nations recommendations ensure that these vessels remain afloat and upright when swamped, Transport Canada TP 1332 does not consider buoyancy and flotation. Therefore, a builder may choose an acceptable building standard that lacks the requirements for buoyancy and flotation, thereby not ensuring that the vessel will remain afloat and upright when swamped.

If Canadian design and safety standards for open vessels do not require fishing vessels of 9 m in length or less to be manufactured with adequate buoyancy to remain upright and afloat when swamped or flooded, the likelihood of survival in these emergency situations is reduced.

The FVSR require any new fishing vessel of more than 9 m in length to undergo a stability assessment. With few specific exceptions, existing fishing vessels more than 9 m in length are not required to have a stability assessment completed. New fishing vessels of 9 m or less in length, similar in length to the occurrence vessel, are not required to undergo a stability assessment, but are to be constructed in accordance with recommended practices and standards. Existing fishing vessels of 9 m or less in length, such as the *Pop's Pride*, require no assessment of stability, buoyancy, or flotation. Therefore, the new FVSR allow for most

existing fishing vessels and new vessels of 9 m or less in length to operate without a stability assessment, and without the vessel- and operation-specific stability information that would have been provided through this assessment.

If all fishing vessels, including existing vessels, do not have a stability assessment that includes information that is comprehensible and relevant to the vessel's specific operations, there is a risk that operating practices will compromise vessel stability.

## 2.5 *Vessel registration*

Although commercial vessels in Canada are required to be registered with TC, a large number of vessels remain unregistered with TC but have been registered with DFO. In this occurrence, the *Pop's Pride* was registered as a commercial fishing vessel with DFO, but had not been registered with TC.

When a commercial vessel is not registered with TC, the regulator responsible for the safety of fishing vessels is unaware of the existence of the vessel, its condition, or its compliance with applicable safety regulations. For owners and operators of unregistered vessels whose size subjects them to periodic inspection, no periodic inspections will be conducted. In the case of owners and operators of smaller vessels that are not required to undergo a periodic inspection, the failure to register their vessels with TC may indicate a lack of awareness of or a lack of compliance with safety regulations that apply to their vessel. Furthermore, if TC is unaware of the vessel, it is prevented from conducting random compliance inspections.

The *Small Fishing Vessel Inspection Regulations*, in force at the time of the occurrence, required that a minimum level of safety equipment be carried on board the occurrence vessel. The new FVSR also have specific requirements for safety equipment and safe operating procedures for vessels like the *Pop's Pride*. If TC is not aware of an unregistered vessel, it therefore has no means to ensure that the vessel complies with the safety requirements of these regulations.

If all commercial fishing vessels are not registered with TC, there is a risk that vessel masters or operators will not be aware of, or will not comply with, safety regulations intended to increase the safety of fishing vessels and fishermen.

In British Columbia, DFO has implemented a regional policy to ensure that commercial fishing vessels registering with DFO have registered with TC; however, this policy has not been adopted nationally. In Newfoundland and Labrador, DFO has implemented a regional policy where fish harvesters must prove that they have obtained a certification as a Level II professional fish harvester from the Professional Fish Harvesters Certification Board before they can be issued their fishing licence. This ensures that fish harvesters have obtained a certain level of experience and safety training. These regional policies in British Columbia and Newfoundland and Labrador demonstrate the value of collaboration among organizations involved in the safety of fish harvesters.

Although TC and DFO have signed a memorandum of understanding (MOU) to collaborate on the issue of safety at sea, this is not reflected nationally in DFO's vessel registration

policy, because DFO does not verify that the owner or operator has registered their vessel with TC before issuing a licence.

If TC and DFO do not share vessel information, there is a risk that commercial fishing vessels will not register with TC or will not comply with TC safety regulations.

## 2.6 *Memorandum of understanding*

TC and DFO, both signatories to the MOU, remain active on the issue of safety at sea for commercial fishermen. This is demonstrated in part by their updating and re-signing of the MOU in 2015. DFO and TC have had some meetings, and TC has been invited to many DFO advisory meetings in Newfoundland and Labrador.

However, the fisheries management measures for the 2016 Northern Cod Stewardship fishery do not reflect the objectives established in the MOU. In fact, in some ways these measures contradict the proactive management measures that DFO has implemented to improve the safety of some fisheries.

Although the MOU has been cited by TC in its response to 2 TSB recommendations as a proactive initiative in developing a safety culture among commercial fishermen, the principles highlighted in the MOU are not consistently being implemented in the practical plans, practices, and policies affecting fishermen, as was seen in this occurrence.

Furthermore, the investigation found no record that DFO has reviewed the “Safety at Sea” sections of IFMPs, which was one of the MOU’s objectives.

