

MARINE INVESTIGATION REPORT

M02W0102

CAPSIZING

SMALL FISHING VESSEL *FRITZI-ANN*
NEAR KELSEY BAY, BRITISH COLUMBIA

08 JULY 2002

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.

Marine Investigation Report

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Summary

On 08 July 2002 at about 0649, while en route from Port Hardy, to Comox, British Columbia, the fishing vessel *Fritzi-Ann*, sailing light with 500 prawn traps on deck, capsized while attempting to counter strong tidal rips in the vicinity of Kelsey Bay Harbour. All three crew members abandoned the vessel using the liferaft and were rescued soon after by the fishing vessel *Serena Joye*. The vessel was righted two days later. No one was injured.

Ce rapport est également disponible en français.

Other Factual Information

Particulars of the Vessel

Name	<i>Fritzi-Ann</i>
Official Number	329339
Port of Registry	Nanaimo, B.C.
Flag	Canada
Type	Small fishing vessel
Gross Tonnage ¹	28.73
Length ²	16.15 m
Built	1969, North Surrey, B.C.
Propulsion	General Motors 8V-71 diesel engine, 220 BHP, single screw
Crew Members	3
Owner	G & I Fishing and Investments Ltd., Comox, B.C.

Description of the Vessel

The *Fritzi-Ann* is a small wooden carvel-built fishing vessel of closed construction with a rounded bilge. The wheelhouse, crew accommodation and engine-room space are located forward of midships. An insulated fish hold, a small freezer compartment and the lazaret are located aft. The fish hold is divided into six sections by portable pen boards and it has a fibreglass weathertight hatch cover.



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.

² See Glossary at Appendix C for all abbreviations and acronyms.

Below the main deck, the hull is subdivided by three transverse watertight bulkheads into the following compartments: forward crew accommodation space, engine room, fish hold, and lazaret space. Fuel oil wing tanks are located at the port and starboard sides of both the engine room and the lazaret space. The freshwater tank is located between the fuel oil wing tanks in the lazaret space.

An aluminum platform, extending approximately 1.67 m aft of the extreme after end of the weather deck, is used to store prawn traps. An aluminum railing surrounds the perimeter of the extension.

The wheelhouse is equipped with navigation and communications gear including two radar sets and a video plotter, two very high frequency (VHF) radios, a global positioning system (GPS), autopilot, and depth sounders. The radar sets interface with an electronic chart display system.

History of the Voyage

The 2002 Pacific Coast "Prawn by Trap" fishery season for the northern shores of British Columbia ran from May 1 to July 6. The *Fritzi-Ann* participated in the fishery throughout the season, calling into Port Hardy to off-load catches. Its crew of three fished around the Ivory Island area, off the north-central coast of British Columbia, about 100 miles north of Port Hardy.

On July 5, the vessel departed the fishing grounds for the home port of Comox via Port Hardy. There were 4082 kg (9000 lb) of prawns and octopuses in the fish hold, and 500 prawn traps stowed on the after part of the weather deck.

At 2130³ on July 6, fuel and freshwater tanks were about half full when the *Fritzi-Ann* arrived in Port Hardy. (See Appendix A for a sketch of the occurrence area.)

On July 7, after off-loading the catch and topping up all fuel and freshwater tanks, the vessel had 1600 gallons of fuel oil and 300 gallons of freshwater. It departed Port Hardy at 1500. While proceeding eastbound through Johnstone Strait, the *Fritzi-Ann* was reported to be rolling heavily, even though the prevailing weather and seas were calm. The vessel anchored for the night in Blenkinsop Bay.

On July 8, the vessel weighed anchor at 0530 and headed for Comox. The skipper was at the helm with a deckhand on watch with him. The other deckhand was asleep in the crew quarters. Proceeding in a southeasterly direction at approximately 4.5 knots, the *Fritzi-Ann* was some 3.3 cables to the northwest of Kelsey Bay Harbour when it encountered strong tidal rips, causing the vessel to sheer sharply to port. The skipper attempted to counteract the sheer by applying starboard helm, but this resulted in the vessel heeling over to starboard. Tidal rips continued to cause the vessel to sheer further to port. To counter this action, more starboard helm was applied, making the vessel heel even more to starboard.

³

All times are Pacific daylight time (Coordinated Universal Time minus seven hours).

In an attempt to avoid heeling the vessel any further, the engine was throttled back to idling speed and astern propulsion was engaged, but these efforts failed to correct the heel. As a last resort, the engine was set to full ahead.

At about 0649, within seconds of this last manoeuvre, the vessel quickly heeled over onto its starboard beam ends. Water soon downflooded through a porthole and other openings. The second deckhand was awakened and both deckhands prepared the liferaft for launching and made ready the immersion suits. They scrambled onto the ship's side and attempted to use a portable VHF to send a distress message.

