

Final report

Marine inquiry MO-2019-202 Fatal jet boat accident Hollyford River, Southland 18 March 2019

February 2020



About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (Commission) is a standing commission of inquiry and an independent Crown entity responsible for inquiring into maritime, aviation and rail accidents and incidents for New Zealand, and co-ordinating and co-operating with other accident investigation organisations overseas.

The principal purpose of its inquiries is to determine the circumstances and causes of occurrences with a view to avoiding similar occurrences in the future. It is not the Commission's purpose to ascribe blame to any person or agency or to pursue (or to assist an agency to pursue) criminal, civil or regulatory action against a person or agency. However, the Commission will not refrain from fully reporting on the circumstances and factors contributing to an accident because fault or liability may be inferred from the findings.



Figure 1: The private jet boat involved in the accident



Figure 2: Location of accident

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1. Executive summary

What happened

- 1.1. On 18 March 2019 between 1930 and 2030, a recreational jet boat with four people on board was proceeding upstream on the Hollyford River from McKerrow Island Hut to Lake Alabaster in Southland.
- 1.2. Although the exact time of the accident is unknown, the light was starting to fade as the driver negotiated a left-hand bend at the same place where a gravel bar¹ split the river into two channels. Travelling at a speed of 35-50 kilometres per hour, the driver steered the boat toward the northern channel, which was shallower than the southern channel.
- 1.3. As the boat approached the channel its starboard quarter² hit a rock. The driver lost control and the boat landed on the gravel bar. One passenger suffered a fatal injury as a result of the accident. Two other passengers suffered injuries that required hospitalisation.

Why it happened

- 1.4. The jet boat was operating in flat light conditions³, which made it difficult for the driver to identify features such as rocks and obstacles in the water. In addition, the jet boat's speed in these conditions likely increased the likelihood of an accident occurring and the severity of the consequences.
- 1.5. The driver's blood alcohol concentration was about three times the legal blood alcohol limit⁴ in New Zealand for driving a car on the road. The Transport Accident Investigation Commission (Commission) found that it was virtually certain that the consumption of alcohol impaired the driver's ability to make good decisions and to operate the jet boat safely.

What we can learn

- 1.6. Occurrence data is essential for effective safety management. The limited data available on alcohol and drug use in the recreational maritime sector reduces the ability of the sector to understand the impacts of alcohol and drugs and implement effective controls. Therefore, the Commission recommends that Maritime New Zealand continue to develop its fatal accident database to improve the quality of the data.
- 1.7. It is important that safety actions are taken on the Commission's recommendations without delay to help prevent similar accidents or incidents occurring in the future. One of the Commission's previous recommendations to introduce appropriate legislation or rules to prohibit people in safety-critical roles being impaired by alcohol or drugs remained open at the time of, and was directly related to the circumstances of, this

¹ An elevated region of sediment that has been deposited by the flow of the river.

² The starboard aft (right-hand back) part of the boat.

³ A term used to describe the lighting conditions when the sun has gone behind the mountains and the light is fading. Under flat light conditions, it is hard to distinguish features in the water.

⁴ Based on the legal limit for drivers 20 years and over, which is 50 milligrams of alcohol per 100 millilitres of blood.

accident. Implementing safety actions to address this recommendation may have avoided this accident occurring.

- 1.8. The driver or skipper of a recreational watercraft has a responsibility to ensure the safety of all persons on board. When navigating rivers where operating conditions can change rapidly it is essential, for the safety of all those on board, that all factors are taken into consideration and that a comprehensive plan is properly developed before setting out on passage.
- 1.9. The consumption of alcohol can impair a person's performance significantly. It can adversely affect their risk perception, reaction time and co-ordination. Alcohol was a contributory factor in this accident, and this emphasises the increased risk of attempting to operate a boat under its influence.

Who may benefit

1.10. Recreational boat users, commercial operators and Maritime New Zealand and other regulators will all benefit from the lessons learned, and the addressing of recommendations identified in this report.

