Transport Accident Investigation Commission

Final report
Tuhinga whakamutunga

Maritime inquiry MO-2021-204
Recreational vessel
Capsize and sinking with three fatalities
Manukau Harbour entrance
16 October 2021

May 2023

The Transport Accident Investigation Commission
Te Kōmihana Tirotiro Aituā Waka

No repeat accidents – ever!

'The principal purpose of the Commission shall be to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.'

Transport Accident Investigation Commission Act 1990, s4 Purpose

The Transport Accident Investigation Commission is an independent Crown entity and standing commission of inquiry. We investigate selected maritime, aviation and rail accidents and incidents that occur in New Zealand or involve New Zealand-registered aircraft or vessels.

Our investigations are for the purpose of avoiding similar accidents in the future. We determine and analyse contributing factors, explain circumstances and causes, identify safety issues and make recommendations to improve safety. Our findings cannot be used to pursue criminal, civil or regulatory action.

At the end of every inquiry, we share all relevant knowledge in a final report. We use our information and insight to influence others in the transport sector to improve safety, nationally and internationally.

Commissioners

Chief Commissioner	Jane Meares
Deputy Chief Commissioner	Stephen Davies Howard
Commissioner	Richard Marchant (until 31 October 2022)
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Commissioner	David Clarke (from 1 December 2022)

Key Commission personnel

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Notes about Commission reports
Kōrero tāpiri ki ngā pūrongo o te Kōmihana

Citations and referencing

The citations section of this report lists public documents. Documents unavailable to the public (that is, not discoverable under the Official Information Act 1982) are referenced in footnotes. Information derived from interviews during the Commission's inquiry into the occurrence is used without attribution.

Photographs, diagrams, pictures

The Commission owns the photographs, diagrams and pictures in this report unless otherwise specified.

Verbal probability expressions

For clarity, the Commission uses standardised terminology where possible.

One example of this standardisation is the terminology used to describe the degree of probability (or likelihood) that an event happened or a condition existed in support of a hypothesis. The Commission has adopted this terminology from the Intergovernmental Panel on Climate Change and Australian Transport Safety Bureau models. The Commission chose these models because of their simplicity, usability and international use. The Commission considers that these models reflect its functions. These functions include making findings and issuing recommendations based on a wide range of evidence, whether or not that evidence would be admissible in a court of law.

Terminology	Likelihood	Equivalent terms
Virtually certain	> 99% probability of occurrence	Almost certain
Very likely	> 90% probability	Highly likely, very probable
Likely	> 66% probability	Probable
About as likely as not	33% to 66% probability	More or less likely
Unlikely	< 33% probability	Improbable
Very unlikely	< 10% probability	Highly unlikely
Exceptionally unlikely	< 1% probability	

Figure 1: The unnamed recreational power boat involved in the accident

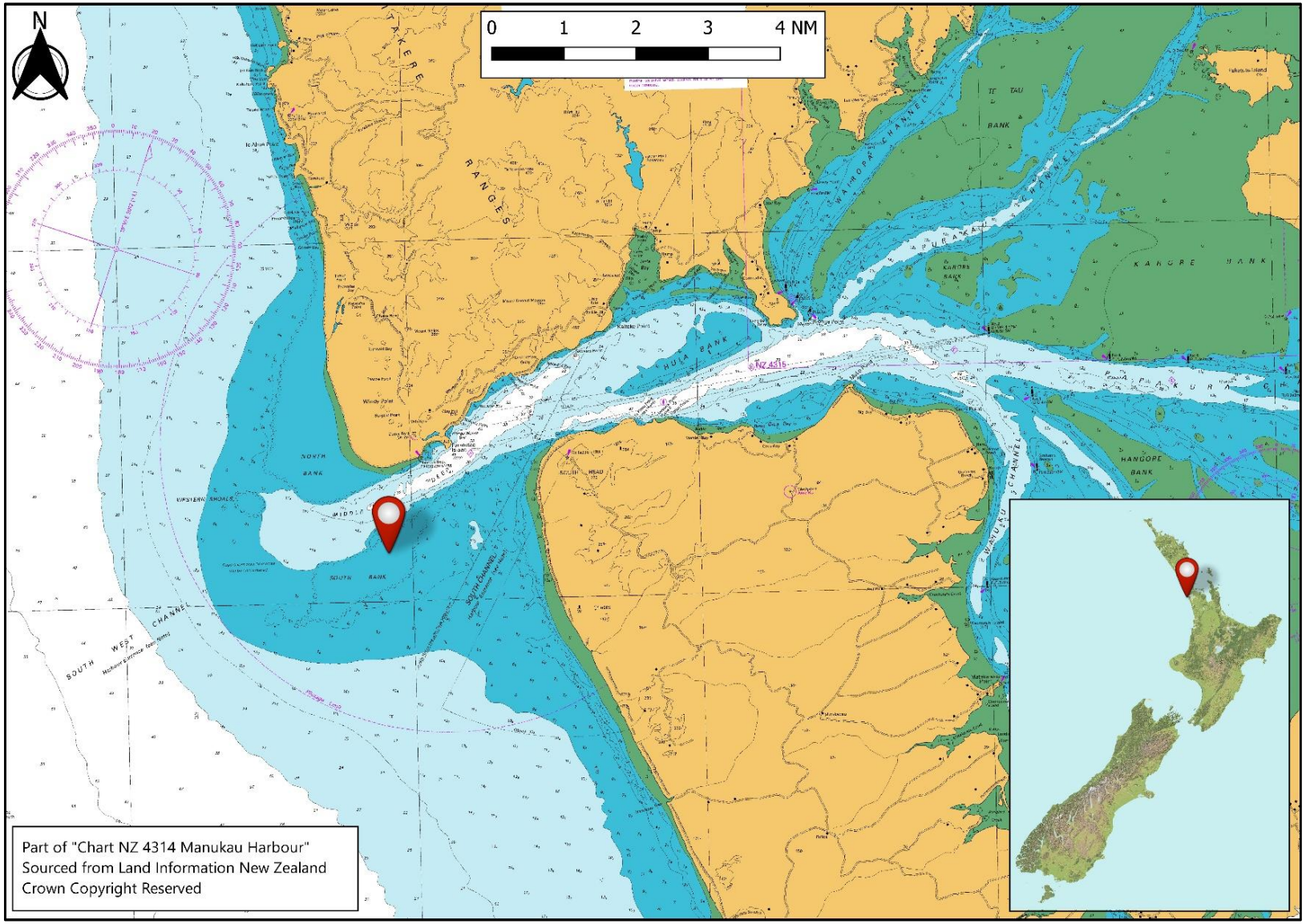

Figure 2: The location of the accident

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What happened

1.1 On 16 October 2021, four people on board a recreational power boat spent the afternoon fishing just outside the Manukau Harbour. As they returned, the skipper steered the boat across the sandbar at the harbour entrance. A set of breaking waves, estimated to have been over 2 metres in height, overwhelmed the boat, causing it to capsize and sink. The boat's occupants were in the water until rescue services arrived. Only one person survived.

Why it happened

1.2 The vessel entered an area of steep, breaking waves and, for reasons that could not be determined, the engine stopped. The vessel turned side-on to the waves and was swamped and then capsized.

1.3 Had everybody on board been wearing properly fitted personal flotation devices, appropriate for the conditions, it is **likely** that they would have survived until rescue responders arrived.

1.4 A lack of food, exertion and the consumption of alcohol **likely** reduced the participants' survival time in the water.

What we can learn

1.5 Emergency preparedness is a fundamental part of planning a boating expedition. A responsible skipper should be aware of their vessel's capabilities and ensure that it is well equipped to give occupants the best chances of survival should something go wrong. Part of this is understanding what emergency services are available in the area and how long it may take for rescue units to arrive on the scene.

1.6 Marine radio is a vital tool and one of the best vehicles for indicating distress to other vessels nearby. Everybody within range of and listening to the same Very High Frequency channel will receive the call for help. Pyrotechnic distress signals such as flares and smoke markers can also alert people on board nearby vessels that help is required. A mobile phone is a good back-up, but its calls are private until emergency services can verify its position and relay the call for help.

1.7 No matter whether a boating expedition is a private recreational activity or a commercial enterprise, the skipper should brief the passengers on how to call for help to ensure everyone has the best chance of surviving until rescued.

Who may benefit

1.8 Recreational boat users, commercial maritime operators, regional councils and maritime training facilities may all benefit from the findings and recommendations in this report.

2 Factual information
Pārongo pono

Narrative

2.1 On the morning of 16 October 2021, a group of friends and acquaintances arranged a fishing trip outside the Manukau Harbour, on the west coast of Auckland. The COVID-19 lockdown had been eased in the previous week and the weather forecast was good.

2.2 At about 0800 two of the participants drove to the skipper's home. The fourth participant arrived at the same time.

2.3 After the skipper and a family member had checked the boat, its trailer was hooked up to the skipper's car and the group set off. On the way to the boat ramp they made stops for bait, tackle and beer.

2.4 At about 1230 the boat was launched at Little Huia (see Figure 3) on the northern side of the Manukau Harbour, just inside the harbour entrance.

Figure 3: Little Huia

2.5 The skipper drove the boat out of the harbour and across the sandbar at the harbour entrance (the bar). The passenger who survived the later accident described the outbound trip as 'rocky' and said that the boat was airborne at times. The other

passengers made assurances that the sea would only be rough as they crossed the bar and that it would be 'smooth' outside.

2.6 After clearing the bar area, the skipper drove the boat to the first fishing spot where the depth was about 50 metres. The group spent 10-20 minutes fishing there before the skipper moved the boat further out, to 60 metres depth, where the fishing was much better.

