

Report 09-201: collision: private jet-boat/private watercraft
Kawarau River, Queenstown, 5 January 2009

The Transport Accident Investigation Commission is an independent Crown entity established to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future. Accordingly it is inappropriate that reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

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Final Report

Marine inquiry 09-201
Collision: private jet-boat/private personal watercraft
Kawarau River, Queenstown, 5 January 2009

Approved for publication: March 2011

Transport Accident Investigation Commission

About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (*Commission*) is 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 cause of occurrences with a view to avoiding similar occurrences in the future. Its purpose is not 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. The Commission carries out its purpose by informing members of the transport sector, both domestically and internationally, of the lessons that can be learnt from transport accidents and incidents.

Commissioners

Chief Commissioner	John Marshall, QC
Deputy Chief Commissioner	Pauline Winter, QSO
Commissioner	Captain Bryan Wyness

Key Commission personnel

Chief Executive	Lois Hutchinson
Chief Investigator of Accidents	Captain Tim Burfoot
Investigator in Charge	Paul Bird
General Counsel	Rama Rewi

Email:	inquiries@taic.org.nz
Web:	www.taic.org.nz
Telephone:	+ 64 4 473 3112 (24 hrs) or 0800 188 926
Fax:	+ 64 4 499 1510
Address:	Level 16, AXA Centre, 80 The Terrace, PO Box 10 323, Wellington 6143, New Zealand

Important notes

Nature of the final report

This final report has not been prepared for the purpose of supporting any criminal, civil or regulatory action against any person or agency. The Transport Accident Investigation Commission Act 1990 makes this final report inadmissible as evidence in any proceedings with the exception of a Coroner's inquest.

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This report remains the intellectual property of the Transport Accident Investigation Commission.

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Citations and referencing

Information derived from interviews during the Commission's inquiry into the occurrence is not cited in this final report. Documents that would normally be accessible to industry participants only and not discoverable under the Official Information Act 1980 have been referenced as footnotes only. Other documents referred to during the Commission's inquiry that are publicly available are cited.

Photographs, diagrams, pictures

Unless otherwise specified, photographs, diagrams and pictures included in this final report are provided by, and owned by, the Commission.



Photograph courtesy of New Zealand Police

Personal watercraft Sea-Doo GTX 155 post accident



Photograph courtesy of New Zealand Police

Jet-boat Hamilton Jet 151A post accident

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Abbreviations

Commission	Transport Accident Investigation Commission
km/h	kilometre(s) per hour
kW	kilowatt(s)
m	metre(s)
Maritime NZ	Maritime New Zealand
mph	mile(s) per hour
NIWA	National Institute of Water and Atmospheric Research
NZS	New Zealand Standard
PFD	personal flotation device
UTC	universal co-ordinated time

Glossary

buoyancy aid	any device designed to assist a person to remain afloat in water until rescue is effected (New Zealand Standard [NZS] 5823:2005)
driver	name often used to describe the person in charge of a small marine craft
fairway	the navigable part of a river, bay, etc, through which vessels enter or depart; the part of a harbour or channel that is kept open and unobstructed for the passage of vessels (Webster Dictionary)
lifejacket	in this report, a generic term to describe any type of buoyancy aid. Where specific standards and Rules are quoted in the report, the other specific definitions provided should be used
lifejacket (1)	a buoyancy aid for use in open waters where early rescue may not always be anticipated, designed to assist in turning the wearer to a safe floating position (NZS 5823:2005)
lifejacket (2)	defined in the Queenstown Lakes District Bylaws 2003 as: a serviceable personal flotation device that meets NZS 5823:2001 or any amendment or replacement thereof or a national standard or international standard that provides an equivalent level of safety
personal flotation device (1)	a buoyancy aid for use in inshore waters where early rescue may be expected: this will improve a wearer's chances of survival, but does not guarantee a wearer's safety and ultimate rescue (NZS 5823:2005)
personal flotation device (2)	in New Zealand Maritime Rules Part 91, Navigational Safety Rules is defined as: any serviceable buoyancy aid that is designed to be worn on the body and that is certified by a recognised authority as meeting – (a) type 401, 402, 403, 404, 405, or 408 in NZS 5823:1989 or NZS 5823:2001 or type 401, 402, 403, 404, 405 or 406 in NZS 5823:2005; or (b) a national or international standard that the Director [of Maritime Safety] is satisfied substantially complies with types 401, 402, 403, 404, 405, or 408 of the NZS 5823:1989 or NZS 5823:2001 or type 401, 402,403, 404, 405 or 406 in NZS 5823:2005