2 Factual information

Narrative

- 2.1. At about 0700 on 18 March 2019, 11 members of a private group departed from Te Ānau on a four-day jet-boating and hunting trip to the Hollyford River area.
- 2.2. A helicopter had been chartered to transfer the group and four jet boats across an unnavigable stretch of the Hollyford River. Once the transfer was completed, the group jet-boated down the river to Lake Alabaster. At about 1200 they arrived at Lake Alabaster Hut (see Figure 3).
- 2.3. The group offloaded their gear at the hut and had lunch before getting back on the water. They spent the afternoon fishing and jet boating around the lake without incident.
- 2.4. The four jet boats returned to Lake Alabaster Hut at about 1800. At about 1844 four members of the group decided to take a jet boat to Lake McKerrow to continue fishing.
- 2.5. The driver and three passengers jet-boated downstream to Lake McKerrow, stopping at various fishing spots near the lake. The jet boat was travelling at about 35-50 kilometres per hour.
- 2.6. When the group arrived at McKerrow Island Hut (see Figure 3), one passenger disembarked to look around.



Figure 3: Hollyford River area

- 2.7. At about the same time the jet boat driver saw four trampers, who wanted to spend the night at McKerrow Island Hut, waving from the other side of the river.
- 2.8. The driver steered the jet boat across the river, which was about 200 metres wide, met the trampers, and ferried them across the river to the hut. On the trip across the river the trampers observed empty beer cans on the deck of the boat and in the cockpit area.

The trampers stated that the lighting at the time was fine but the sun had gone behind the mountains.

2.9. After a brief conversation with the trampers, the driver and the three passengers departed from McKerrow Island Hut. The exact time of departure is not known but was estimated as being between 1930 and 2030. The driver and three passengers (A, B and C) were seated as shown in Figure 4.



Figure 4: Seating arrangement at the time of the accident

2.10. The visibility at the time of departure was described as "well into dusk". The water level in the river was slightly lower than usual and continued to reduce over the course of the evening.



Figure 5: Location of accident

2.11. On the return trip from Lake McKerrow Hut to Lake Alabaster Hut, the jet boat's engine was operating at 2,800-3,000 revolutions per minute (rpm). The approximate speed of the jet boat was estimated to have been 35-50 kilometres per hour depending on the effects of the river current. The driver had consistently maintained this rpm throughout the day's jet boating.

- 2.12. About 5.5 kilometres downstream from McKerrow Island Hut, in the vicinity of a lefthand bend, a gravel bar split the river into two channels. The channel to the north of the gravel bar was wider than that to the south (see Figure 5) but had exposed rocks and logs.
- 2.13. The channel to the south of the gravel bar was narrower but deeper, and had a greater volume of water flowing. The southern channel was favoured by commercial jet boat drivers because the northern channel was shallower and had exposed logs.
- 2.14. As the jet boat approached the bend in the river, the driver saw the gravel bar and steered the boat towards the northern channel.
- 2.15. As the driver started to negotiate the turn, the starboard quarter of the jet boat made contact with a rock (see Figure 6) and skidded onto its starboard side before hitting the ground and landing upright on the gravel bar. The jet boat was pointing towards the north when it came to rest.



Figure 6: Approximate position of rocks

- 2.16. After the accident, passenger B remembered standing up on the gravel bar near the starboard forward area of the boat. Passenger A was ejected from the boat and landed near the starboard aft area. Passenger A suffered a serious leg injury and head laceration. The driver was on the port side near the steering wheel. Passenger C was lying on the gravel bar with their legs trapped under the port side (see Figure 5).
- 2.17. The driver and passenger B lifted the port side of the jet boat and pulled passenger C clear from under the boat. Passenger C had a deep cut on their leg. A towel was tied around the cut and a cover removed from the jet boat and placed around passenger C in an attempt to keep them warm. The driver and passenger B then shifted their focus to passenger A, who was in considerable pain.