2.7 By around 1600 they had caught their quota of fish, and at 1622 the survivor sent text messages to their partner and friends asking if they wanted some fish.

2.8 The skipper drove the boat back towards the harbour entrance. The survivor recalled that the waves looked 'really big' as they approached the bar. Once again, the others made assurances that it would only be rough while they crossed the bar. The survivor recalled that the skipper was driving the boat at a 'steady pace' and that when the boat was in the middle of the rough area the waves were 'towering' over the boat.

2.9 The survivor recalled that the boat made it over one of the large waves and then the engine stopped. In quick succession, a wave from astern swamped[1] the boat and a wave from 'the left' hit the boat and tipped it over. The capsize was relatively slow and the survivor recalled that they went into the cabin to get lifejackets because they knew that the boat was not going to come back upright.

2.10 After the capsize the boat rested bow up, stern down, with two persons holding on to the outside of the hull and two persons – the skipper and the survivor – being inside the cabin. The survivor tried to call for help on their mobile phone, but the touch screen would not work as it was wet.

2.11 The survivor and the skipper discussed how to get out of the cabin and had just decided to dive under the water and swim out when the forward hatch popped open. The survivor helped the skipper to exit first and then threw all the lifejackets and a plank of wood outside before also exiting. The waves were 'crashing every second' and everyone was trying to hold on to the boat as waves were breaking over their heads.

2.12 The survivor made another attempt to use their mobile phone. A 111[2] call went through to an emergency call taker at 1635, but it was cut off. The survivor's next attempt to call 111 connected at 1638, and the survivor talked to a call taker for about four minutes before the phone was knocked out of their hand and sank.

2.13 Before the survivor's 111 call ended, the Auckland Police Maritime Unit was informed of the emergency and assumed control of the search and rescue mission. The incident controller immediately assigned the Police Eagle helicopter and the Westpac Rescue Helicopter. At this stage the exact location of the survivor had not been confirmed, but phone data returned a latitude and longitude position that indicated the Manukau Harbour entrance and an estimated locality of Karekare. The helicopters were sent to search the Manukau Harbour entrance. Police vehicles, first responders and a St John ambulance were initially sent to Karekare but were rerouted to Little Huia.

2.14 The Eagle helicopter departed its Pikes Point base at 1649 and the Westpac Rescue Helicopter departed Ardmore at 1656.

[1] Engulfed by waves and flooded with water.

[2] 111 is the telephone number to reach emergency services in New Zealand.

2.15 At 1655 the Auckland Police Maritime Unit contacted Coastguard New Zealand (Coastguard) to request a Mayday relay broadcast[3] and to determine if there were any Coastguard vessels deployed near the Manukau Harbour at the time. There were no Coastguard vessels underway at the time, but the Papakura and Waiuku boat crews were assigned to launch and assist with the search.

2.16 At 1658 Coastguard broadcast a Mayday relay call on very high frequency (VHF) channels 16 and 18.

2.17 At 1701 the Eagle helicopter approached the harbour entrance and turned towards the northern end of the bar to commence its search. As more information was received it continued the turn, and headed back towards the centre of the bar.

2.18 At 1704 the private vessel *Piracy*, responding to the Mayday relay, called Coastguard to inform it that it was heading out to assist. Another private vessel, *Fish Trap*, also went to the scene to assist.

2.19 At 1707 the Westpac Rescue Helicopter arrived on the scene and the crew immediately spotted people in the water.

2.20 By 1718 the Westpac Rescue Helicopter had recovered the survivor and one of the other passengers from the water. The *Piracy* and the *Fish Trap* recovered one person each. The Westpac Rescue Helicopter departed for Auckland City Hospital and the boats headed back to Little Huia.

2.21 At 1725 the Eagle helicopter's technical flight officer was landed at Little Huia to assist with resuscitation.

2.22 At 1739 another Westpac Rescue Helicopter arrived at Little Huia and resuscitation attempts continued.

2.23 At 1743 the Eagle helicopter returned to the bar to search for the boat's wreckage.

2.24 At 1805 resuscitation and defibrillation attempts proved unsuccessful and ceased.

2.25 At 1807 two Coastguard vessels arrived on the scene and commenced searching for the wreckage.

2.26 At 1809 the Eagle helicopter arrived back at its Pikes Point base.

2.27 At 1959 and 2008 respectively, the Coastguard vessels ceased searching and stood down.

Personnel information

2.28 The skipper had about 20 years of experience as a recreational boat owner, but did not have any formal maritime qualifications. Family members estimated that the skipper had crossed the Manukau bar at least 100 times, as the skipper's favourite fishing spot was outside the Manukau Harbour.

2.29 The skipper was well known in the community as an experienced fisher and boater.

[3] Mayday relay broadcasts are used to repeat Mayday (distress) calls or broadcast Mayday calls on behalf of vessels in distress.

Vessel information

2.30 Following the capsize and recovery operation, two Coastguard vessels searched for the boat. Some floating objects were located and recovered, but the wreck was not found.

2.31 The skipper's family had acquired the boat second-hand and owned it for about six years. No owner's manual or purchase and service documents were recovered during the investigation.

2.32 The boat had a 5.5-metre aluminium hull with a small cabin forward. It had the phrase 'Bluefin 5.5' on its hull and was very likely manufactured before the Bluefin naming rights were purchased by the current manufacturer of Bluefin vessels. Vessels described as 'original Silverdale Bluefins' were built between the late 1980s and 1990s and were described on fishing and boating forums as sturdy, well-built vessels.

2.33 A 100-horse-power Yamaha four-stroke outboard engine provided propulsion. The skipper's family had purchased the engine second-hand a year or two before the accident. At the time of the purchase the engine had accumulated approximately 100 running hours and at the time of the accident it had accumulated 250-300 running hours. The skipper's family members reported that the outboard engine had been serviced as per the recommended servicing schedule. No documents were provided to the Transport Accident Investigation Commission (the Commission) to support the assurance that the engine had been regularly serviced.

Meteorological and ephemeral information

2.34 Weather forecasts showed the following conditions predicted for 16 October 2021:

- NW through to SSW 3-6 knots
- sea 1.2 metres
- swell westerly 1.1 metres
- chop 0.5 metres.

2.35 Tidal predictions indicated low water at 1348 (Land Information New Zealand, Paratūtae Island) or 1310 (boating forecast, Manukau Harbour entrance).

2.36 The wind, swell and tide were acting towards the shore as the skipper drove the boat back towards the Manukau Harbour.

Site and wreckage information

2.37 The wreck sank and was not found. It is common for wreckage to be buried, uncovered and reburied as wave actions constantly move the sand.

Medical and pathological information

2.38 Post-mortem reports indicated that, primarily, the three fatalities were due to drowning. All had consumed alcohol and had blood alcohol levels higher than the road driving limit of 50 milligrams per 100 millilitres (mg/100 ml) of blood.[4]

2.39 The skipper's blood alcohol level was 111 mg/100 ml of blood.

[4] Driver over 20 years old with a full licence.

Survival aspects

2.40 The skipper kept six or seven personal flotation devices (PFDs) on board the boat. Five of these were recovered during the search and rescue operation. The skipper was reported to have been wearing a PFD but was not wearing it when they were recovered from the water. Two of the other occupants wore their PFDs on the outbound trip and removed them when they started fishing. They did not wear the PFDs during the inbound trip.

2.41 The survivor said that the group had forgotten to take food with them, so it is likely that nobody had eaten for several hours at the time of the accident. After an afternoon of exertion, it is likely that those in the group were all fatigued before the boat capsized.

2.42 The sea temperature was about 15.5 degrees Celsius. This would correspond to a usual exhaustion time of one to two hours and death time of one to six hours for a person immersed in that water. Individual factors can affect a person's ability to survive while immersed in water. These include:

- age
- gender
- amount of body fat
- fitness
- injury
- in-water competence
- cold adaptation
- psychological state
- alcohol consumption.

2.43 A person immersed in turbulent water, such as breaking waves, will have trouble keeping their nose and mouth clear of the water. This difficulty will be exacerbated as they become exhausted from their efforts to stay afloat.

Emergency services in New Zealand

2.44 In New Zealand, maritime search and rescue operations can be coordinated by the Police or by the Rescue Coordination Centre.

2.45 The Rescue Coordination Centre is responsible for coordinating national-level maritime and aviation search and rescue operations within New Zealand's search and rescue region. These operations are known as Category II SAROPs.

2.46 Category I SAROPs are coordinated by the Police at local levels, and include land, river, lake and inland waterway operations and close-to-shore marine operations. There are two specialist Police Maritime Units in New Zealand, based in Auckland and Wellington.

2.47 The Auckland Police Maritime Unit is based at Mechanics Bay on the Waitemata Harbour and covers an operational area of about 3700 square kilometres, including the greater Hauraki Gulf. Its on-water operational capability is concentrated on the eastern coast of the Auckland region, and access to western navigable waters requires

collaboration with other organisations such as Coastguard, Westpac Rescue and the airport rescue service.

2.48 When not engaged in air ambulance services or Police work, Westpac Rescue[5] and Police Eagle helicopters are well located to attend search and rescue missions in Auckland's west coast waters (see Figure 4). Each Westpac Rescue Helicopter is able to winch two persons from the water. Eagle helicopters do not have winching capabilities but can deliver rescue and flotation devices to persons in the water. If appropriate, a rescue swimmer can be dropped into water to aid survivors.