The safety implications of specific fishery management measures, the level of specificity in the “Safety at Sea” sections of IFMPs, and vessel registration practices that allow fishing vessels to be registered with DFO but not with TC are 3 examples of areas that do not seem to reflect the objectives established by the MOU.

If the principles of the MOU signed by TC and DFO are not consistently reflected in the plans and policies developed by those departments, there is a risk that those plans and policies will not improve the safety of fishermen.

## 2.7 *Safety issues in the fishing industry*

The *Safety Issues Investigation into Fishing Safety in Canada* (SII) categorized actions impacting 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.<sup>64</sup> In this occurrence, practices and procedures relating to 3 of the 10 safety significant issues identified in the SII were evident:

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<sup>64</sup> TSB Marine Investigation Report M09Z0001.

### 2.7.1 Fisheries resource management

Findings of the Safety Issues Investigation into Fishing Safety in Canada	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, operating in poor weather.	The master sailed in adverse weather to retrieve his nets and catch his weekly quota before the end of the week, when the quota and associated earnings would be lost.
Fishermen can compromise vessel stability when they operate vessels in conditions for which they were not intended.	The master sailed in conditions beyond the normal operating conditions for the vessel.
Fishermen are put at risk when fisheries resource management measures do not consider safety at all levels, from policy through to practice.	Fisheries resource management measures such as weekly quotas and time limits on how long gear can remain unattended are implemented to maintain the stock and economic viability of the industry without detailed consideration of the safety implications to fishermen.

### 2.7.2 Lifesaving appliances

Findings of the Safety Issues Investigation into Fishing Safety in Canada	Relationship to this occurrence
Fishermen may fit their vessels with lifesaving appliances (LSAs) only for regulatory compliance.	The vessel was not fitted with any non-compulsory lifesaving appliances, such as an EPIRB.

### 2.7.3 Safe work practices

Findings of the Safety Issues Investigation into Fishing Safety in Canada	Relationship to this occurrence
Fishermen change or eliminate some safe work practices to meet economic pressures.	The master sailed in adverse weather conditions to catch his weekly quota before the end of the week, when the quota and associated earnings would be lost.
Unsafe work practices continue to put fishermen and their vessels at risk.	The decision to sail in poor weather conditions was likely influenced by a combination of fisheries resource management measures and economic pressures.

## 2.8 Interdependency of safety issues

The safety of fishermen is compromised by numerous issues that are interconnected. The following safety issues share a complex relationship and contributed to this occurrence:

- fisheries resource management;
- unsafe work practices; and
- the use and availability of lifesaving appliances.

Past attempts to address these safety issues on an issue-by-issue basis have not led to the intended result: a safer environment for fishermen. The SII emphasizes that, 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 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.

## 3.0 Findings

### 3.1 Findings as to causes and contributing factors

1. At the time of the *Pop's Pride's* departure, environmental conditions were poor; the wind was at approximately 25 knots and the seas were at 2 m in height.
2. The crew chose to depart in those adverse conditions, although they were beyond the normal operating conditions of the vessel.
3. After the gillnets were recovered, the vessel was heavily loaded with the 4 nets, an estimated 700 pounds of catch, and 4 crew members; this reduced the vessel's freeboard.
4. The vessel swamped and sank, leaving the 4 crew members in the water.
5. Because no distress signals were transmitted, no rescue efforts were initiated until the vessel was reported overdue.

### 3.2 Findings as to risk

1. If specific fish harvesting measures do not take into account the safety impact on fishermen, there is a risk that fishermen will fish in conditions they would otherwise avoid in the absence of a given measure and, in doing so, compromise the safety of the vessel and crew.
2. If fishing vessels do not carry communications equipment that is capable of sending an automatic distress signal, such as an emergency position-indicating radio beacon, search-and-rescue efforts may be delayed or not initiated, increasing the risk of fatalities.
3. If Canadian design and safety standards for open vessels do not require fishing vessels of 9 m in length or less to be manufactured with adequate buoyancy to remain upright and afloat when swamped or flooded, the likelihood of survival in these emergency situations is reduced.
4. If all fishing vessels, including existing vessels, do not have a stability assessment that includes information that is comprehensible and relevant to the vessel's specific operations, there is a risk that operating practices will compromise vessel stability.
5. If all commercial fishing vessels are not registered with Transport Canada, there is a risk that vessel masters or operators will not be aware of, or will not comply with, safety regulations intended to increase the safety of fishing vessels and fishermen.
6. If Transport Canada and Fisheries and Oceans Canada do not share vessel information, there is a risk that commercial fishing vessels will not register with Transport Canada or will not comply with Transport Canada safety regulations.