personal watercraft	in this report, a generic term to describe a vessel that uses an inboard motor powering a water jet pump as its primary source of motive power and that is designed to be operated by a person sitting, standing or kneeling on the vessel, rather than the conventional manner of sitting or standing inside the vessel. Sometimes also referred to as a jet-ski
skipper	colloquial term used in some maritime sectors for the person in charge of a vessel
stand-on vessel	vessel not required to give way under New Zealand collision-prevention rules
starboard	right-hand side of a vessel when looking forward
true river right	the right-hand side of a river when looking downstream
type 402 inshore waters PFD	previously known as an inshore waters lifejacket. A buoyancy aid worn on the body that is intended to maintain the wearer in a safe floating position and for use in inshore waters where early rescue may be anticipated (NZS 5823:2005)

Data summary

Vessel particulars:

Name:	<i>jet-boat</i>	<i>personal watercraft</i>
Type:	Hamilton Jet 151A	Sea-Doo GTX 155
Length:	4.60 metres (m)	3.31 m
Breadth:	1.75 m	1.22 m
Approximate dry weight:	1250 kilograms	361 kilograms
Maximum speed:	about 48 knots (88 kilometres per hour [km/h])	About 46 knots (85 km/h)
Built:	2001	2003
Propulsion:	350 horsepower (261.1 kilowatts [kW]) 6 litre Chevrolet engine driving a Hamilton 212 jet unit	155 horsepower (115.6 kW) Rotax 4-TEC engine
Owner/operator:	private	private

Date and time: 5 January 2009, at about 1924¹

Location: Kawarau River

Persons on board: *jet-boat:* 3
personal watercraft: 2

Injuries: fatalities: 2
injured: 3

Damage: constructive total loss both craft

¹ Times in this report (09-201) are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode.