- 2.18. The driver found and then activated their personal locator beacon⁵.
- 2.19. An attempt was made using the jet boat's VHF (very high frequency) radio to contact other members of the group at Lake Alabaster Hut, but the attempt was unsuccessful because of the steep terrain. They also made a mayday call on VHF channels 16, 61 and 63, but did not receive any response.
- 2.20. The driver, together with passenger B, talked to passenger A and passenger C, reassuring them that help was on the way.
- 2.21. The rest of the group at Lake Alabaster Hut were concerned that the jet boat had not returned and they made several unsuccessful attempts to contact those on board using VHF radio.
- 2.22. At about 2042 the signal emitted by the personal locator beacon was received by Rescue Coordination Centre New Zealand.
- 2.23. At about 2046 the local search and rescue co-ordinator contacted Southern Lakes Helicopters and tasked it with conducting a search and rescue operation.
- 2.24. Southern Lakes Helicopters gathered further information on the location and access to the accident site, and organised the resources needed for the rescue operation.
- 2.25. At about 2150 a rescue helicopter with a medic on board departed the Southern Lakes Helicopters base.
- 2.26. At about the time the rescue helicopter arrived, the jet boat driver noticed that passenger C was not breathing and started performing cardiopulmonary resuscitation (CPR).
- 2.27. At about 2221 the first of two rescue helicopters arrived at the scene. The medic assessed all persons on the jet boat and continued performing CPR on passenger C. After about 18 minutes of CPR, the medic declared passenger C was deceased.
- 2.28. The driver and two passengers were evacuated by helicopter from the site at about 2259.
- 2.29. A helicopter was dispatched the following day to recover the deceased.

Jet boat

- 2.30. The jet boat had been manufactured by McKenzie Marine & Mackraft Limited in December 2017. The aluminium-hull jet boat was five metres long and powered by a 6.2litre General Motors engine. The jet boat's engine was coupled to a water jet propulsion unit made by Scott Design and Manufacture.
- 2.31. The jet boat was fitted with navigation lights on either side, but had no headlights. The jet boat was able to seat a driver and four passengers.

Post-accident inspection

2.32. On the starboard side of the hull there was significant damage along the welded seam. At the aft starboard corner the hull had been breached with a hole that was consistent with the boat hitting a rock (see Figure 7). There was a second hole about one metre forward of the first along the same side.

⁵ A small emergency distress beacon that emits an ultra-high-frequency radio signal when activated. Search and rescue services use the signal to locate the beacon.

2.33. The boat suffered a dent on the port side along the gunwale⁶ near the driver's seat and one near the engine bay area.



Figure 7: Damage sustained on the starboard quarter

Technical inspection

- 2.34. The boat was inspected by McKenzie Marine & Mackraft and a Transport Accident Investigation Commission (Commission) investigator after the accident. The steering mechanism, engine alignment and hull structure were examined during the inspection. The steering mechanism was found in good order; however, the reverse mechanism was not operational as the handrail had collapsed on impact, breaking the reversing controller and cable. The reversing mechanism had been in good order prior to the accident.
- 2.35. The engine and accelerator operation were tested and found to be in good condition. A diagnostic test was also conducted on the engine control unit to determine whether there were any existing faults at the time of the accident. No faults were found.

Driver experience

- 2.36. The driver had been driving jet boats for more than 30 years and was described by those on the trip as an experienced recreational jet boat driver who was safety conscious and risk averse. The driver had obtained a Boatmaster Certificate, which is a recreational qualification issued by Coastguard Boating Education.
- 2.37. The driver reported having more than 1,000 hours of experience driving recreational jet boats, of which about 120 hours had been on the jet boat involved in the accident. The driver later recalled having jet-boated on the Hollyford River about 10-12 times, with the most recent trip being in November 2018, about five months prior to the accident.