When the radiotelephone failed to work, the skipper broke the wheelhouse window, re-entered and, using VHF channel 16, informed Comox Marine Communications and Traffic Services (MCTS) of their position and their situation. The skipper retrieved log books before escaping from the wheelhouse and rejoining the other crew members. All three donned their immersion suits and abandoned the vessel into the liferaft. Minutes later, the vessel capsized completely, floating in the overturned condition. (See Appendix B for photographs of the capsized *Fritzi-Ann*.)

The crew of the fishing vessel *Serena Joye* at berth in Kelsey Bay noticed the liferaft, and used its skiff to rescue the survivors. The *Fritzi-Ann* was towed into the harbour and righted the following day. None of the crew members were injured and there was no reported pollution to the environment.

Damage to the Vessel

Damage to the hull, mast and rigging was minimal. The navigation equipment and machinery sustained extensive water damage. Declared a constructive total loss for insurance purposes, the vessel was later sold, but has not been put into service.

Vessel Certification

The *Fritzi-Ann* was inspected by Transport Canada (TC) on 13 December 2001, and a full-term Safety Inspection Certificate (SIC 29) was issued for voyages within the limits of Home Trade Class II until 12 December 2005.

As part of TC's Ship Registration Program, a Certificate of Registry with a covering letter is sent to the registered owner or authorized representative. The cover letter includes information indicating that modifications to the vessel must be reported to TC,⁴ and that the Certificate of Registry has a three-year expiry date from the day the certificate is issued. This new process began in February 2000, as part of the *Canada Shipping Act* reform.

The new certificate was not issued to the registered owner of the *Fritzi-Ann*. Prior to and during the introduction of the new process, the owner failed to respond to TC standard letters of request for an update of the vessel's status data and the owner's current address.

⁴

Consistent with *Canada Shipping Act* provisions.

Personnel Certification and History

The skipper and crew of the *Fritzi-Ann* held no formal marine qualifications, nor were they required to. The present crewing regulations do not require skippers or crews of small fishing vessels of less than 60 gross registered tons to hold any marine certificate of competency.

None of the crew members had received training in marine emergency duties (MED), nor were they required to. The operator had sailed the vessel for about 12 years, the last 7 as skipper, since taking over from his father. All three crew members had fished together for the last 9 years. Their individual experience on fishing vessels ranged from 9 to 22 years.

Weather Information

Winds were from the northwest at 10 knots with an air temperature of 15°C. Seas were calm, but heavy tide rips were experienced in the area of the capsizing.

Tide and Current Information

On 08 July 2002, high water for the Kelsey Bay area⁵ was predicted to be at 0020 with a height of 4.4 m above chart datum and low water at 0745 with a height of 0.8 m above chart datum. The accident occurred at approximately 0649, some 56 minutes before low water.

Tidal streams run strongly through Current Passage and Race Passage. They attain 5 knots on the ebb and flood in Current Passage and 6 knots on the ebb and flood in Race Passage.

The capsizing occurred in an area to the west of both Current Passage and Race Passage, where the effects of current, although less, were still present about one hour before low water. Any current experienced would be in a 280° T direction.

Tide rips, dangerous to small craft, are encountered between Kelsey Bay and Port Neville.⁶

Vessel Stability History

As a small fishing vessel of closed construction not engaged in fishing for herring or capelin, the *Fritzi-Ann* was not required to comply with the intact stability requirements of Section 29 of Part I of the *Small Fishing Vessel Inspection Regulations*, nor was it required to meet the criteria included in a section of the *Stability, Subdivision and Load Line Standards* (TP 7301) entitled "Stability Standards for Fishing Vessels STAB 4."

⁵ Tidal differences for Kelsey Bay are referenced on Alert Bay (Tide Tables Volume 6)

⁶ *Sailing Directions for the British Columbia Coast (South Portion)*, volume 1, Sixteenth Edition

A rolling period test, carried out on 17 April 1969, showed the newly constructed vessel as having a positive metacentric height (GM) of 0.50 m.

In 1990, modifications were made to the vessel, including replacement of the old wooden deckhouse with an aluminum one. An aluminum platform extension to the after end of the vessel was also added for storing prawn traps. The high platform was located at bulwark level, in line with the aftermost step in the main deck. A marine consultant's calculation showing the comparative weights of the old wooden and new aluminum deckhouses was submitted to TC.

These calculations indicated that the new structure had a lower centre of gravity and a reduction in total weight. A subsequent rolling period test, also carried out in 1990 in the presence of a TC inspector, showed the vessel to have a GM of 0.33 m. TC accepted the consultant's calculations as evidence of the *Fritzi-Ann's* stability characteristics at that time, provided the following instructions are observed:

- That no additional weights be added high on the vessel; i.e., on top of the deckhouse or on top of the aft canopy.
- Slack tanks should be kept to a minimum during fishing operations.
- Gear for fishing operations and the crew's personal gear should be stowed as low in the vessel as is possible.

In 1995, following the adoption by the Department of Fisheries and Oceans (DFO) of the reallocated trap limits (RTL) policy, vessel owners were able to double up on the original "Prawn by Trap" single fishing licence by transferring licensing rights and additional traps from another vessel.