7. If the principles of the Memorandum of Understanding signed by Transport Canada and Fisheries and Oceans Canada are not consistently reflected in the plans and policies developed by those departments, there is a risk that those plans and policies will not improve the safety of fishermen.
8. The safety of fishermen will be compromised until the complex relationship and interdependency among safety issues is recognized and addressed by the fishing community.

## 4.0 *Safety action*

### 4.1 *Safety action taken*

The Board is not aware of any safety action taken as a result of this occurrence.

*This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 18 October 2017. It was first released on 27 November 2017.*

#### **Correction**

The reference to the Newfoundland and Labrador Fish Harvesting Safety Association and footnote 28 describing the association have been removed from the last sentence of the fourth paragraph of section 1.10.2, 2016 Northern Cod Stewardship fishery.

The sentence now reads, "None of the agenda items addressed the safety of fishermen, and no representatives from TC were in attendance." The text of footnote 28 has been added to footnote 24.

*This correction was approved by the Board on 28 November 2017, and the corrected version of the report was released on 08 December 2017.*

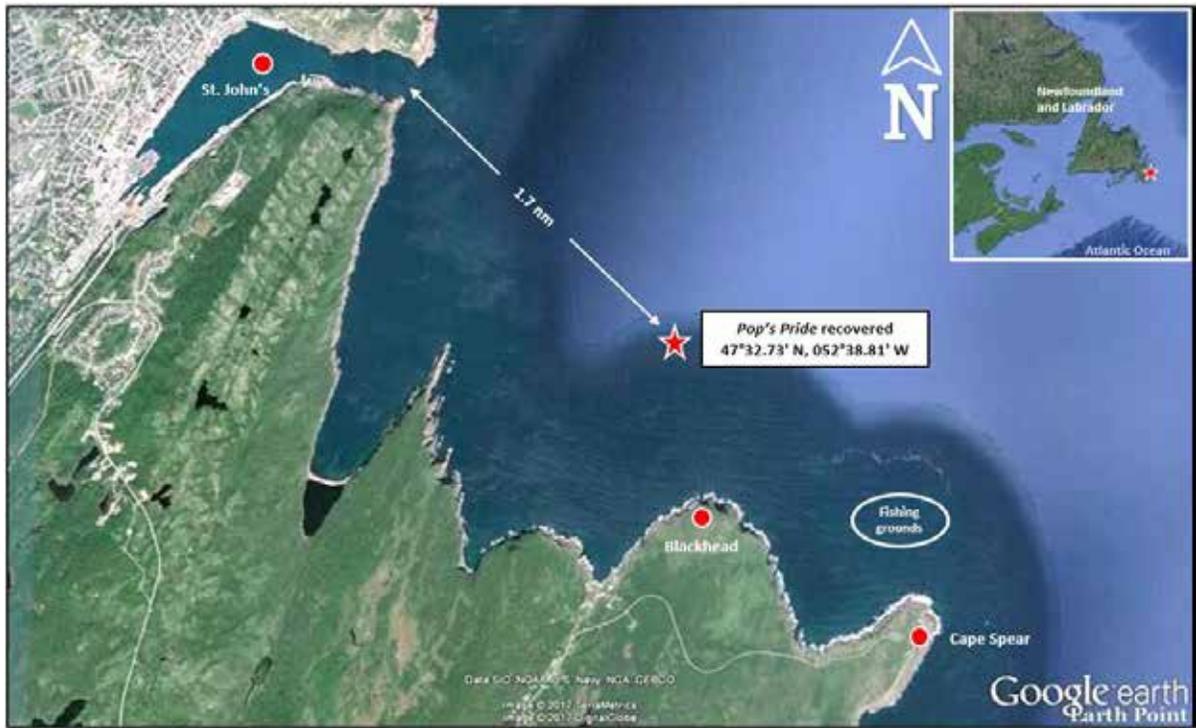
*Visit the Transportation Safety Board of Canada's website ([www.tsb.gc.ca](http://www.tsb.gc.ca)) for information about the TSB and its products and services. You will also find the Watchlist, which identifies the key safety issues that need to be addressed to make Canada's transportation system even safer. 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.*

## Appendices

### Appendix A – Drain holes



*Appendix B – Area of the occurrence*



Source: Google Earth, with TSB annotations

*Appendix C – Northwest Atlantic Fisheries Organization (NAFO) fishing area map showing Divisions 2J3KL*



Source: Fisheries and Oceans Canada at <http://www.dfo-mpo.gc.ca/international/media/images/NAFOmap-carteOPANOlg-eng.jpg> (last accessed on 16 November 2017).