⁶ The top edge of the hull of a boat.

3 Analysis

Introduction

- 3.1. The private group was on an annual recreational jet-boating trip to the Hollyford River. During the trip, a member of the group suffered a fatal injury when the jet boat on which they were travelling made contact with a rock and collided with a gravel bar. The jet boat was in good working order and the accident was not a result of any mechanical malfunction.
- 3.2. The driver of the jet boat was an experienced recreational jet boat operator who carried essential lifesaving and communication equipment on board, including a personal locator beacon. Once the personal locator beacon had been activated and the signal received, a search and rescue operation was initiated by the Rescue Coordination Centre New Zealand. The survivors were located and airlifted to hospital, two were suffering from serious injuries and showing signs of hypothermia.
- 3.3. There were a number of unfavourable conditions that existed at the time of the accident, which are discussed in the analysis together with the importance of planning a jet boating trip, even if it is only a simple or short journey, and the need to proceed at a safe speed, particularly when navigating in unfavourable operating conditions.
- 3.4. The Commission found that alcohol was a factor contributing to the accident. The analysis also discusses the issue of there being limited data to show the extent of alcohol- and drug-related accidents in the recreational maritime boating sector in New Zealand.

Operating conditions

3.5. Driving a jet boat under normal operating conditions requires attention, skill and planning. When environmental conditions are unfavourable, as was the case in this accident, it is even more important to plan the trip thoroughly and drive to the conditions. This may include the driver recognising the limits of their own ability, reducing speed to match the operating environment and re-evaluating whether to continue the journey should operating conditions deteriorate. The unfavourable operating environment in which the jet boat was operating at the time of the accident is discussed in detail below.

Visibility

- 3.6. The Hollyford River is a class 3 river, with some sections containing rocks, logs and shallows. Class 3 rivers are considered difficult to navigate even under favourable conditions. Skills are required and they are not recommended for families.
- 3.7. Figure 8 is a photograph of the gravel bar area taken three days after the accident, and is representative of the light conditions at the approximate time of the accident.

Figure 8: Photograph of the gravel bar area, taken at 2010 on 21 March 2019

- 3.8. When the jet boat departed from Lake McKerrow Hut sometime after 1930, visibility was starting to deteriorate due to the reduction in the amount of daylight. The exact time of the accident is unknown, but it is estimated to have occurred at about 2010 based on interviews and references to actual lighting conditions at the time. As the boat progressed upriver it is very likely that the driver's eyes would have been constantly adjusting to the changing light levels. Figure 9 is a sequence of photographs of the gravel bar area showing how quickly the lighting conditions can change. The photographs were taken between 1942 and 2025 on 21 March 2019, three days after the accident.
- 3.9. A commercial jet boat driver with more than 1,000 hours of experience on the Hollyford River advised that the jet boat would have been travelling under flat light conditions if the lighting conditions at the time of the accident were similar to those in Figure 8. Flat light is a term used to describe the lighting condition when the sun has gone behind the mountains and the light is fading. Under flat light conditions, depth perception is degraded and it is harder than in daylight to distinguish features in the water; the shadows cast by the forest on the banks of the river could have distorted its true width, making it appear narrower and harder to read.
- 3.10. It is likely that when the driver was approaching the left-hand turn in the river the natural light conditions had degraded. With the driver trying to adapt his eyesight to the changing light conditions and it becoming increasingly difficult to distinguish features, the driver's ability to identify any obstructions in the river would have been significantly reduced. As a result, the driver would have been unable to take any avoidance action before impact.

Figure 9: Photographs of the gravel bar area taken at 1942, 2010, 2015 and 2025 hrs

River level

3.11. The river level was lower than usual and continued to drop overnight. This increased the risk of submerged rocks and other obstacles being exposed. Under flat light conditions, it would have been harder for the driver to see obstacles from a safe distance.