Another extension of about 0.91 m was added in about 1999 to the existing platform extension to accommodate the increase in the number of prawn traps from 300 to 500, as a result of the RTL policy provision. The overall extension is now 1.67 m. This modification was not reported to TC. The traps were stored in stacks of 25 to a height of 1.98 m above the main deck. They extended over the deck area from about 1 m aft of the fish hold hatch to the extreme after end of the extension platform. The traps averaged in weight from 2.7 kg to 5.2 kg.

After the capsized *Fritzi-Ann* was recovered and prepared in a suitable condition, TSB investigators conducted rolling period tests on the vessel to determine the GM. The tests showed that, in the light condition with oil, fuel and freshwater tanks full, and with no traps on board, the average transverse GM was 0.31 m. In the same light condition with an additional equivalent weight of the 500 traps on deck, as carried on board at the time of capsizing, the GM was found to be 0.23 m.

The rolling period test is a method of approximating a ship's initial metacentric height and may be used for vessels up to 24 m in registered length, if it is not practical to carry out an inclining experiment. When it is not acceptable as a basis for determining a ship's stability characteristics, an inclining experiment is required by regulation.

Chronological Sequence of Events in the Prawn and Shrimp Trap Fishery

In 1990, as a Fishery Management Conservation measure, vessel length and licence limitations were introduced. There were no limitations or restrictions on procuring a licence to fish for “Prawn and Shrimp by Trap” until then. The number of licences issued was set to a reduced number of vessels. Also, DFO decided to bind the length of vessel to each particular licence issued, with the proviso that the transfer of licences is only permitted if the replacement vessel does not exceed the overall length of the vessel being replaced.

Until 1995, there were no trap limits in the fishery and some vessels fished in excess of 1000 traps each. Many of these traps were transported to the fishing grounds by other vessels. In 1994, there were in excess of 100 000 traps in use.

The Prawn Sectoral Committee, concerned with the large number of traps in use and the resulting gear conflict on the grounds, requested DFO to establish limits on how many traps could be fished. DFO consulted with industry in 1994 and set trap limits in 1995 at 300 for a single licence and 450 for vessels with RTL. The trap limit for vessels with RTL licences was increased from 450 to 500 for a portion of the coast in 2000 and for the entire coast for season 2001. About 250 prawn fishing licences have been issued on the West Coast, and of these, about 35 are vessels with RTL.

Before trap limits were adopted in 1995, operators set their traps and tended them only once a day to haul in their catch. Once trap limits were adopted, vessels began hauling in their reduced number of traps two to three times a day. To mitigate this practice, another DFO management measure was introduced in 2000 as a pilot project in southern coastal waters and extended to the entire coast in 2001. This involved limiting commercial trap hauling to once per day from 0700 to 1900.

Evolution of Size and Weight Limitations for Prawn Traps

At one time, the more commonly used prawn traps were of the “bucket type.” They were shaped like buckets with their bottoms removed and substituted with a netting and a grab line. Fishers got into the habit of tying two of these bucket traps together and using them as a single trap. This arrangement did not segregate the various sizes of prawns well, resulting in an increased catch mortality rate. These traps weighed approximately 0.9 kg each. By 1994, however, most traps were triple-ring cone nesting or wire mesh.



Concerned about conservation and sustainability in the prawn industry stemming from inappropriate use of the older bucket-type prawn traps, DFO set the upper limits for traps by volume and mesh size in 1995. The specifications were set at 170 litre volume and 38.1 mm mesh size, but no consideration was given to the weight of the traps. When licence holders acted to make their traps more robust and keep their volumetric shape and size, the weight of traps increased from 2 kg to 5 kg.

Analysis

Conditions Leading to the Capsizing

The capsizing occurred in an area to the west of both Current Passage and Race Passage, where the weaker current would have had a less effect on the vessel's behaviour. Tide rips, dangerous to small craft, are encountered in the vicinity of Kelsey Bay and had a major effect on the vessel.

Regardless of the amount of expertise and skills required to manoeuvre a vessel caught in strong tidal rips, it is of the utmost importance for a vessel to have good stability. The uniformly low values of the rolling period tests indicate the limited nature of the vessel's transverse stability, particularly in the light condition. Hence, it tended to roll on its homeward voyage when it approached the waters off Kelsey Bay.

Strong tidal rips caused the *Fritzi-Ann* to sheer to port and the tidal stream would have flowed against the starboard bow. When starboard helm was applied with the vessel moving ahead, pressure on the rudder developed a component lateral force to port and, being applied below the vessel's centre of gravity, caused an upsetting moment to heel the vessel to starboard. When the skipper put the engine to full ahead, the propeller delivered maximum thrust to the starboard-directed rudder. This caused such an increase in the upsetting moment to starboard that it overwhelmed the vessel's poor righting ability, resulting in the sudden capsizing.