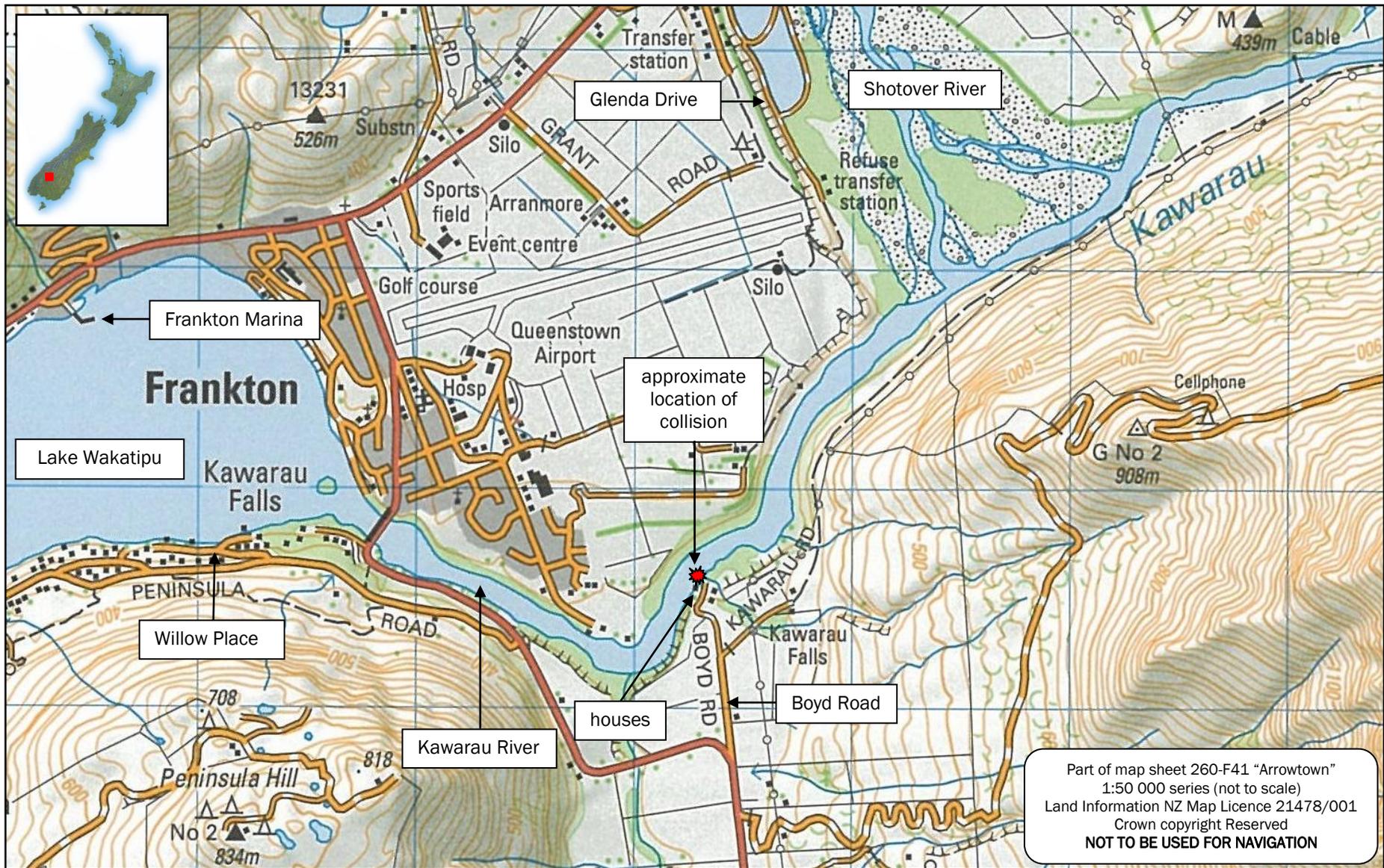


Figure 1
Map of the general area

1. Executive summary

- 1.1 At about 1924 hours on 5 January 2009, a recreational *jet-boat* and *personal watercraft* collided almost head-on at high speed close to willow trees near the bank of the Kawarau River, Queenstown.
- 1.2 None of the 3 persons on the *jet-boat* was wearing a lifejacket², so when the driver and front-seat passenger were ejected from the boat in the collision and probably rendered unconscious, they drowned. The third person received minor injuries.
- 1.3 The driver of the *personal watercraft* and his passenger were both wearing lifejackets and despite the passenger being knocked unconscious and being critically injured, she survived. The driver was also seriously injured. Both craft were extensively damaged and declared total constructive losses.
- 1.4 Speed was one of 2 main proximate causes of the collision. Both craft were travelling on the Kawarau River in an area where the speed limit of 5 knots within 200 m of the shore had been uplifted through a Council resolution, but neither vessel was travelling at a safe speed as required by Maritime Rules Part 22, Collision Prevention, because both craft were nearing a clump of willow trees that obstructed their view of any other craft or persons permitted to be in that area at the time. The second main proximate cause was the *jet-boat's* travelling at speed on the wrong side of the river at the time of the collision.
- 1.5 The report discusses the general issue of recreational boat users not being required to demonstrate an in-depth knowledge of the collision-prevention rules; knowledge that could have made both drivers more aware of their responsibilities to travel at a safe speed at all times, regardless of any uplifting of speed restrictions.
- 1.6 Lifejackets save lives and would likely have prevented the deaths of the 2 *jet-boat* occupants in this case. The report discusses the requirement or otherwise to wear lifejackets in craft under 6 m in length. The Transport Accident Investigation Commission (Commission) does not make a recommendation to address this issue because recent educational programmes have had some success in this area, and some local government authorities have mandated wearing lifejackets in small craft. In other areas the wearing of lifejackets is left to the discretion of the person in charge of the boat.
- 1.7 One of the drivers had consumed a small quantity of alcohol prior to the collision, but probably not enough to impair his performance. Nevertheless, the Commission has looked at the available statistics on alcohol and fatal boating accidents and discusses recreational boating and alcohol, and the relationship between this and the licensing of recreational boat users.
- 1.8 The *personal watercraft* was travelling at an unsafe speed at the time of the collision because of its close proximity to the willow trees. The Commission has determined that commercial jet-boats routinely followed similar lines at unsafe speeds. The report discusses how the routine commercial jet-boat operations on the Kawarau River conflict with the requirement for all craft to travel at safe speeds, and how commercial jet-boat drivers, like recreational boat drivers, are not required by Maritime Rules to hold Maritime Documents that require them to have demonstrated an in-depth understanding of the collision-prevention rules.
- 1.9 The discussion of commercial jet-boat operations and the uplifting of speed restrictions leads to an issue of whether adequate protections had been put in place to mitigate the risk to river users where a speed restriction had been uplifted, a restriction that had been put in place to protect other people engaging in leisure activities around shorelines from craft travelling at high speed.