Experience

3.12. The driver, although an experienced recreational jet boat driver, did not have the same level of knowledge and skill as that of a commercial jet boat driver and was not anticipating the gravel bar in the river. It is very likely that the driver was not aware that the safer route, used by commercial jet boat drivers, was through the narrower but deeper channel south of the gravel bar, not the shallower northern channel the driver attempted to navigate.

Speed

- 3.13. The jet boat was travelling at about 35-50 kilometres per hour at the time of the accident, the same speed it was travelling on the downstream trip when the lighting condition was good.
- 3.14. However, on the return trip to Lake Alabaster Hut the operating environment, specifically the light conditions, deteriorated and reduced the driver's ability to navigate the jet boat safely.
- 3.15. Had the driver chosen to reduce speed on the return trip to match the operating environment, it is likely that there would have been more time to identify any hazards ahead of the boat and, if necessary, take avoiding action.
- 3.16. Importantly, had the boat been proceeding at a safe speed appropriate to the conditions and still made contact with the same rock, it is likely that the consequences of the impact would have been considerably reduced.

Alcohol consumption

Safety issue: There is limited data to quantify the extent of alcohol and drug use in the New Zealand recreational maritime sector and its impacts on recreational boating accidents.

- 3.17. The driver and passengers on the jet boat had been consuming alcohol throughout the afternoon. The driver's blood alcohol concentration was tested⁷ and found to be within the approximate range of 135-195 milligrams per 100 millilitres at the time of the accident. The legal blood alcohol limit in New Zealand for a car driver on the road, 20 years old or over, is 50 milligrams per 100 millilitres of blood. No-one on the jet boat, including the driver, felt they were intoxicated or incapacitated. The driver reported being confident of being able to navigate the jet boat safely at all times.
- 3.18. The Commission found that it was virtually certain that the driver of the jet boat was impaired and their ability to navigate safely compromised. The driver's blood alcohol concentration was about three times the legal blood alcohol limit for driving a car on the road.
- 3.19. The detrimental effects of alcohol on cognitive ability are well documented. Alcohol can impair co-ordination and judgement and is a major cause of road injury in New Zealand. Maritime New Zealand's website states that 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 concentration of blood going to your brain and muscles, contributing to muscle heat and fluid loss

Reduce your ability to hold your breath

Suppress your airway protection flexes 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

3.20. The driver was unaware of the extent of their intoxication, and perceived the risk of proceeding through the Hollyford River under flat light conditions to be low. However, the amount of alcohol in the driver's bloodstream had almost certainly impaired their ability to make good decisions and to operate the jet boat safely under what were already difficult operating conditions.

Regulatory oversight

3.21. Maritime New Zealand records show that since January 2015, 79 people have died in recreational boating accidents in New Zealand. Between January 2019 and October 2019, 19 people died in recreational boating accidents. It is unclear how many of these fatal accidents were a consequence of the skippers being impaired, because there are no

⁷ At the Institute of Environmental Science and Research Limited. The blood specimens were collected on 19 March 2019 at about 0249.

specific powers to test recreational boat drivers and skippers for the presence of alcohol or drugs if they are involved in accidents.

- 3.22. The detrimental effects of alcohol and drugs on cognitive ability have been described and documented by researchers in the transport sector. For example, the 2018 recreational boating statistics released by the United States Coast Guard found that alcohol was the leading known contributing factor in fatal boating accidents in the United States, accounting for 100 deaths or 19 percent of total fatalities in the United States recreational boating sector.
- 3.23. The Commission has previously recommended appropriate legislation or rules to prohibit people in safety-critical roles being impaired by alcohol or drugs. The recommendation included people operating recreational vessels. The Commission considers this to be a long-standing and serious transport safety concern and it remains on the Commission's watchlist⁸. The Ministry of Transport undertook policy work in response to the recommendation, including commissioning a report by the New Zealand Institute of Economic Research on a cross-modal risk analysis of substance impairment. The report noted:

Maritime NZ (2008) noted that alcohol was consumed in 18% of boating fatalities based on post-mortem testing investigations. This percentage is considered to be a conservative estimate due to the limited opportunity for testing and gathering information on factors contributing to maritime fatalities. For the purpose of our analysis we have assumed that substance impairment is a contributing factor in 25% of recreational maritime fatalities.