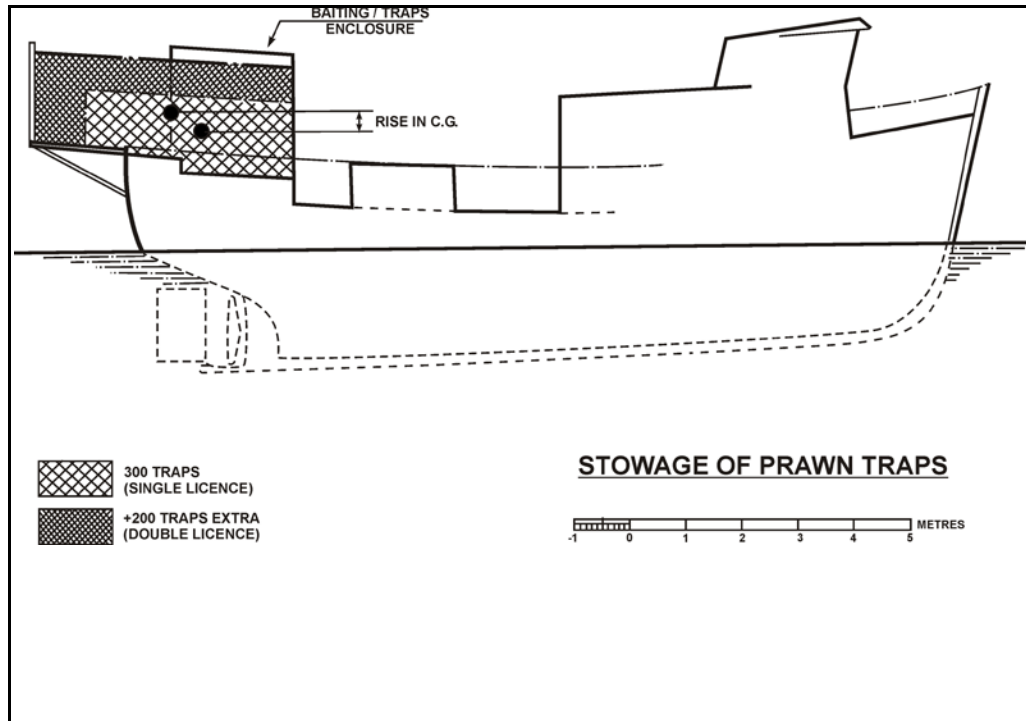
Vessel Stability

Figures supplied by the previous owner's marine consultant, after the wooden deckhouse was replaced with an aluminum one in 1990, indicate the aluminum deckhouse as having both a lower total weight and a lower centre of gravity, thus tending to improve the vessel's stability. Rolling period tests done on the vessel when new in 1969 and after the inclusion of the new deckhouse show an overall reduction in stability, with GM reduced by 0.17 m. This reduction in stability, despite the installation of the new deckhouse, should have increased the GM, indicating that, during the interim 21 years since its construction, the vessel had been subjected to other changes that eroded its stability.

TC accepted the 1990 figures as indicative of the vessel's stability at that time, subject to the owner/operator following the instructions provided. In this occurrence, 500 prawn traps were stowed on the after part of the weather deck. The instructions that no additional weights be added high on the vessel and gear for fishing operations be stowed as low in the vessel as possible were not followed. About 30 per cent of the total traps at the stern were situated higher than the deckhouse top, rather than low in the empty hold.

The RTL licence granted to the *Fritzi-Ann* led to practices that further adversely affected the vessel's transverse stability. The area of the deck and platform extensions available for the stowage of traps increased 20 per cent by adding the second extension, but the trap capacity increased in volume by 67 per cent. This resulted in the

Fritzi-Ann carrying 500 traps at an average height about 40 per cent greater than the 300 carried previously as a single licensed vessel (see Figure 1).



Stability Assessment

Although only applicable to small fishing vessels catching herring or capelin or large fishing vessels, TC Stability Standard STAB 4 is also recognized as the most appropriate “yardstick” to assess the intact transverse stability characteristics of other small fishing vessels of closed construction. Compliance with the minimum stability criteria of STAB 4 ensures that fishing vessels maintain adequate margins of intact transverse stability throughout a range of standard loading conditions related to the vessel’s intended service.

Rolling period tests carried out by the TSB during the investigation process indicated the following:

- In the light condition with oil fuel and freshwater tanks full, the average transverse metacentric height of 0.31 m is 11.4 per cent lower than the minimum GM 0.35 m required by STAB 4.

- In the light condition with 500 traps on the after deck, the average GM of 0.233 m is 33.4 per cent lower than the minimum required by STAB 4, showing a considerable reduction of the already low initial transverse stability due to the weight and location of the fishing traps.

The GM obtained by these tests is less precise than that derived from an inclining experiment. They provide only a relative indication of a vessel's initial transverse stability. The uniformly low values of the above results indicate the limited nature of the vessel's transverse stability and that, on its homeward voyage after off-loading its catch, the *Fritzi-Ann* was in a vulnerable condition. It had little remaining righting ability to withstand any sudden external heeling influences.