² Refer to glossary for relationship to personal flotation devices

1.10 Six safety recommendations have been made to the Director of Maritime New Zealand (Maritime NZ), the Secretary for Transport, the Chief Executive of Local Government New Zealand and the Chief Executive of Queenstown Lakes District Council to address the safety issues where:

- the process for uplifting speed restrictions is inconsistent and there is a lack of a formal assessment of the risks created in doing so
- neither recreational boat users nor commercial jet-boat drivers are required to demonstrate knowledge of the collision-prevention rules
- there are no limits for alcohol and other performance-impairing substances for recreational and commercial boat drivers, and no legal mechanism to test them for alcohol and other performance-impairing substances
- there is a lack of mandatory requirements for head protection on personal watercraft and other craft involved in high-risk activities.

2. Conduct of the inquiry

2.1. Inquiry opened

- 2.1.1. At about 0900 on 6 January 2009, the Commission learned through the media of an almost head-on collision between a recreational *jet-boat* and a *personal watercraft* on the Kawarau River near Queenstown. There had been no eye witnesses to this accident apart from the surviving occupants of the 2 craft.
- 2.1.2. The collision had occurred the day before at about 1924. Five people had been involved in the accident: 3 from the *jet-boat* and 2 from the *personal watercraft*. Two of the men from the *jet-boat* were still missing.
- 2.1.3. Queenstown Police and Maritime NZ were notified of the accident on 5 January 2009. After securing the accident scene, Queenstown Police commenced its own investigation followed by Maritime NZ. Both organisations conducted an initial examination of the accident site, took photographs, and questioned or took statements from people, including the driver of the *personal watercraft*, the surviving passenger from the *jet-boat*, those who had arrived at the scene after the accident to offer assistance, and people from nearby properties who had heard the collision.
- 2.1.4. After learning of the accident the Commission spoke with Queenstown Police and Maritime NZ to gain a better understanding of the accident and the events leading up to it. As a result of this discussion, the Commission formed a belief that either the circumstances of the accident had, or would be likely to have, significant implications for transport safety or that the accident would give rise to, or would be likely to give rise to, findings or recommendations that may increase transport safety.
- 2.1.5. Adding to the Commission's concern was the heavy commercial jet-boat activity in the area where this accident happened, and the fact that there had been a spike in accidents involving private jet-boats.
- 2.1.6. After taking all these factors into consideration, the Commission opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 to determine the circumstances and causes of this accident. A Commission marine investigator was assigned as investigator in charge to lead the investigation.³
- 2.1.7. The terms of reference for the Commission's inquiry into this accident were set out in sections 4 and 8 of the Transport Accident Investigation Commission Act. Section 4 required the Commission to determine the circumstances and causes of the accident with a view to avoiding similar occurrences in the future rather than to ascribe blame. To assist it with this purpose, section 8 required the Commission to investigate the accident, including to make such inquiries as it considered appropriate in order to ascertain the cause or causes of the accident, and to prepare and publish findings and recommendations (if any) in respect of its investigation.