- 3.24. The New Zealand Institute of Economic Research estimated there were about 43 recreational boating fatalities in the period 2002-2011 where substance impairment might have been a factor.
- 3.25. New Zealand Police and Maritime New Zealand have expressed support for enforceable drug and alcohol limits in the recreational sector, and the New Zealand Safer Boating Forum's 2014 strategy recommended mandatory alcohol limits for recreational skippers. However, the Ministry of Transport considers that the current data on alcohol- and drug-related incidents does not justify the higher levels of intervention proposed by the Commission's recommendation. The Ministry has indicated that the decision could be reconsidered if new data gathered by the regulators indicated a widespread problem.
- 3.26. The Commission's recommendation remains open and the fatal consequences in this accident highlight the ongoing risk of not implementing safety actions to address this recommendation. Furthermore, the Commission believes that the estimated 43 deaths in the 2002-2011 period show that the risk is not as low as reasonably practicable and more needs to be done to address the Commission's recommendation.
- 3.27. We acknowledge the work that Maritime New Zealand has done in developing its fatal accident database and encourage further work on the database. A recommendation has been made to Maritime New Zealand to address the need to improve the quality of the data so that the industry is better able to understand the role of alcohol and drugs in recreational boating accidents.

⁸ https://www.taic.org.nz/watchlist/regulations-preventing-substance-impairment.

4 Findings

- 4.1. The jet boat was found to be in good working order. The accident was not a result of any mechanical malfunction.
- 4.2. The jet boat was operating in flat light conditions, which likely made it difficult for the driver to identify features such as rocks and obstacles in the water.
- 4.3. The jet boat's speed in the operating environment increased the likelihood of an accident occurring and the severity of the consequences.
- 4.4. The driver's blood alcohol concentration was about three times the legal blood alcohol limit in New Zealand for driving a car on the road. The Commission found that the consumption of alcohol almost certainly impaired the driver's ability to make good decisions and to operate the jet boat safely.
- 4.5. There is limited data available to determine the extent of alcohol and drug use in the recreational maritime sector and its influence on accident statistics.
- 4.6. The Commission's previous recommendation to introduce appropriate legislation or rules to prohibit people in safety-critical roles being impaired by alcohol or drugs remained open at the time of the accident.

5 Safety issues and remedial action

General

- 5.1. Safety issues are an output from the Commission's analysis. They typically describe a system problem that has the potential to adversely affect future operations on a wide scale.
- 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.

Limited data available on alcohol and drug use in the New Zealand recreational maritime sector

- 5.3. Between January 2019 and October 2019, 19 people died in recreational boating accidents. It is unclear how many of these fatal accidents were a consequence of the drivers of the recreational watercraft being substance impaired.
- 5.4. New Zealand Police and Maritime New Zealand have expressed support for enforceable alcohol and drug limits in the recreational boating sector, and the New Zealand Safer Boating Forum's 2014 strategy recommended mandatory alcohol limits for recreational skippers. However, the Ministry of Transport considers that the current data on alcohol- and drug-related incidents does not justify the higher levels of intervention proposed by the Commission's recommendations. The Ministry indicated the decision could be reconsidered if new data indicated a widespread problem.
- 5.5. Maritime New Zealand is continuing its work on improving the fatal events dataset so that it better captures alcohol and drug use in recreational boating accidents.