Light Operating Conditions

Vessels such as the *Fritzi-Ann* are at their highest risk when initially outbound for the fishing grounds and while returning home at the end of a fishing season. During these trips, the general practice is to travel light, with their holds empty and all their traps stowed high up on the main deck.

The instruction to stow gear for fishing as low in the *Fritzi-Ann* as possible creates a problem for the fishers when going to the grounds with fresh ice in a clean fish hold. The labour-intensive work in handling the heavier traps, both in carefully stowing them in the fish hold before departure from port and lifting them onto the deck to bait and set them in strings upon arrival at the fishing grounds, is reduced to a large degree if all traps can be stowed in an accessible position on deck.

The same economic pressures were not prevalent on the return voyage of the *Fritzi-Ann* after discharging its catch at the end of season, when traps could have been placed in the empty fish hold. Nevertheless, the owner/operator elected to stow all the traps on the after deck platform extensions, causing an adverse effect on the stability of his vessel.

Trap Size and its Effect on the Vessel's Stability

In 1995, acting out of concerns for conservation of prawn and shrimp stocks, DFO specified the required dimensions of traps based on volumetric and mesh size considerations. Since the maximum allowable weight of a trap was not specified, licence holders decided to maximize the catch size by having the traps made more robust to keep their volumetric shape. Thus, the weight of prawn traps has progressively increased toward 5 kg. As trap weights are not a consideration in the management of fisheries, their weights are not recorded. TC was not contacted to determine whether there were safety implications.

Systemic Shortcoming in Approach to Fishing Vessel Safety

In 1990, the stability of the vessel was verified by a marine consultant. The effects of the modifications on the stability of the vessel were investigated for TC acceptance. The same approach was not taken in 1999, when further extending the deck to accommodate additional traps, nor was TC advised of this modification. The onus is on the owner/operator to inform TC of any modifications carried out to the vessel. Nevertheless, it is also incumbent upon the inspector to be vigilant and ask the master or the owner if any alterations have been carried out between inspections.

There is no system in place at DFO to actively involve TC in formulating DFO rules, regulations, policies and Integrated Fishery Management Plans (IFMP). As this occurrence demonstrates, the lack of coordination between the owner/operator, TC and DFO regarding the RTL policy precluded an objective assessment of the impact of the deck extension and the intended load of 500 heavy traps on the stability of the vessel. The need for greater cooperation and harmonization of regulations, policies and practices between the two agencies was recognized more than a decade ago.

DFO maintains that its expertise does not extend into establishing specifications for the construction of traps, nor does it possess technical knowledge of safety affecting small fishing vessels. Nevertheless, DFO has not involved TC as an active joint partner in formulating rules, regulations, policies or IFMP. The Memorandum of Understanding (MOU) between TC and DFO respecting Marine Transportation Safety and Environmental Protection, dated April 1996, recognizes that DFO has a legitimate interest in fishing vessels and is to be consulted by TC on the development of safety standards and regulations for these vessels. The MOU does not call for similar cooperation when DFO is formulating its rules, policies and IFMP to ensure that fishing vessel safety is not compromised.

Training

Special technical skills and knowledge are required to ensure safe and efficient vessel operations. Formal training courses for fishers, including training in MED together with seagoing experience, can provide an enhanced awareness of safe practices during normal and emergency operations. As of 31 July 2002, every member of the complement of a Canadian fishing vessel is required to successfully complete MED training in basic safety (MED A1) before completing six months on board vessels.

In general, few fishers fully understand the principles of ship stability. In this instance, the improper distribution of weights secured high on the after deck severely eroded the vessel's transverse stability and contributed to its capsizing.

Completion of formal competency-based training and evaluation courses incorporating the fundamentals of ship stability and structured toward acquiring a certificate of competency would raise the awareness of small fishing vessel operators of the consequences of improperly distributed weights, including prawn traps, stacked high up on the vessel. The skipper of the *Fritzi-Ann* had no formal training in this regard and could not fully appreciate the reduction in the vessel's stability.

The subject of training and certification of fishers, as well as other issues including small fishing vessel stability, effectiveness of Ship Safety Bulletins, unsafe operational practices, and the risk-taking attitude of operators, has been comprehensively addressed in TSB report No. M02W0147 (*Cap Rouge II*). The Board, concerned about the safety of a large number of small fishing vessels that are operating without approved stability data, recommended that:

The Department of Transport require all existing inspected small fishing vessels currently without any approved stability data be subjected to a roll period test and a corresponding freeboard verification not later than their next scheduled quadrennial inspection. (M03-06)

While attitudes and beliefs toward risk form the basis of an effective safety culture, and recognizing the need to initiate a change in attitude among fishers to mitigate risk, the Board 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. (M03-07)

The report also points to new initiatives being taken by TC for the development of new Small Fishing Vessel Safety Regulations, due for implementation in 2006.