2.49 Coastguard is a charity organisation that has 59 water-based rescue units, two air-patrol units and two communication units. Rescue assets are crewed by volunteers. Additionally, Coastguard runs boating education courses and operates the bar report radio check-in monitoring system.[6] This is a non-compulsory safety measure activated when a skipper transmits a 'bar crossing report' to Coastguard by radio. A timeframe is set in which the skipper must call back to say that they have successfully crossed the bar. If Coastguard does not receive that call within an allocated timeframe, it will make contact to ensure that the vessel has crossed the bar safely.

[5] Operated by Auckland Rescue Helicopter Trust/Northern Rescue Helicopter Limited.

[6] A recommended, but not compulsory, safety measure whereby a vessel's skipper makes a radio report to Coastguard before and after crossing a coastal bar. If Coastguard is unable to confirm that the vessel has crossed the bar safely, search and rescue procedures are initiated.

Figure 4: Rescue responder deployment sites around the Manukau Harbour

Previous occurrences

2.50 On 5 March 2005 the recreational vessel *Tobamoray*, with three people on board, capsized while returning from a fishing trip. As it approached the Manukau Harbour entrance and crossed the bar, the *Tobamoray* was swamped by a 5-metre wave that broke over the vessel. The *Tobamoray* was a 5-metre fibreglass vessel with a 90-horsepower outboard engine. Its skipper and two passengers were thrown clear, and the boat sank. The skipper and one passenger were rescued about two hours later, but the other passenger was found deceased. The accident report produced by the maritime regulator, Maritime New Zealand, found that:

- the *Tobamoray* capsized due to the large wave that broke over the vessel as it attempted to cross the Manukau bar
- the *Tobamoray* sank due to insufficient reserve buoyancy caused by the inherent design of the boat and the likelihood of water ingress to the buoyancy compartment
- loss of life was due to a combination of the sinking and the fact that essential distress signalling equipment was inaccessible when the vessel submerged. It was possible that a head injury rendered the person unable to support themselves in breaking waves.

The report also stated that Maritime New Zealand, the Maritime Industry Association and the boat-building industry would continue to explore the feasibility of achieving level flotation[7] (see Appendix 1) for vessels up to 8 metres in length.

2.51 On 16 January 2005 an unnamed recreational vessel transiting the Raglan Bar was swamped after its engine failed. Another recreational vessel, the *Lucky No.5*, proceeded to assist and tow in the swamped vessel. Both vessels capsized and one passenger on board the *Lucky No.5* was trapped in the upturned hull. The passenger eventually surfaced and was rescued by surf lifesavers, but died in hospital a few days later. Maritime New Zealand published a report that included the following advice.

> Wear lifejackets while crossing the bar. A capsize can happen instantaneously and trying to put on a lifejacket while in choppy waters is near impossible. Skippers must always have the safety of the crew and passengers at the forefront of their minds and not take risks.

2.52 The *Lucky No.5* report also included the following quote from an acknowledged New Zealand expert on harbour sand bars.

> Put simply, if the conditions are suitable for a recreational boat to cross a bar, then there should be no need to avoid breaking waves, large swells, surfing or broaching. If conditions are adverse then no one should be crossing the bar.

2.53 On 26 November 2016 eight people died when the commercial charter fishing vessel *Francie* capsized while crossing the Kaipara Bar. The Commission launched an inquiry[8] into this accident and identified key safety lessons on the dangers of harbour bars and improved chances of survival when people are wearing appropriate, well-fitted lifejackets (see 3.24).

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[7] Level flotation ensures a vessel's ability to stay afloat and level with the waterline after a flooding and capsize event.

[8] MO-2016-206: Capsize and foundering of the charter fishing vessel *Francie* with the loss of eight lives https://taic.org.nz/inquiry/mo-2016-206.

3 Analysis
Tātaritanga

Introduction

3.1 A survey conducted for Maritime New Zealand showed that approximately 1.6 million New Zealanders participated in maritime recreational activities during 2020. More recent surveys show that participation has increased to about two million. International travel restrictions during 2021, due to the COVID-19 pandemic, led to an increase in local holiday activities such as boating. This accident occurred shortly after COVID-19 restrictions in Auckland were eased to allow outdoor recreational activities.

3.2 When the unnamed Bluefin power boat capsized at the Manukau bar, several factors reduced the survival times of the skipper and the passengers.

3.3 The following section analyses the circumstances surrounding the event to identify those factors that increased the likelihood of the event occurring or increased the severity of its outcome. It also examines any safety issues that have the potential to adversely affect future recreational maritime activities.

Planning and preparation

The fishing trip was planned in haste and the participants were not well prepared to survive a maritime incident.

3.4 During August and September 2021, the New Zealand Government implemented social control measures to help control the COVID-19 Delta outbreak.

3.5 From 2359 on Tuesday 5 October the restrictions were eased to allow people to:

- connect with loved ones outdoors, with no more than two households at a time, up to a maximum of 10 people
- attend early childhood education
- move around Auckland for recreation such as beach visits and hunting.[9]

3.6 On 8 October 2021 some of the skipper's family members and friends launched the boat at Titirangi but remained within the Manukau Harbour. The boat was reported to have been running well.

3.7 The following weekend the weather forecast indicated good conditions for fishing outside the Manukau Harbour. The COVID-19 restrictions had prevented the skipper and friends from going fishing. The skipper enjoyed fishing very much, launching the boat weekly and sometimes more frequently.

3.8 At about 0730 on 16 October, the survivor was called and invited to go on the fishing trip. The group was described as excited about finally being allowed to go fishing. Although they stopped for bait, tackle and beer on the way to the boat ramp, they forgot to take food and extra water.

[9] https://covid19.govt.nz/news-and-data/latest-news/auckland-restrictions-eased-in-steps.

3.9 The survivor did not have any significant boating experience, but felt comfortable knowing that the other three people on the boat went out fishing 'all the time'. Despite the fishing experience of the other two passengers, only the skipper was experienced in driving a boat, and it is likely that the skipper's experience was not underpinned by formal maritime training. The skipper's family described how they had learned from the skipper and the skipper had learned from 'following other boats'.

3.10 The person in charge of a recreational boat is responsible for the safety and wellbeing of every person on board and for the safe operation of the vessel.[10] It is the skipper's responsibility to ensure that there is an appropriately sized PFD for each person on the boat. The skipper was reported to have been the only one in the group who wore a PFD. However, at the time of the recovery from the water, no one from the group was wearing a PFD. If the skipper had been wearing a PFD it is likely that it would not have been secured properly and it would have been stripped away by the turbulent water conditions at the bar. There were enough PFDs on board the vessel, but the survivor stated that they chose not to wear one and the other two passengers removed theirs when they started fishing. It is likely that no one in the group was fully aware of the legal requirement[11] for people to wear PFDs at all times on a vessel under 6 metres in length and on any recreational vessel operating in an area of heightened risk (such as a bar).

3.11 The role of a responsible skipper is partly fulfilled by good voyage planning. The skipper is responsible for ensuring that the boat is fit for its intended voyage, that the voyage is suitable for the boat and that the boat is operated safely. Conditions can deteriorate very quickly along the New Zealand coast and skippers need to be prepared for emergencies. The participants on this fishing trip were not well prepared to survive. They had not eaten for hours, they had consumed alcohol and they were likely tired after a successful afternoon of fishing. There were PFDs on board, but they were old (see Figure 5) and did not have crotch straps, which would have made them more appropriate for use in the Manukau bar area. They were stowed in the forward cabin, and by the time anybody thought to retrieve them the accident had already happened.

Figure 5: PFDs recovered from the water during the search and rescue

3.12 'Be a responsible skipper' has been one of the main factors promoted in recent safer boating educational campaigns (see Figure 6). The simplest ways to fulfil this

[10] Section 6, Ture ā-Rohe Urungi Āhuru 2021/Navigation Bylaw 2021, Auckland Council, 24 June 2021 and Section 19 of the Maritime Transport Act 1994.

[11] Sections 6, 18, 19 and 20, Ture ā-Rohe Urungi Āhuru 2021/Navigation Bylaw 2021, Auckland Council, 24 June 2021 and Maritime Rules Part 91 – Navigation Safety Rules section 91.4, Maritime New Zealand Consolidation 1 November 2016.

responsibility are firstly to plan well to avoid having an accident and secondly to know that, no matter how much experience and maritime education a skipper has, anyone can be caught out by unexpected conditions and events. So a responsible skipper must also plan to survive an unexpected adverse event, including knowing how to call for help, what help is available in the area, how long it may take for that help to arrive and how to survive in the water until then.

3.13 The investigation found that the helicopters were on the scene within half an hour of the successful 111 phone call. No time was lost in deploying the helicopters to the scene. Had the Police tasked Coastguard with broadcasting the 'Mayday relay' call sooner, the private vessels that responded might have arrived on the scene earlier. However, the risks to those vessels of attempting a rescue on the bar had also to be considered. In January 2022 a person lost their life when their boat capsized during a rescue attempt on the Tairua bar, on the east coast of the Coromandel Peninsula. Two days previously another recreational vessel had capsized on the same bar, with all occupants rescued.

3.14 The use of the Westpac Rescue Helicopter was **very likely** the best option for performing a rescue from the water at the bar. Survival time is influenced by many factors (see 2.42 and 2.43). A person would become exhausted by their efforts to stay afloat in turbulent sea conditions such as those at the Manukau bar at the time of the accident. Had the boat's occupants worn appropriate PFDs, particularly those suitable for use in breaking seas, they would have had a better chance of surviving until the rescue helicopters and responding private vessels arrived.