6 **Recommendations**

General

- 6.1. The Commission may issue, or give notice of, recommendations to any person or organisation that it considers the most appropriate to address the identified safety issues, depending on whether these safety issues are applicable to a single operator only or to the wider transport sector. In this case, a recommendation has been issued to the Director of Maritime New Zealand, with notice of the recommendation given to the Secretary of Transport.
- 6.2. In the interests of transport safety, it is important that this recommendation is implemented without delay to help prevent similar accidents or incidents occurring in the future.

New recommendation

6.3. On 21 February 2020, the Commission recommended that the Director of Maritime New Zealand continue to develop its fatal accident database to improve the quality of the data so that the maritime sector is better able to understand the risks of alcohol and drug use in recreational boating accidents. (001/20)

On 5 March 2020, the Director of Maritime New Zealand replied:

Maritime NZ accepts the final recommendation and can confirm it is in the process of implementing it. Updating and improving the quality, fidelity and timeliness of data held in Maritime NZ's internal Maritime Fatal Events Database is an on-going and continuing task for Maritime NZ data analysis staff.

Noting the importance of building the reliability of the dataset, there is currently a focus on capturing more detailed historical coroner findings data including a focus on detail such as skipper impairment and causal factors. This will allow for more detailed analytical review over time.

In light of the on-going nature of this work, Maritime NZ does not consider it prudent to specify a completion date for this recommendation. An update on progress on the increasing reliability of the data set could, however, be provided as that becomes evident.

7 Key lessons

- 7.1. The driver or skipper of a recreational watercraft has a responsibility to ensure the safety of all persons on board. When navigating rivers where operating conditions can change rapidly it is essential, for the safety of all those on board, that all factors are taken into consideration and that a comprehensive plan is properly developed before setting out on passage.
- 7.2. The consumption of alcohol can impair a person's performance significantly. It can adversely affect their risk perception, reaction time and co-ordination. Alcohol was a contributory factor in this accident, and this emphasises the increased risk of attempting to operate a boat under its influence.
- 7.3. It is important that safety actions are taken on the Commission's recommendations without delay to help prevent similar accidents or incidents occurring in the future.

8 Data summary

Vehicle particulars

	Name:	private jet boat
	Туре:	private
	Length:	5 metres
	Built:	December 2017
	Propulsion:	6.2-litre General Motors engine
	Owner/operator:	private owner
	Minimum crew:	one
Date and time		28 March 2019, 2010
Location		Hollyford River
Persons involved		four
Injuries		one fatal injury, two serious injuries
Damage		significant hull damage on starboard side

9 Report information

Abbreviations

CPR	cardiopulmonary resuscitation
VHF	very high frequency
Glossary	
flat light	a term used to describe the lighting conditions when the sun has gone behind the mountains and the light is fading. Under flat light conditions, it is hard to distinguish features in the water
gravel bar	an elevated region of sediment that has been deposited by the flow of a river
starboard quarter	the starboard aft (right-hand back) part of the boat

Citation

New Zealand Institute of Economic Research, A cross-modal risk analysis of substance impairment, July 2014

10 Conduct of the inquiry

- 10.1. On 19 March 2019, Maritime New Zealand notified the Transport Accident Investigation 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.
- 10.2. On 21 March 2019, two investigators travelled to Invercargill to inspect the jet boat and gather evidence.
- 10.3. On 21 March 2019, a protection order was issued on the jet boat and secured at the Invercargill Police station.
- 10.4. On the same day two investigators travelled to the site of the accident on the Hollyford River to gather evidence.
- 10.5. On 1 April 2019, two investigators travelled to Te Ānau to interview the driver of the jet boat and one other passenger.
- 10.6. On 4 June 2019, an investigator and the manufacturer of the jet boat inspected the vessel and engine control unit.
- 10.7. The Commission also gathered information from Maritime New Zealand, the harbourmaster and New Zealand Police.
- 10.8. On 20 November 2019, the Commission approved a draft report for circulation to three interested persons for their comment.
- 10.9. Two written submissions were received. The Commission considered the submissions, and changes as a result of those submissions have been included in the final report.
- 10.10. On 19 February 2020, the Commission approved the final report for publication.