Fishery Management Plans

Vessels with RTL and Safety

As part of the RTL policy, DFO maintains a database of registered traps that are identified by numbered trap tags, but the database does not record trap weights. The recording of trap weights could provide useful information in determining the stability of the vessel. The transfer of traps from one vessel to another, as in the case of RTL licence, could then be readily monitored. The sharing of this information with TC would provide TC with an opportunity to review the stability of the vessel to ascertain the impact of the RTL licence before DFO issues it.

Under the current regime, trap weights and their effects on vessel stability and crew safety were not taken into consideration during the development of DFO management plans. TC was not consulted for input and review of the effects of the management plans on vessel and crew safety.

Until 1995, some vessels fished in excess of 1000 prawn traps, some of which were transported to the fishing grounds by other vessels. When single licences were granted, the 300-trap limit per vessel alleviated the need to transport traps on a second vessel. The additional conservation measures, introduced in 2000/2001 to set and haul traps only once per day from 0700 to 1900, motivated owners of vessels such as the *Fritzi-Ann's* to obtain an RTL licence to strive for economic advantage during the short prawn fishing season.

DFO does not consider the extension platform at the stern of a vessel to be part of the licensed overall length,⁷ because the structure does not form an integral part of the hull. Instead, the platform is looked upon as an appendage to the after deck for stowing extra gear. Length restrictions apply to all fishing vessels participating in this fishery. Any vessel owner can apply to reallocate trap limits and DFO does not consider vessel length in the process.⁸

Within the fleet of approximately 250 licensed prawn-fishing vessels, about 35 of which received RTL licences, the remainder used 300 traps each. Smaller vessels carrying the traps on deck incur some measure of risk by reducing vessel stability. The risk increases significantly when an RTL licence is granted to the smaller class of vessel, which has limited deck space and is more susceptible to capsizing when carrying 500 traps at a greater height on deck.

The *Fritzi-Ann* qualified for an RTL licence to carry 500 traps. The licensed vessel fishes with fewer traps (500) than two single licensed ones (300 + 300). It was to stow extra fishing gear on a deck extension placed beyond the licensed length and normal limits of the hull, for which the vessel was not originally designed. This affects the behaviour and safety of a vessel at sea, but was not considered by the owner or the authorities to be a significant design change requiring safety analysis.

Approach to Fishery Management Plans and Safety

In all IFMP, the DFO's prime concern is for the conservation and sustainability of fish stocks. Consideration for health and safety is mentioned as a general principle statement in management plans. However, the effects of the plans are not being fully considered despite a directive⁹ issued to the regions on 15 February 2001, which states in part that, "when developing fisheries management plans and policies, all measures be examined to ensure that their effects do not result in unsafe conditions to fishers."

The directive also mentions the need to ensure "that regional staff involved in developing and approving fisheries management plans are made aware of the importance of considering safety at sea as an issue in fisheries management decisions." Careful consideration of the elements that affect safety of the fishing vessels operations can be reasonably assured by taking into account all the risks and mitigating options.

⁷ *Survey Guidelines for Commercial Fishing Vessels*, Appendix 4, page 2

⁸ *2001 Prawn and Shrimp Trap Commercial Harvest Plan* (Appendix 1), page 9, paragraph 4.4.1.2

⁹ DFO memorandum to all Regional Directors General from the Assistant Deputy Minister of Fisheries Management, reference Management and Safety-RDG's-00028, dated 15 February 2001

Small Fishing Vessel Safety Review

In November 2000, the Canadian Coast Guard (CCG) Maritime Search and Rescue, Newfoundland Region, issued a report titled *Fishing Vessel Safety Review (less than 65 feet)*, which not only addressed safety issues concerning the Newfoundland and Labrador fleet, but contained a literature review of recent national and international studies and reports.

In examining the literature on fishing vessel safety, common elements that affect safety include such long-standing items as a tendency by fishers to accept and take risks for economic gains, poor seamanship practices, improper loading, lack of standards in safety equipment, education, training, and overall operator competency. Studies in all jurisdictions paid special attention to external influences; one of the most striking was fisheries management being carried out with conflicting objectives, where safety was either subordinated or given no consideration at all.

The report also proposed recommendations from a CCG perspective, including:

Recommendation No. 2 B

In keeping with the spirit and intent of the MOU between TC and DFO respecting Marine Transportation Safety, a process of consultation should be undertaken to address mandates and roles of each department in enhancing safety for the small vessel fishing fleet.

Recommendation No. 5 B

The Integrated Fish Management Plan process should give thorough consideration to the possible effects that changes in management plans may have on safety. This would include discussion and consideration of the safety implications of management plan elements during the Industry Advisory Process and in the development of Conservation Harvesting Plans and would be extended to any reviews of licensing, allocation or access issues. To facilitate this objective, there should be a safety representative (TC and/or CCG) participating in the Industry Advisory Process.