3.15 The role of a responsible skipper encompasses the first four items on the boating safety code list, as shown in Figure 6. By making informed decisions based on the intended voyage, the maritime area and the capabilities of the vessel and its equipment, the skipper can ensure that their boat and the people on it have the best chances of surviving an adverse event. Several factors reduced the survival capacity of the skipper and the passengers: their not wearing PFDs; their being tired from exertion and lack of food; the consumption of alcohol; and the boat not remaining afloat once it had been swamped.

Figure 6: Key safety messages used in current New Zealand boating safety campaigns

Credit: Maritime New Zealand, New Zealand Safer Boating Forum

3.16 The skipper was reported to have consumed 'a few' bottles of beer during the fishing trip. Post-mortem toxicology results indicated a blood alcohol level more than twice the limit of that for driving a vehicle on the road. It is **likely** that the skipper's coordination and judgement were impaired by alcohol consumption. It is **likely** that the skipper's risk perception was also affected, and this may have been why the skipper did not take the safer route through the South Channel (see 3.26 and 3.27).

3.17 Maritime New Zealand's safety campaigns advise boat users to avoid alcohol, and information on its website[12] includes the following advice:

> No matter the activity, alcohol affects balance, vision, coordination and judgement. In boating, factors like wind, sun, noise, motion and vibration can magnify the effects of alcohol and accelerate impairment.
>
> A momentary lapse that might pass unnoticed on shore can have dangerous consequences out on the water.
>
> Alcohol will:
>
> - decrease your coordination and ability to perform a simple task, such as putting on a lifejacket
> - increase your sense of disorientation
> - make it harder for you to stay afloat in the water
> - lower concentrations of blood going to your brain and muscles, contributing to muscle, heat, and fluid loss
> - reduce your ability to hold your breath

[12] https://www.maritimenz.govt.nz/content/recreational/safety/alcohol/default.asp#doesnt_take_much.

- suppress your airway protection reflexes and make it easier for you to inhale water
- give you a false sense of your situation, causing you to attempt tasks beyond your abilities
- reduce your awareness of the onset of hypothermia.

3.18 The group had not taken food with them, so it is **likely** that nobody had eaten for several hours. After an afternoon of exertion, it is **likely** that everyone in the group was fatigued before the boat capsized.

3.19 Being a skipper with passengers is a huge responsibility. As it is with the driver of a car, the passengers rely on the safety decisions that the skipper makes. This accident is a tragic example of how lapses made at the planning stages and during a maritime trip can reduce a person's chances of surviving a maritime accident.

3.20 On 22 October 2010 the Commission issued a recommendation to the Secretary for Transport that they address the safety issue of increased risks of recreational craft mishaps due to there being no requirement for recreational skippers to demonstrate competence (recommendation 004/11, see Section 5). The recommendation was not accepted, and Maritime New Zealand and its safer boating partners continue to run voluntary education campaigns for safer boating. The Commission acknowledges the safety campaigns that are available in New Zealand and the allocation of fuel excise duty grants to safe boating organisations. However, participation in these programmes is voluntary, and those who are new to recreational maritime activity may not be aware of the education and training schemes available.

3.21 Compulsory licensing for recreational skippers and boats would establish a system that provides tangible contact points between recreational boaters and Maritime New Zealand. Additionally, there would be a more accurate source for statistics on participation, education and competence standards. Boat licensing could establish a better service and provenance history of craft offered for sale on the second-hand and used markets. Furthermore, passengers could have more information on skippers' competence and boats' capabilities before heading out on the water.

3.22 The current reluctance to regulate the recreational boating sector is a tacit acceptance of the trade-off that every year around 15-20 recreational boaters will lose their lives as a result of their actions. It is **unlikely** that a new system would lead to zero lives lost, but higher competence requirements would **likely** lower the risk of boat users being involved in fatal accidents.

Harbour bars are dangerous

3.23 The Manukau Harbour bar is a coastal feature known commonly as a harbour bar or tidal delta. Sand, silt and sediments transported out of the harbour on the ebb tide have been deposited on the coast and become part of a supply-and-demand cycle that is driven by wind, waves, tides and currents.[13] The sand bars formed present a particular hazard to navigation at harbour entrances and river mouths because they form natural barriers of shallows where incoming ocean swells slow down, steepen and break. The ongoing deposition and drift cycle means that the precise locations of the sand bars and the depths of the water over them are subject to constant and unpredictable changes.

[13] https://www.geological-digressions.com/crossing-the-harbour-bar.

3.24 The capsize of the commercial charter fishing vessel *Francie* in November 2016 made evident the hazards that can be encountered when navigating across a harbour bar. The Commission's inquiry into this accident identified the importance of wearing appropriate and well-fitted lifejackets or PFDs. The Commission recommended that Maritime New Zealand require commercial operators to provide open-water lifejackets with crotch straps when operating out of bar harbours. Furthermore, the Commission recommended that Maritime New Zealand encourage recreational boat users to adopt a similar standard when boating in exposed coastal waters and harbour bar areas.[14]

3.25 Three main conditions are required to put a boat at high risk of capsize:

1. The boat is struck by a breaking wave.
2. The boat is broadside[15] to the wave.
3. The wave height[16] is greater than 60 per cent of the boat's length. If the wave is greater than 30 per cent of the boat's length this also elevates the risk of capsize.

3.26 A harbour bar is a location where there is a high likelihood of a boat encountering these conditions. Additionally, the smaller the boat, the lower the wave height required to fulfil the third capsize factor. Skippers are required to exercise good seamanship and judgement based on their local knowledge and experience to navigate their vessels and their passengers safely from one side of a bar to the other.

3.27 Usually this can be achieved using a channel of relatively deeper water, such as the South Channel (see Figure 7), and by timing the bar crossing to avoid the worst conditions. When the tide is ebbing and acting in opposition to the incoming waves, steeper and more unpredictable waves are created. Mariners often describe their local bars as 'washing machines' due to the turbulence of the water over the bars. Breaking waves are dangerous to boats, and small boats are prone to swamping and capsize if they encounter breaking waves. Figure 7 shows the turbulent water over the Manukau bar and the relatively calm water at the South Channel. It should be noted that on the day of the accident there was less wind than there was on the day the photograph was taken.

[14] Recommendation 013/18 made to Maritime New Zealand, 23 May 2018, https://www.taic.org.nz/recommendation/01318.

[15] Side-on to.

[16] The vertical distance from the trough of a wave to the following wave crest.

Figure 7: Aerial photo of the Manukau Harbour entrance and bar, November 2021

3.28 When the skipper drove the boat back towards the harbour, it was about three hours after low water, so near the midpoint of the flood tide. The wind, swell and tide were acting in the same direction as the boat. Figure 8 shows the conditions at the bar about 45 minutes before the accident occurred. Although it was a fine day and sea conditions were relatively benign, the figure shows that waves were breaking over the south bank. The survivor described the calm conditions as the boat left the harbour, but said that it was still 'rocky' going over the bar. However, the Manukau bar – or any harbour bar – is notorious for being unpredictable and dangerous. On the way back in, the waves were described as 'towering', and although the wind had only increased by a small amount, the wave heights relative to the size of the boat increased enough to make the risk of swamping and capsize a reality.

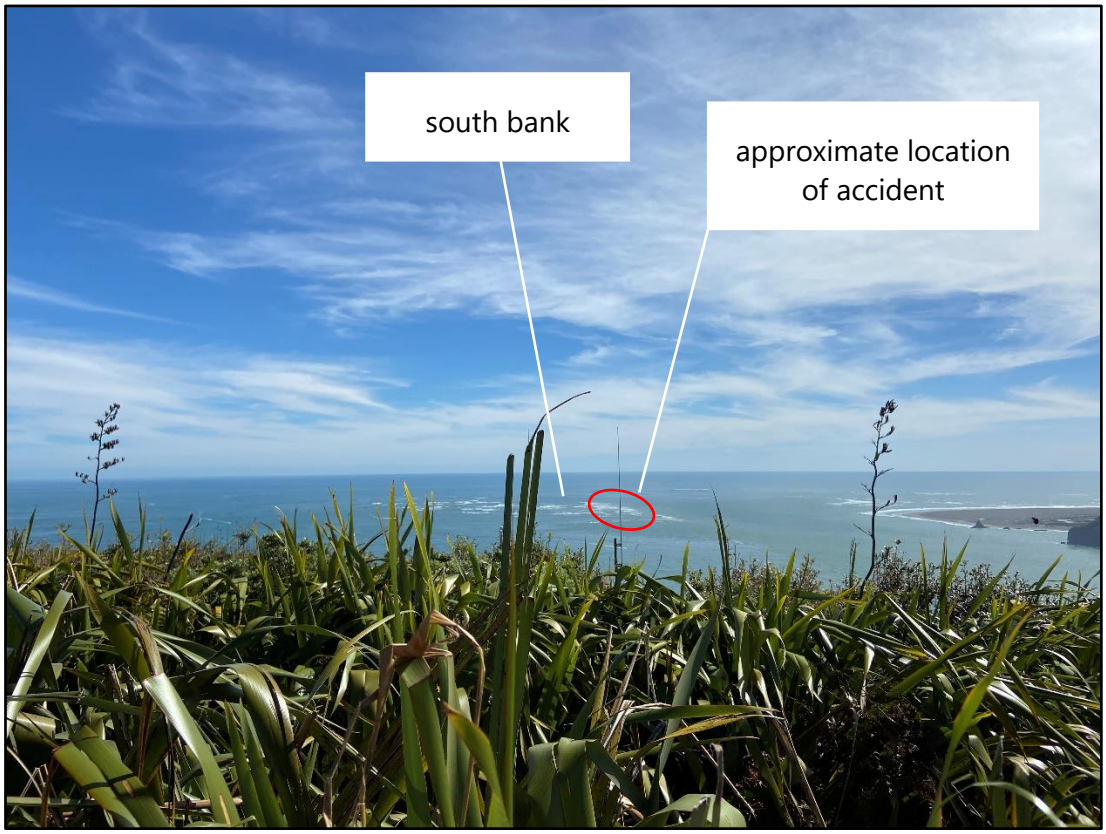

Figure 8: Looking towards the bar from the Manukau Heads lighthouse approximately 45 minutes before the accident

Credit: Isabelle Saull

3.29 A person who responded to the Commission's appeal for witnesses stated that they were fishing from their boat outside the Manukau bar on the afternoon of the accident. They saw a small power boat that seemed to be heading back towards the harbour entrance. Initially the power boat seemed to be heading towards the South Channel, which is the safer route into the harbour. The witness noticed that the power boat then turned and headed towards the breaking water over the bar, as illustrated by the witness using their chart plotter (see Figure 9). The witness continued with their fishing and did not see the accident.