2.2. Enquiries immediately after the accident

- 2.2.1. The day after the accident, the investigator in charge and one other marine investigator from the Commission travelled to Queenstown, where they were met and briefed by Maritime NZ investigators and Queenstown Police at the Queenstown Police Station. At that briefing session, the Commission's 2 investigators were informed that:
 - (a) the accident scene had been photographed and Queenstown police had interviewed a number of people
 - (b) the *jet-boat* and *personal watercraft* had been removed from the scene and stored at the Queenstown Police Station for further inspection

³ An **inquiry** is the overarching process, which involves the collation and examination of evidence relevant to an occurrence, and the reporting of that evidence. An **investigation** is a sub-set of an inquiry process, and is the mechanism by which the Commission collates and examines this evidence. An investigator in charge will conduct the investigation in each inquiry and present the findings of their investigation to Commissioners. Commissioners are the decision-makers. They own the inquiry process and determine what evidence is reported and how.

- (c) the 2 survivors from the *personal watercraft* had been transferred to Dunedin Hospital.
- 2.2.2. After this briefing session, the Commission's 2 investigators and a jet-boat expert from Maritime NZ inspected the *jet-boat* and *personal watercraft*. The Commission's investigators later obtained copies of the statements made to the Queenstown Police and Maritime New NZ investigators.
- 2.2.3. On 7 January 2009, a reconstruction of the *jet-boat* trip was made using a Queenstown Coastguard vessel. The Commission's and Maritime NZ's investigators were on board the Coastguard vessel, with the surviving *jet-boat* passenger present to explain the events leading up to the accident. Later that day, the Commission's investigators interviewed the surviving passenger from the *jet-boat* and Queenstown Police. They also met the relatives of those involved in the accident.
- 2.2.4. On 8 January 2010 the Commission's investigators interviewed the Queenstown harbourmaster and deputy harbourmaster, then travelled to Dunedin Hospital to interview the driver of the *personal watercraft*. The passenger of the *personal watercraft* could not be interviewed as she was still in a critical condition in Dunedin Hospital's intensive care unit. At the time of publishing this report, she still had no recollection of the events leading up to, and at the time of, the accident.

2.3. Later enquiries

- 2.3.1. In the course of the next 18 months, the Commission continued to gather and analyse information concerning the accident itself, the 2 craft involved in the accident and the regulatory environment in which all craft on the Kawarau River operate. In particular, the Commission examined international conventions and the Maritime Rules applicable to safe speed and narrow channels, it examined the local bylaws applicable to the Kawarau River, it looked at the resource consent process applicable to commercial jet-boat operators, it examined the qualifications required of recreational and commercial jet-boat operators, and it looked at the legislation applicable to personal flotation devices (PFDs).
- 2.3.2. In carrying out these enquiries, the Commission met with or obtained information from a range of sources, including Maritime NZ, New Zealand Police, Queenstown Coastguard, Lakes Environmental Limited (a 100% owned company of Queenstown Lakes District Council), jet-boat operators and associations and the Queenstown harbourmaster and deputy harbourmaster.