11 Notes on Commission reports

Commissioners

Chief Commissioner	Jane Meares			
Deputy Chief Commissioner	Stephen Davies Howard			
Commissioner	Richard Marchant			
Commissioner	Paula Rose, QSO			
Key Commission personnel				

Chief Executive	Lois Hutchinson
Chief Investigator of Accidents	Aaron Holman
Investigator in Charge	Naveen Mathew Kozhuppakalam
General Counsel	Cathryn Bridge

Citations and referencing

This report does not cite information derived from interviews during the Commission's inquiry into the occurrence. Documents normally accessible to industry participants only and not discoverable under the Official Information Act 1982 are referenced as footnotes only. Publicly available documents referred to during the Commission's inquiry are cited.

Photographs, diagrams, pictures

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

Verbal probability expressions

This report uses standard terminology to describe the degree of probability (or likelihood) that an event happened or a condition existed in support of a hypothesis. The expressions are defined in the table below.

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	

*Adopted from the Intergovernmental Panel on Climate Change

TAIC Kōwhaiwhai - Māori scroll designs

TAIC commissioned its kōwhaiwhai, Māori scroll designs, from artist Sandy Rodgers (Ngati Raukawa, Tuwharetoa, MacDougal). Sandy began from thinking of the Commission as a vehicle or vessel for seeking knowledge to understand transport accident tragedies and how to prevent them. A 'waka whai mārama (i te ara haumaru) is 'a vessel/vehicle in pursuit of understanding'. Waka is 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 represent the individual inquiries.

Sandy acknowledges Tane Mahuta in the creation of this Kowhaiwhai.

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 aviation.

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

Marine: 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 'Marine'.

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

Rail: rerewhenua - flowing across the land

<u>REARES</u>

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.

Recent Marine Occurrence Reports published by the Transport Accident Investigation Commission

- MO-2019-201 Jet boat Discovery 2, contact with Skippers Canyon wall, 23 February 2019
- MO-2018-202 Accommodation fire on board, fishing trawler *Dong Won 701*, 9 April 2018
- MO-2018-203 Grounding of container ship Leda Maersk, Otago Lower Harbour, 10 June 2018
- MO-2018-204 Dolphin Seeker, grounding, 27 October 2018
- MO-2017-204 Passenger vessel *Seabourn Encore*, breakaway from wharf and collision with bulk cement carrier at Timaru, 12 February 2017
- MO-2017-203 Burst nitrogen cylinder causing fatality, passenger cruise ship *Emerald Princess*, 9 February 2017
- MO-2017-205 Multipurpose container vessel Kokopo Chief, cargo hold fire, 23 September 2017
- MO-2017-202 Passenger vessel L'Austral, grounding, Milford Sound, Fiordland, 9 February 2017
- MO-2016-206 Capsize and foundering of the charter fishing vessel *Francie*, with the loss of eight lives, Kaipara Harbour bar, 26 November 2016
- MO-2016-202 Passenger ship, *Azamara Quest*, contact with Wheki Rock, Tory Channel, 27 January 2016
- MO-2017-201 Passenger vessel L'Austral contact with rock Snares Islands, 9 January 2017
- MO-2016-201 Restricted-limits passenger vessel the PeeJay V, Fire and sinking , 18 January 2016
- MO-2016-204 Bulk carrier, *Molly Manx*, grounding, Otago Harbour, 19 August 2016
- MO-2016-205 Fatal fall from height on bulk carrier, New Legend Pearl, 3 November 2016
- MO-2015-201 Passenger ferry Kea, collision with Victoria Wharf, Devonport, 17 February 2015

Interim ReportBurst nitrogen cylinder causing fatality on board the passenger cruise ship *Emerald*MO-2017-203Princess, 9 February 2017

MO-2012-203 Fire on board Amaltal Columbia, 12 September 2012

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