3.30 Investigators plotted the witnessed track with the location of the emergency call and the helicopter winching position (see Figure 9). The resulting composite diagram showed that it was **likely** that the small power boat witnessed was the boat that capsized. Coupled with the survivor's description of large breaking waves that towered over the vessel, it is **virtually certain** that the skipper attempted to navigate into the Manukau Harbour over the bar rather than take the safer route through the South Channel.

3.31 Navigating the vessel over the bar placed the vessel at a high risk of encountering conditions in which it would be prone to capsize and swamping – especially in the case of loss of propulsion. Once the outboard motor stopped, the skipper had no way to control the vessel's angle of encounter with the waves. It could not be determined whether the vessel was swamped by an overtaking wave and then the engine stopped or the engine stopped first and the vessel was then swamped. In either case, had the skipper elected to use the South Channel they would have been in deeper and calmer water and might have had some chance of restarting the engine. Additionally, there may have been a passing vessel that could have given assistance.

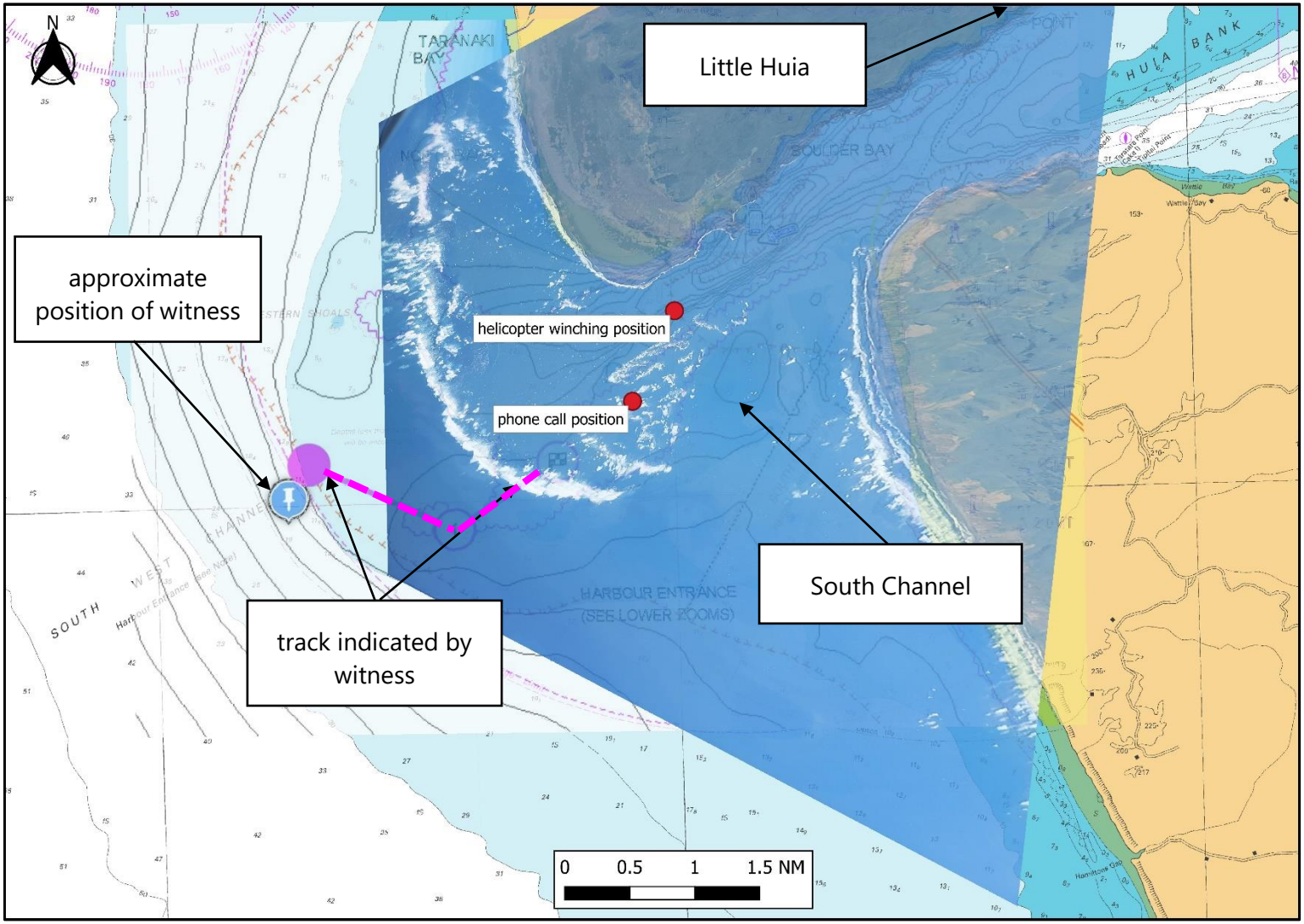

Figure 9: Chart overlaid with approximate track of the boat as described by the witness in 3.29, overlaid with aerial photograph

Regulation of the recreational boating sector in New Zealand

Safety issue: In New Zealand there is little regulation of the recreational boating sector. There is no registration or licensing system, there are no minimum standards for the design and construction of pleasure boats, and there is no requirement for assessments and licensing of recreational skippers to ensure a minimum standard of competency.

3.32 In New Zealand there is no requirement for recreational vessels to be registered or for recreational skippers to be licensed. However, there is a requirement for recreational skippers to comply with the relevant provisions of the Maritime Transport Act 1994 and any rules made under the Act. Local bylaws also make recreational skippers responsible for operating their vessels safely, in particular with respect to collision avoidance and the use of PFDs.

3.33 Because there is no requirement for registration or certification in the recreational maritime sector, Maritime New Zealand relies on surveys for information on boating participation and behaviour.

3.34 In 2021 Maritime New Zealand released a summary of recreational fatal accidents in the years 2015 to 2020.[17] This summary reported an average of 16 deaths per year in the six years covered. The summary also estimated that about 1.6 million New Zealanders had participated in maritime recreational activities in the preceding year.

3.35 Maritime New Zealand has replaced its annual participation and behaviour surveys with quarterly surveys. The 2022 second-quarter survey report[18] identified that most recreational boating activity was for the purpose of fun and relaxing on the water. The report identified complacency, lack of concern and lack of equipment and knowledge as the main reasons for suboptimal safety practices on the water. Furthermore, the report indicated that more than half of recreational boat users did not know and follow the Navigation Safety Rules and local bylaws. Over half did little or no planning before going out on the water.

3.36 For the past 20 years campaigns for safer boating have consistently advocated safety messages in line with the Safer Boating Code (see 3.15). There has been no significant reduction in the number of recreational boating fatalities and there remains the barrier of complacency. The 2022 second-quarter survey report identified that the way forward was to change the attitudes that lead to complacency and unsafe practices.

3.37 It is the Commission's view that an administered system for the education and regulation of the recreational maritime sector, including a registration and licensing regime, would hold recreational skippers to a standard of competency and provide additional leverage for behavioural motivators. Additionally, there could be more factual data to assist in monitoring recreational maritime safety, and correlations in fields such as registration, licensing, competence, compliance and vessel records. The Commission has issued a recommendation to the Ministry of Transport to address this safety issue (see Section 6).

[17] Recreational Boating Fatal Accidents: 2015-2020. Prepared by Research, Analysis, and Intelligence, 2021.
[18] Maritime New Zealand Recreational Boating Monitor Full-Year Report, Q2 2022, IPSOS, July 2022.

Registration and records for recreational vessels

3.38 Maritime Rules Part 91: Navigation Safety Rules refers to recreational vessels as pleasure craft and provides the following definition:

> a vessel that is used exclusively for the owner's pleasure or as the owner's residence and is not offered or used for hire or reward; but does not include-
>
> (a) A vessel that is provided for the transport or sport or recreation by or on behalf of any institution, hotel, motel, place of entertainment, or other establishment or business:
>
> (b) A vessel that is used on any voyage for pleasure if it is normally used or intended to be normally used as a fishing vessel or for the carriage of passengers or cargo for hire or reward:
>
> (c) A vessel that is operated or provided by any club, incorporated society, trust, or business.

3.39 Local government bylaws require vessels to display names or identification on the hulls, but there remains no requirement to register vessels. Personal watercraft (jet skis) are required to be registered. The reason for this difference may be due to the more recent introduction of personal watercraft to the New Zealand market. Introducing a new requirement to register all recreational boats would be a challenge to implement as there are many older vessels with no documented provenance. In some cases, older unseaworthy vessels are abandoned in marinas or at watersides. There is a vast second-hand boat market in New Zealand and often the sales are facilitated through online sale and purchase websites.