2.4. Consultation on draft final report

- 2.4.1. After completing its main enquiries, the Commission prepared a draft final report of the accident. This report contained a factual account of the accident, explained the legislative and regulatory provisions applicable to water craft activities on the Kawarau River, and contained an analysis of the evidence collated by the Commission, draft findings and recommendations.
- 2.4.2. In August 2010, Commissioners met to consider the draft final report and to review the facts. After making amendments, the draft final report was sent to 17 interested persons and agencies for comment in September 2010. Eight people/agencies responded in writing. Extensive submissions were received from Queenstown Lakes District Council, the Queenstown harbourmaster and Maritime NZ. After considering these submissions, the Commission prepared a second draft final report and forwarded it to the same interested persons and agencies for further comment. This occurred in December 2010. Although this draft final report was different from the first report, its findings and recommendations remained relatively the same.
- 2.4.3. Five written submissions were received on the second draft final report, one of which included a further extensive and detailed written submission from Queenstown Lakes District Council.
- 2.4.4. Given the nature of Queenstown Lakes District Council's comments, the Commission invited the Council to meet with Commissioners in Wellington. A teleconference between Queenstown Lakes District Council and Commissioners subsequently took place on 24 February 2011.

- 2.4.5. At that teleconference, Queenstown Lakes District Council detailed its comments on the second draft final report. In particular it queried the scope of the Commission's inquiry and report, claiming that an examination of commercial jet-boat activities on the Kawarau River was unnecessary as the accident had involved 2 private recreational craft.
- 2.4.6. The submissions and the Commission's response to them are fully addressed in the body of this report, although the matter concerning the scope of the Commission's inquiry and report warrants discussion now.
- 2.4.7. In conducting its inquiries, the Commission examines those actions that are most proximate to an occurrence and that are generally associated with front-line operations, such as the decision-making of the drivers of the *jet-boat* and *personal watercraft* in this case. These are typically known as "active failures" (Reason, 1997). However, the Commission also goes further and examines those matters that are not proximate to the event but which may arise during management decision-making, manufacture, design and maintenance. These are typically known as "latent failures" and, in this case, they included matters like the regulatory system applicable to watercraft operating on the Kawarau River, including commercial watercraft given that they were high users of the Kawarau River.
- 2.4.8. This approach is well accepted by international transport investigation authorities like the Commission, as well as by international organisations such as the International Maritime Organization and the International Civil Aviation Organization. It is also an approach espoused by James Reason, a well known author of investigative methodology, who submits that latent failures may lie dormant for many years and may not be identified as posing a risk to an operation until they are associated in time with some active failures. Once combined, active and latent failures may then give rise to a tragic event, such as the capsizing of a ship or, in this case, the collision of 2 craft.
- 2.4.9. After examining the most proximate causes of the accident in this case, the Commission broadened its enquiries to examine the regulatory system within which the 2 accident craft, and other users of the Kawarau River, were operating, to gain a better understanding of the circumstances that may have contributed to the collision. Because the Commission had evidence that a high percentage of the river activity involved commercial jet-boat operations, and because the Commission believed that the speed and route routinely taken by commercial jet-boats were safety issues, the Commission turned its attention to the commercial jet-boat operations on the Kawarau River. This, in turn, led the Commission to look at the resource consent system applicable to commercial jet-boat operations.