Findings as to Causes and Contributing Factors

1. The *Fritzi-Ann* was in a highly vulnerable condition, with little remaining righting ability with which to withstand any sudden external heeling influences, and capsized while attempting to counter tidal rips in the vicinity of Kelsey Bay Harbour.
2. The vessel capsized when its transverse stability was compromised by the combined effects of the sudden dynamic external heeling forces, and the weight and location of some 500 fishing traps stowed high up above the main deck level.
3. The operator of the *Fritzi-Ann* was not trained in ship stability and was not fully cognizant of the stability requirements of his vessel.

4. The operator of the *Fritzi-Ann* did not follow the instructions endorsed by Transport Canada (TC) regarding location of weights and gear.
5. Having no weight restrictions for prawn traps resulted in the use of more robust, heavier traps and increasing the overall weight of the stacked prawn traps on deck, which adversely affected the vessel's stability.

Findings as to Risk

1. The Department of Fisheries and Oceans (DFO) does not use a systematic risk-based approach when formulating Integrated Fishery Management Plans (IFMP) and conservation policies.
2. Lack of coordination between DFO and TC to ensure that DFO rules, regulations, policies, practices and IFMP are in harmony with fishing vessel safety requirements continues to place the safety of small fishing vessels at risk.

Safety Action Taken

TSB Marine Safety Advisory

Early into the investigation of the capsizing of the *Fritzi-Ann*, the TSB issued Marine Safety Advisory (MSA) No. 02/03 addressed to the Department of Fisheries and Oceans (DFO) and Transport Canada (TC), which identified the absence of maximum allowable weight of prawn traps by DFO and the inherent risks associated with vessels carrying heavier traps, affecting their stability. The MSA also raised concerns that DFO does not consult with TC, while in the process of formulating Integrated Fishery Management Plans (IFMP), in order for TC to assess if the plans jeopardize vessels' transverse stability or have an impact on other aspects of vessel safety.

In response, DFO has stated that its expertise does not extend into establishing specifications for the construction of traps, but agreed that fishers need to be made aware of the possible danger of overloading a vessel in such a manner that would jeopardize the vessel's stability.

In response, TC is developing new revised fishing vessel regulations that would require a stability assessment of some kind for all fishing vessels. Discussions with stakeholders are in progress on a proposed new requirement that the stability of fishing vessels be assessed in the port departure condition, with cages or traps on deck if so equipped, in addition to the operating conditions already established.

Department of Fisheries and Oceans

DFO distributed the following document to all vessel owners eligible for a 2003/2004 prawn and shrimp trap licence:

Subject: Marine Transportation Safety Board, Vessel Safety

The Marine Transportation Safety Board has completed investigation of an incident following the 2002 commercial prawn trap fishing season, in which a vessel returning from the fishery with traps on deck, rolled over. Fortunately, there was no loss of life.

The Board has expressed concern that the increased average weight of traps in recent years may have been a contributing factor, as well as the number of traps which the vessel was carrying.

The Department strongly recommends that vessels, masters and crew engaged in the prawn and shrimp trap fisheries exercise caution in the loading and transport of gear prior to, during and following the fishing season. The Department reminds fishers that alternate vessels or skiffs may be used to transport gear to and from the fishing grounds and during the fishery, provided that the traps are set and hauled from the licensed vessel to which the traps are registered for fishing use. If carried by another W licensed vessel, the traps should be carried in a "non-fishable condition" with no tags attached or snaps on the bridle, as outlined in the commercial harvest plan for replacement traps on board.

Also be advised that the Department will provide time for reasonable deployment of vessels to the fishing grounds. If necessary, the season opening may be delayed to provide for such time. The opening date will be announced by a variation order and notice to industry, in late April.

This document, except for the final paragraph referring to a possible delay of season opening, was also distributed by the Pacific Prawn Fishermen's Association, in its mail out to all "W" licence holders in preparation for the upcoming fishing season.

Information has also been included in the IFMP and in the Commercial Harvest Plan. These documents are provided to each licence holder at the time of licence renewal.