3.40 Newer vessels may have been built under the New Zealand Audited Boat Building Standard, which is a voluntary standard and safety initiative adopted by many New Zealand boat manufacturers. Vessels built using the Compliance Plate Certification (CPC) programme display CPC plates similar to that shown in Figure 10. The programme was introduced in 1999 and covers manufacturing processes, materials, construction methods and fuel and electrical systems. Vessels less than 6 metres in length must have enough reserve buoyancy to prevent their sinking if they are swamped. The buoyancy is provided by the installation of buoyant materials, distributed around the hulls to provide either basic[19] or level flotation (see Appendix 1).

3.41 A vessel's ability to float provides some means for people to access emergency equipment stowed inside, support themselves in the water and even climb clear of the water while awaiting rescue. In this case, it is **virtually certain** that the boat had neither basic nor level flotation. Everybody survived the capsize, but once the boat sank they had no means to support themselves in the water and their chances of survival were greatly reduced.

3.42 To maintain the CPC standard, a manufacturer must keep records of a vessel's ownership as well as maintenance, repairs and alterations. A compulsory and enduring record of a vessel's background is an important factor that is missing from the recreational boating sector in New Zealand. A boat is a large investment and most recreational skippers are likely to conduct their research diligently, but there is no guarantee that sub-standard older vessels will not be purchased or that newer vessels will be operated safely. Currently there are more than 400 boat-manufacturing companies in New Zealand and only about 20 participate in the CPC programme.

[19] Basic flotation is a vessel's ability to stay afloat, whether inverted, upright or in any other orientation, after a flooding and capsize event.

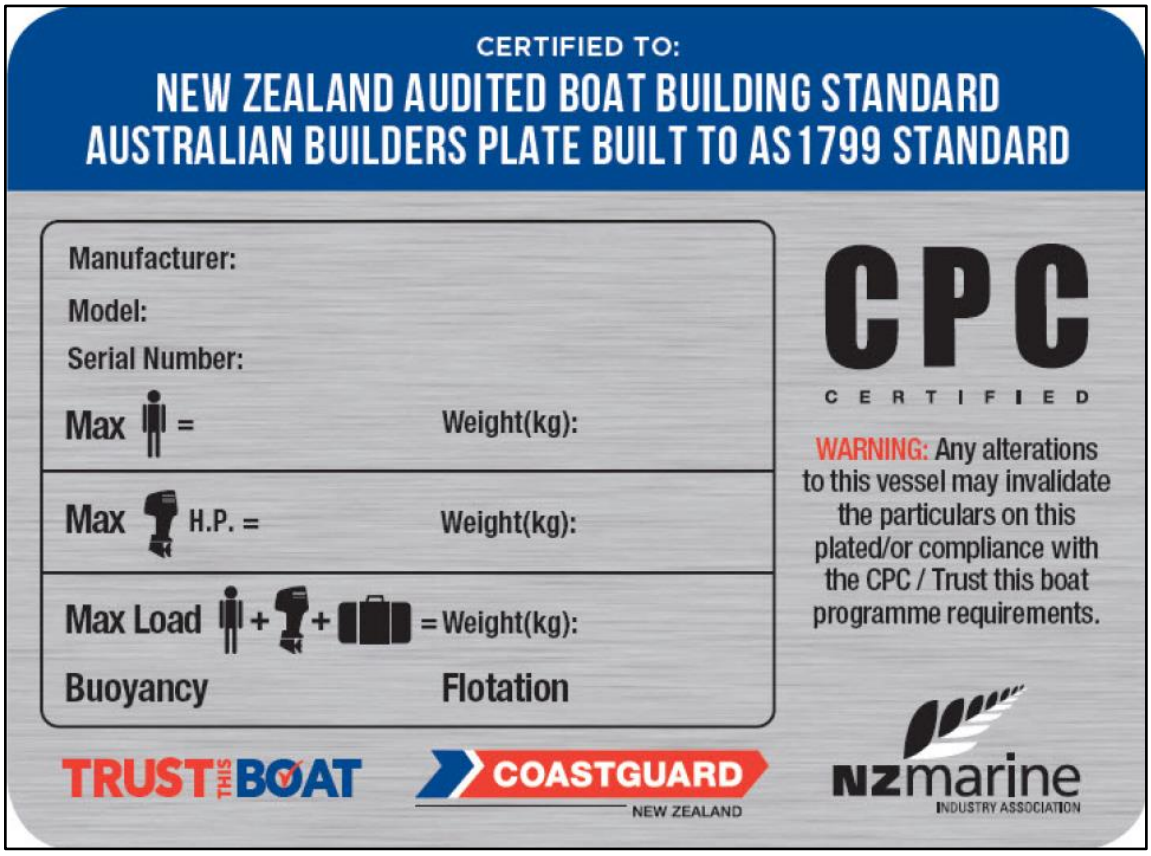

Figure 10: Example of a manufacturer's plate showing CPC programme compliance

3.43 A boat-registration system, coupled with a recreational skipper licensing system, would provide a better-structured foundation to enable the collation and analysis of recreational boating statistics. Additionally, a system like this would provide some documented history of the vessels themselves. In this case there was no documentation to verify the maintenance, repair and servicing of the boat or the outboard motor, nor was there any ownership history available.

3.44 It is **virtually certain** that the boat did not contain enough flotation material to maintain buoyancy when swamped and capsized. Even though the boat had been swamped, if it had remained partially afloat for longer and the occupants had worn PFDs, it is **likely** that there would have been more than one survivor.

Competence of recreational skippers

Safety issue: New Zealand's Maritime Rules place no obligations on recreational boat users to demonstrate that they understand and practise safe boating behaviour before going out on the water.

3.45 The Maritime Transport Act 1994 is mainly aimed at 'participants in the maritime transport system', namely persons and organisations that hold maritime documents such as commercial licences and certificates to operate. There is a general requirement under the Act for non-participants to comply with all relevant or appropriate parts of the Act and the Maritime Rules. The salient rules applicable to recreational boaters are the Navigation Safety Rules[20], the Collision Prevention Rules[21] and the navigation safety bylaws applicable in the area.

[20] Maritime Rules Part 91: Navigation Safety Rules.
[21] Maritime Rules Part 22: Collision Avoidance.

3.46 Although maritime skills and knowledge can be gained through training courses offered by Coastguard, these courses are voluntary. In the commercial maritime sector, operators must gain licences through assessments of competency, but there is no way of determining levels of competence among recreational skippers. Currently there is no limitation on the maximum size of a vessel that can be purchased by a recreational boat owner.

3.47 Competence can be considered as a combination of skills, knowledge, attitude and experience. Although the skipper had been a boat owner for many years and was known to have transited the Manukau Harbour entrance many times, there is no way to measure whether the skipper had learned sound practices over the years.

3.48 Boating safety information is available for those who know where to find it, and boating education courses are available through Coastguard. However, it remains optional for a skipper to gain a minimum standard of maritime knowledge, such as on maritime risks and acceptable boating behaviour, before taking a recreational boat to sea. Yet in doing so, they become responsible for the lives of every person on board with them and for any other water users that are affected by their boating activities.

4 Findings
Ngā kitenga

4.1 It is **virtually certain** that the skipper navigated the vessel over the bar instead of through the South Channel. This placed the vessel at a high risk of encountering conditions in which it would be prone to capsize and swamping – especially in the case of loss of propulsion.

4.2 It is **likely** that the skipper's ability and judgement were impaired by alcohol.

4.3 Once the outboard motor stopped, the skipper had no way to control the vessel's angle of encounter with the waves.

4.4 The fishing trip was planned at short notice and the group were not well prepared to survive an emergency event.

4.5 Had the boat's occupants worn appropriate personal flotation devices, particularly those suitable for use in breaking seas, they would have had a better chance of surviving until the rescue helicopters and responding private vessels arrived.

4.6 New Zealand's Maritime Rules place no obligations on recreational boat users to demonstrate before going out on the water that they understand and practise safe boating behaviour.

4.7 As long as there is no formal system for administering recreational boats and setting training standards for skippers, it is **likely** that similar accidents will continue to occur.

5 Safety issues and remedial action
Ngā take haumanu me ngā mahi whakatika

General

5.1 Safety issues are an output from the Commission's analysis. They may not always relate to factors directly contributing to the accident or incident. They typically describe a system problem that has the potential to adversely affect future transport safety.

5.2 Safety issues may be addressed by safety actions taken by a participant, otherwise the Commission may issue a recommendation to address the issue.

5.3 There is a long history of debate about the regulation of the recreational maritime sector. This is partially described in the Commission's watchlist[22] items 'Recreational boat users: essential knowledge and skills' and 'Substance use: regulatory environment for preventing performance impairment', and recommendation 004/11. The Commission's watchlist is intended to draw the attention of regulators, operators, the Government and people involved with transport to concerns about systemic transport safety risks of high social, economic or environmental importance. Due to the limited regulation of the recreational maritime sector, there is no control of who can and cannot drive a boat, and few levers to induce appropriate behaviour on the water.

Recreational boat users: essential knowledge and skills

Safety issue: In New Zealand there is little regulation of the recreational boating sector. There is no registration or licensing system, there are no minimum standards for the design and construction of pleasure boats and there is no requirement for assessments and licensing of recreational skippers to ensure a minimum standard of competency.