3. Factual information

3.1. Narrative

Jet-boat perspective

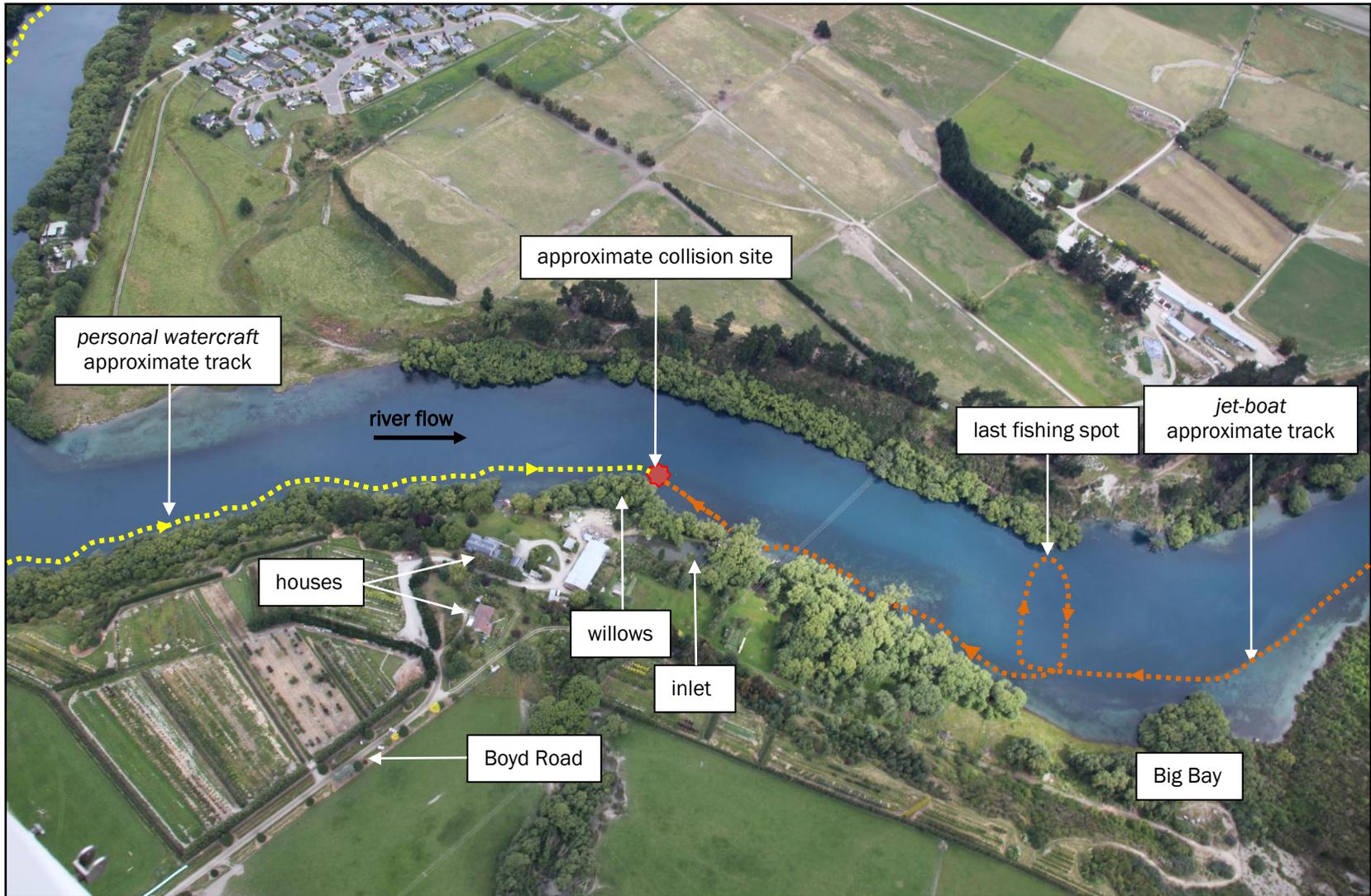
- 3.1.1. On 5 January 2009, at about 1645, an uncle, his nephew and a friend all working in Queenstown decided to take a fishing trip on the Kawarau River. The uncle owned the *jet-boat* and on the previous day he, the same friend and another person had been on a similar fishing trip on the river.
- 3.1.2. The uncle went home to collect the *jet-boat* and the 3 men met back at Frankton Marina (Figure 1).
- 3.1.3. The boat was launched at about 1730. The friend was driving the *jet-boat* when it left the marina, with the uncle sitting beside him in the front passenger seat and the nephew sitting in the back passenger seat. The subject of lifejackets was not discussed and none of the men chose to wear the lifejackets that were on board.
- 3.1.4. The boat was driven straight across the Frankton Arm of Lake Wakatipu to the Kawarau Falls, under the Kawarau Falls Bridge and onto the Kawarau River. The group then drove down the true-right side of the river and past the confluence of the Kawarau and Shotover Rivers, eventually beaching the boat on a shingle island.
- 3.1.5. The men got out of the boat, fished for a time and had one beer each. When they had finished fishing that particular spot, the uncle took over driving. The friend was seated in the front passenger seat and the nephew in the back. They then continued downstream fishing from the boat at spots where the uncle and friend had seen fish the previous day.
- 3.1.6. The nephew could not remember exactly how far they went downstream, but eventually they headed back upstream, remaining close to the bank on the true right (the left side of the river when travelling upstream) because it was more sheltered from the wind and offered better conditions for fishing. They stopped at various spots to fish, occasionally reaching planing speed between spots. During this period the nephew and the friend consumed a second beer.
- 3.1.7. When the *jet-boat* reached the end of Big Bay (Figure 2), the uncle powered up the engine and made a sharp right turn to the opposite bank. The boat was brought to rest about 10 m from the bank, and the nephew and friend cast in their lines. A stronger current and wind on this side of the river made it unfavourable for fishing. After only 2 or 3 casts the uncle made another sharp clockwise turn and returned the boat to the true-right side of the river.
- 3.1.8. The uncle then drove the *jet-boat* upstream along the willow trees that lined the riverbank and through a narrow arch of willow trees (Figure 3). He then steered between more willow trees near the entrance to a small inlet at the end of Boyd Road before powering up and heading in a straight track across a small bay towards a clump of willow trees. The nephew later said that the boat was on the plane but not travelling at an excessive speed. Figure 3 shows the approximate track of each vessel as recalled by each witness involved in the crash, and the relative positions in which the bodies and debris were found.
- 3.1.9. Before the *jet-boat* reached the corner with the clump of willow trees the nephew saw a *personal watercraft* with 2 people on board round the willow trees in front of them, about 5 m away on a head-on collision course. The nephew said that the *personal watercraft* was almost brushing the branches of the willow trees. The uncle tried to avoid a collision by steering the *jet-boat* to starboard towards the centre of the river, but the *personal watercraft* appeared to him to turn in the same direction as well and the 2 craft collided.
- 3.1.10. The nephew said that on impact he was thrown about 2 to 3 m into the air, then landed back on the boat between the back seat and the engine compartment, landing heavily on his left side. He remained conscious throughout. The uncle and his friend were ejected from the *jet-boat* during the collision.