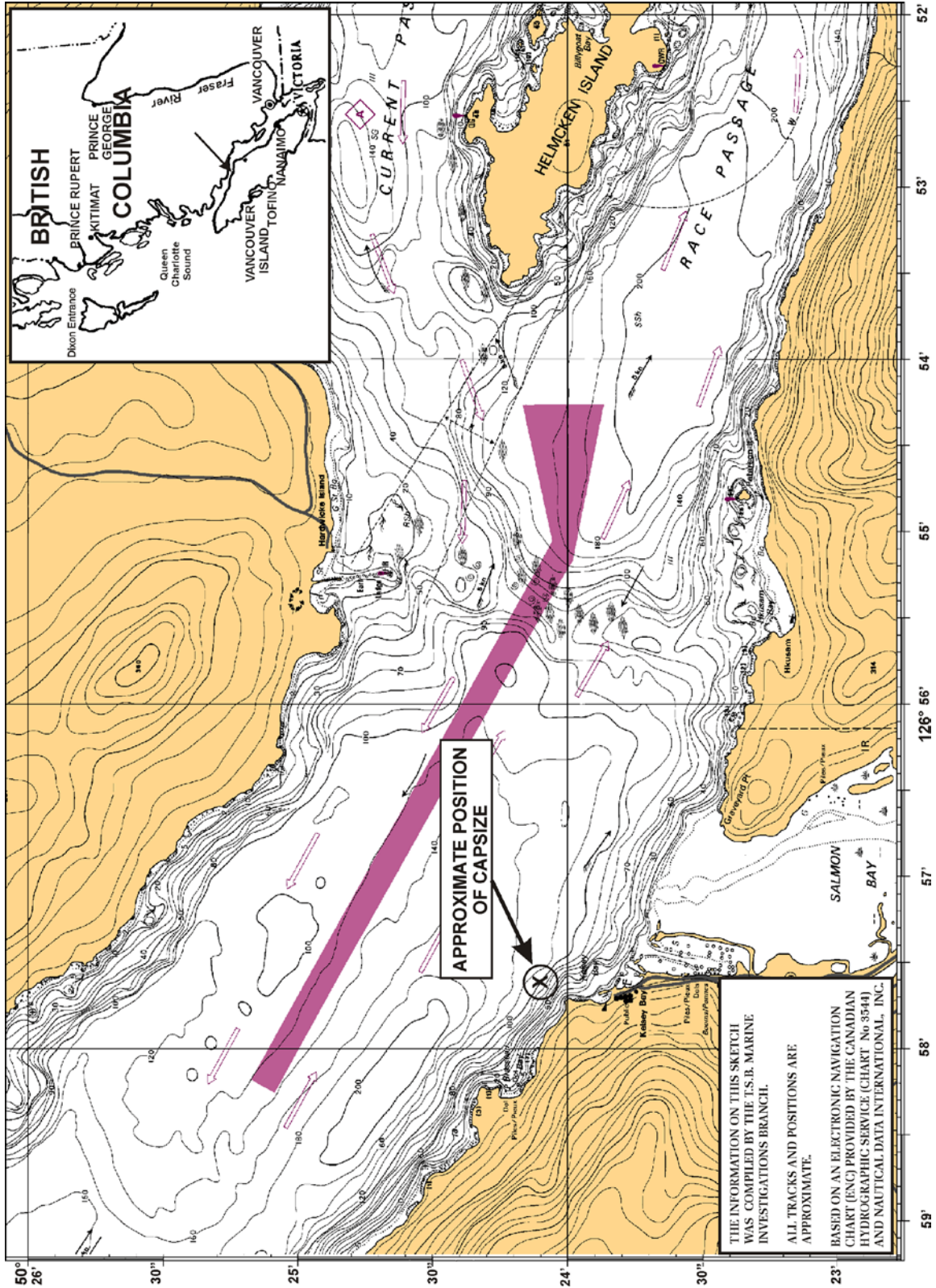
DFO can take and has taken steps to improve coordination with TC and other agencies involved with vessel and crew safety, such as the Workers' Compensation Board (WCB) of British Columbia. Actions include:

- A Marine Action Group has been formed in the Pacific Region to promote safety awareness, provide safety education, and foster safe operating practices in the fishing community. The Group includes TC Marine Safety, TSB, the WCB of British Columbia, Fisheries Management, Canadian Coast Guard (CCG) and industry representatives, such as the B.C. Seafood Alliance.
- Continue work with TC and the WCB of British Columbia to make small fishing vessel owners, masters, and crew aware of safety issues. This will include information in all IFMP about vessel safety, which should improve over time and be made specific to the particular fishery through the advice of TC and the WCB of British Columbia, along with a role for TC and the WCB of British Columbia during advisory committee meetings.
- Specific to the prawn by trap fishery, DFO will continue to include the advice on vessel safety in the IFMP and provide TC and the WCB of British Columbia opportunities to address vessel and crew safety at the Prawn Sectoral Committee.
- Further, DFO will consult with TC to address their respective mandates and roles in enhancing safety for the small vessel fishing fleet. This would include improved coordination with TC on the development of IFMP and policies that may affect fishing vessel safety, and the sharing of information pertinent to vessel safety available to DFO.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 05 April 2004.

Visit the Transportation Safety Board's Web site (www.tsb.gc.ca) for information about the Transportation Safety Board and its products and services. There you will also find links to other safety organizations and related sites.

Appendix A – Sketch of the Occurrence Area



Appendix B – Photographs



Appendix C – Glossary

B.C.	British Columbia
BHP	brake horsepower
CCG	Canadian Coast Guard
DFO	Department of Fisheries and Oceans
GM	metacentric height
GPS	global positioning system
IFMP	Integrated Fishery Management Plan
kg	kilogram
lb	pound
m	metre
MCTS	Marine Communications and Traffic Services
MED	marine emergency duties
MOU	Memorandum of Understanding
mm	millimetre
RTL	reallocated trap limits
TC	Transport Canada
TP	Transport Canada publication
TSB	Transportation Safety Board of Canada
VHF	very high frequency
WCB	Workers' Compensation Board
°C	degree Celsius
°T	degree True