Safety issue: New Zealand's Maritime Rules place no obligations on recreational boat users to demonstrate before going out on the water that they understand and practise safe boating behaviour.

5.4 New Zealand's Maritime Rules place no obligations on recreational boat users to demonstrate before going out on the water that they understand and practise safe boating behaviour. Although recreational boat users are legally required to observe the rules covering boating, they are not required to show that they know them or have the skills needed to comply with them.

5.5 Strategies to promote safety in New Zealand's recreational boating sector focus on encouraging self-reliance and skipper responsibility through safety awareness and education. The Commission's view is that the system is flawed because it relies on users knowing the rules, regulations and bylaws, but does not require them to demonstrate such knowledge before taking craft on the water. This situation is anomalous compared to the aviation and road sectors.

5.6 In 2010 the Commission recommended that the Secretary for Transport address this issue with respect to the risk of collisions and other mishaps.

[22] https://www.taic.org.nz/watchlist.

> While persons in charge of recreational craft are not required to demonstrate an in-depth knowledge of Maritime Rules around collision avoidance, the risk of collisions and other mishaps will be elevated, increasingly so with increases in recreational boating activity.
>
> It is recommended that the Secretary for Transport address this safety issue by recommending rules or some other mechanism that require the person in charge of a designated recreational craft to hold a licence or certificate that requires them to be appropriately educated to identified standards. 004/11

At the time the Ministry of Transport consulted Maritime New Zealand and the National Pleasure Boat Safety Forum about this recommendation. Neither was persuaded that a skipper licensing scheme would result in 'any significant safety benefits relative to the current more focused education/legislative programme that specifically targets the key risk factors in the fatality equation'. The Ministry of Transport has not changed its approach to recommendation 004/11, and safety education campaigns remain the principal method of sharing maritime knowledge with recreational boaters.

5.7 The Commission acknowledges the efforts that the New Zealand Safer Boating Forum[23], Maritime New Zealand, councils and harbourmasters have made in improving safety, including the increasing use of social media in safety awareness campaigns. The Commission also acknowledges the annual fuel excise duty funding, announced in August 2022, for water safety including recreational boating. Maritime New Zealand has allocated grants to focus on communities most in need of support, such as ethnic minority groups and low socio-economic and hard-to-reach areas.[24] However, while education campaigns are welcomed, it remains true that a person with no understanding of maritime risks and no notion of acceptable boating behaviour can take a recreational boat to sea. In doing so, they become responsible for the lives of every person on board with them, and for any other water users who are affected by their boating activities.

5.8 The issue of whether to require some kind of licence for recreational boating has been long debated in New Zealand. Until local bylaws or Maritime Rules require recreational boats and boat skippers to become part of a formal administered system, there will be limited statistics on participation, behaviour and skills in the recreational maritime sector. The sector will continue as a largely unregulated 'non-system' where it is **likely** that the risk of accidents caused by knowledge-based errors will not decrease. Maritime New Zealand has reported that work had started on assessing the merits of a licensing scheme.

5.9 The Commission has previously commented that the risk of accidents will increase with any expansion in maritime activity. In the period following the COVID-19 restrictions, recreational boat sales doubled, accompanied by a marked increase in the number of new recreational boat users. These developments have increased the Commission's concerns about recreational boat users not being required to demonstrate knowledge of the rules or general seamanship before they head out on the water. The Commission has issued two new recommendations to the Ministry of Transport to address these concerns.

[23] Formerly the National Pleasure Boat Safety Forum.

[24] https://www.maritimenz.govt.nz/public/news/2022/august/maritime-nz-announces-safer-boating-funding.

6 Recommendations
Ngā tūtohutanga

General

6.1 The Commission issues recommendations to address safety issues found in its investigations. Recommendations may be addressed to organisations or people, and can relate to safety issues found within an organisation or within the wider transport system that have the potential to contribute to future transport accidents and incidents.

6.2 In the interests of transport safety, it is important that recommendations are implemented without delay to help prevent similar accidents or incidents occurring in the future.

6.3 In 2010 the Commission issued recommendation 004/11 to the Secretary for Transport. At the time a decision was made to not introduce additional regulation to the recreational maritime transport sector.

6.4 Recreational maritime accidents are often associated with skippers' lack of maritime knowledge and boating skills. The Commission has previously recommended the introduction of some mechanism to ensure that a person in charge of a recreational boat is appropriately educated. The current educational campaigns provide fundamental safety information, but the motivation to learn and apply that knowledge is not levered by any legal compulsion. The Commission considers that the number of people who die in recreational boating accidents every year is unacceptable.

New recommendations

6.5 On 25 January 2023 the Commission recommended that the Ministry of Transport revisit its decision with respect to recommendation 004/11 and take steps to mitigate the increase in the risk of competence-based accidents in the recreational maritime transport sector. (002/23)

On 14 February 2023, the Ministry of Transport replied:

> As reiterated in our response on the draft report of 23 November, the Ministry of Transport (the Ministry) remains of the view that safety education campaigns are the most appropriate way to share maritime knowledge with recreational boat users. The Ministry considers that the introduction of skipper licensing would be a blunt instrument for dealing with a basic safety issue.
>
> This notwithstanding, the Ministry has consulted afresh with Maritime New Zealand on this recommendation and, as time and resources permit, Maritime New Zealand will explore the merits of initiatives such as skipper education and a licensing regime as potential mechanisms for achieving public safety objectives.
>
> If new evidence suggests that introducing skipper licensing, in addition to educational campaigns, would make a material difference to recreational boating safety, the Ministry will reconsider its position.

6.6 **On 25 January 2023 the Commission recommended that the Ministry of Transport undertake research to determine the merits of a regulatory system for the recreational maritime sector, in line with overseas best practice, and how**

such a system may incorporate licensing, registration and boat design standards to improve the safety of New Zealand's recreational maritime sector. (003/23)

On 14 February 2023 the Ministry of Transport replied:

> The Ministry accepts this recommendation. The Ministry routinely reviews regulatory systems overseas and will continue to do this for the recreational maritime sector.

Notice of new recommendations

6.7 **The Commission gives notice to Maritime New Zealand and the New Zealand Safer Boating Forum that it has issued recommendations 002/23 and 003/23 to the Ministry of Transport and that these recommendations will require the involvement of Maritime New Zealand and the New Zealand Safer Boating Forum.**

7 Key lessons
Ngā akoranga matua

7.1 Being a responsible skipper means planning to avoid an incident and to survive an incident should one occur.

7.2 Coastal bars are dangerous, and conditions can quickly deteriorate to the extent that they can overwhelm a small vessel.

7.3 If there is a deep-water channel through a bar, it is very likely that it will be a safer route than crossing over the bar.

7.4 PFDs, such as lifejackets, must always be worn when crossing a bar.

7.5 Alcohol and boating do not mix. Alcohol affects coordination and judgement, and its effects can be magnified by conditions out on the water.

7.6 A lack of food and the consumption of alcohol will shorten the survival time of a person in the water.

7.7 Marine radio is a vital tool and one of the best vehicles for indicating distress to other vessels nearby. Everybody within range of and listening to the same VHF channel will receive the call for help. A mobile phone is a good back-up, but its calls are private until emergency services can verify its position and relay the call for help.

7.8 Older recreational boats may not have been constructed with adequate buoyancy to stay afloat after capsizing and swamping events. A vessel built and maintained under the voluntary CPC programme is very likely to stay afloat after such an event, and provide flotation and a gathering point for survivors in the water.

8 Data summary
Whakarāpopoto raraunga

Vehicle particulars

Name:	the vessel did not have a name
Type:	power boat
Sector:	recreational
Limits:	N/A
Make:	Bluefin
Length:	5.5 metres
Breadth:	unknown
Gross tonnage:	N/A
Built:	unknown
Propulsion:	Yamaha 100 HP 4-stroke outboard motor
Service speed:	N/A
Owner/operator:	private
Port of registry:	N/A
Minimum crew:	N/A

Date and time	16 October 2021, 1630
Location	the Manukau Harbour entrance
Persons involved	skipper and three passengers
Injuries	three fatalities
Damage	vessel foundered and lost

9 Conduct of the inquiry
He tikanga rapunga

9.1 On 16 October 2021 Maritime New Zealand notified the Commission of the occurrence. The Commission subsequently opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 and appointed an investigator in charge.

9.2 On 18 October 2021 two investigators travelled to Auckland to secure evidence and interview the survivor, witnesses and people who participated in the rescue.

9.3 On 16 February 2022 a new investigator in charge was appointed. Further information was sought from the Auckland harbourmaster and Drowning Prevention Auckland.

9.4 On 16 June 2022 an investigator viewed helicopter video footage at the Police Eagle helicopter base in Auckland.

9.5 On 28 September 2022 the Commission approved a draft report for circulation to seven interested persons for their comment.

9.6 The Commission received six submissions, and changes as a result of these have been included in the final report.

9.7 On 25 January 2023 the Commission approved the final report for publication.

Abbreviations
Whakapotonga

Coastguard	Coastguard New Zealand
CPC	Compliance Plate Certification
PFD	personal flotation device
VHF	very high frequency (radio)

Glossary
Kuputaka

111	the telephone number to reach emergency services in New Zealand
Mayday relay	a radio broadcast used to repeat a Mayday (distress) call or broadcast a Mayday call on behalf of a vessel in distress
level flotation	level flotation ensures a vessel's ability to stay afloat and level with the waterline after a flooding and capsize event
swamped	engulfed by waves and flooded with water
the bar	the sandbar at the harbour entrance
wave height	the vertical distance from the trough of a wave to the following wave crest

Appendix 1 Basic and level flotation

Reproduced with permission from Maritime Safety Victoria[25]

Basic flotation ensures that a boat is fitted with enough flotation to keep the vessel floating in some form (typically upturned and largely submerged) in the case of swamping, flooding or capsize. In this circumstance, the occupants will be partially submerged in the water, clinging to an upturned hull and risk becoming hypothermic.

Pictured: A vessel with basic flotation can end up largely submerged

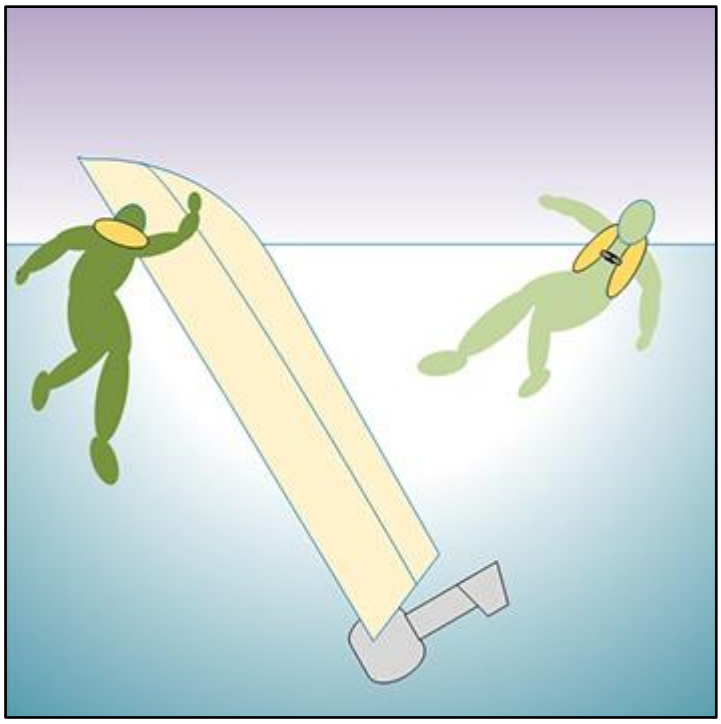

Figure 11: Basic flotation

Level flotation ensures that a boat is fitted with adequate and well-located flotation, meaning the vessel should float level with the waterline, providing a safer place of refuge in the case of swamping, flooding or capsize. If the vessel becomes swamped or flooded, it is less likely to capsize due to the location of buoyancy under the gunnels.[26]

Level flotation provides the best chance that occupants will not be submerged in water. It allows easier access to safety equipment and a greater opportunity to attempt self-rescue by bailing water from the boat.

While level flotation does not provide a self-righting capacity, if a boat fitted with level flotation capsizes, the length of the upturned hull should float above the waterline. This provides opportunity for occupants to climb upon the hull. Whether floating upright or

[25] https://transportsafety.vic.gov.au/maritime-safety/recreational-boating/trip-preparation/vessel-maintenance/buoyancy

[26] Gunnel is an alternative spelling of gunwale, the upper side of a ship or boat or the uppermost planks of a wooden vessel.

upside down, it provides a larger target to be spotted by rescuers and a larger space for refuge than basic flotation.

Pictured: A vessel with level flotation provides the best chance that occupants will not be submerged in water

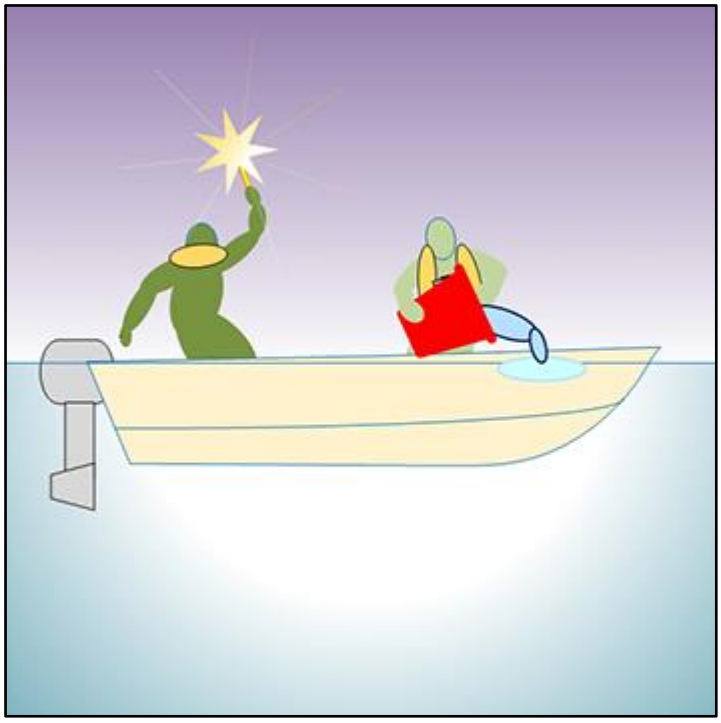

Figure 12: Level flotation

Kōwhaiwhai - Māori scroll designs

TAIC commissioned its four kōwhaiwhai, Māori scroll designs, from artist Sandy Rodgers (Ngāti Raukawa, Tūwharetoa, MacDougal). Sandy began from thinking of the Commission as a vehicle or vessel for seeking knowledge to understand transport accident tragedies and how to avoid them. A 'waka whai mārama' (i te ara haumaru) is 'a vessel/vehicle in pursuit of understanding'. Waka is a metaphor for the Commission. Mārama (from 'te ao mārama' – the world of light) is for the separation of Rangitāne (Sky Father) and Papatūānuku (Earth Mother) by their son Tāne Māhuta (god of man, forests and everything dwelling within), which brought light and thus awareness to the world. 'Te ara' is 'the path' and 'haumaru' is 'safe' or 'risk free'.

Corporate: Te Ara Haumaru - the safe and risk free path

The eye motif looks to the future, watching the path for obstructions. The encased double koru is the mother and child, symbolising protection, safety and guidance. The triple koru represents the three kete of knowledge that Tāne Māhuta collected from the highest of the heavens to pass their wisdom to humanity. The continual wave is the perpetual line of influence. The succession of humps represents the individual inquiries.

Sandy acknowledges Tāne Māhuta in the creation of this Kōwhaiwhai.

Aviation: Ngā hau e whā - the four winds

To Sandy, 'Ngā hau e whā' (the four winds), commonly used in Te Reo Māori to refer to people coming together from across Aotearoa, was also redolent of the aviation environment. The design represents the sky, cloud, and wind. There is a manu (bird) form representing the aircraft that move through Aotearoa's 'long white cloud'. The letter 'A' is present, standing for a 'Aviation'.

Sandy acknowledges Ranginui (Sky father) and Tāwhirimātea (God of wind) in the creation of this Kōwhaiwhai.

Maritime: Ara wai - waterways

The sections of waves flowing across the design represent the many different 'ara wai' (waterways) that ships sail across. The 'V' shape is a ship's prow and its wake. The letter 'M' is present, standing for 'Maritime.

Sandy acknowledges Tangaroa (God of the sea) in the creation of this Kōwhaiwhai.

Rail: rerewhenua - flowing across the land

The design represents the fluid movement of trains across Aotearoa. 'Rere' is to flow or fly. 'Whenua' is the land. The koru forms represent the earth, land and flora that trains pass over and through. The letter 'R' is present, standing for 'Rail'.

Sandy acknowledges Papatūānuku (Earth Mother) and Tāne Mahuta (God of man and forests and everything that dwells within) in the creation of this Kōwhaiwhai.

Transport Accident Investigation Commission

Recent Maritime Occurrence reports published by the Transport Accident Investigation Commission (most recent at top of list)

MO-2021-205	Container vessel, Moana Chief, serious injury to crew member, Port of Auckland, New Zealand, 10 December 2021
MO-2020-205	General cargo vessel, Kota Bahagia, cargo hold fire, Napier Port, 18 December 2020
MO-2021-202	Factory fishing trawler Amaltal Enterprise Engine room fire, 55 nautical miles west of Hokitika, 2 July 2021
MO-2021-203	Collision between fishing vessel 'Commission' and container ship 'Kota Lembah', 84 nautical miles northeast of Tauranga, Bay of Plenty, New Zealand, 28 July 2021
MO-2021-201	Jet boat KJet 8, loss of control, Shotover River, Queenstown, 21 March 2021
MO-2021-203	Collision between fishing vessel 'Commission; and container ship 'Kota Lembah', 84 nautical miles northeast of Tauranga, Bay of Plenty, New Zealand, 28 July 2021
MO-2020-202	Bulk log carrier Funing, Loss of manoeuvrability while leaving port, Port of Tauranga, 6 July 2020
MO-2018-206	Bulk carrier *Alam Seri*, loss of control and contact with seabed, Port of Bluff, 28 November 2018
MO-2020-201	Collision between bulk carrier *Rose Harmony* and fishing vessel *Leila Jo*, Off Lyttelton, 12 January 2020
MO-2019-204	Capsize of water taxi *Henerata*, Paterson Inlet, Stewart Island/Rakiura, 12 September 2019
MO-2019-203	Bulk log carrier *Coresky OL*, Crew fatality during cargo-securing operation, Eastland Port, Gisborne, 3 April 2019
MO-2018-205	Fatality on board the factory trawler *San Granit*, 14 November 2018
MO-2019-202	Fatal jet boat accident, Hollyford River, Southland, 18 March 2019
MO-2019-201	Jet boat Discovery 2, contact with Skippers Canyon wall, 23 February 2019

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