Personal watercraft perspective

- 3.1.11. The driver of the *personal watercraft* was on holiday in Queenstown. On the day of the accident he met with 2 friends who had just arrived in Queenstown. The *personal watercraft* driver offered to take each of his 2 friends for a ride on the family-owned *personal watercraft*.
- 3.1.12. At some time after 1900, the *personal watercraft* driver and one of his friends set off from a jetty near Willow Place (Figure 1) for a trip down the Kawarau River; both of them were wearing lifejackets.
- 3.1.13. The *personal watercraft* driver said that he had completed the proposed trip many times previously and was familiar with the area. His friend had accompanied him on the trip about 4 times previously. That trip was to go from the jetty, under the Kawarau Falls Bridge and down the right-hand side (true right) of the Kawarau River before turning around just before the confluence with the Shotover River. The return leg of the trip was back up the right-hand side of the river (true left) to the starting point. He then intended to repeat the trip with his other friend who was left waiting at the jetty.
- 3.1.14. The *personal watercraft* driver said that he left the jetty and took the designated lane for downstream traffic under the Kawarau Falls Bridge and stuck to the right-hand side of the river, performing some “zigzags” and staying quite close to the willow trees on the side of the riverbank. He later said that this was a track he had seen commercial jet-boats take on his previous trips. He recalled that the speedometer on his *personal watercraft* was reading over 30 miles per hour (mph) (26 knots).
- 3.1.15. The *personal watercraft* driver said that he took extra caution as he approached a corner close to where he knew there was a house at the end of Boyd Road, because on previous trips he had seen people swimming in the river there. He slowed down a little to about 30 mph and adjusted his line so that his craft was about 6 to 7 m from the willow trees (Figure 2).
- 3.1.16. As the *personal watercraft* rounded the corner (Figure 3) the driver saw a *jet-boat* coming towards him; he tried to avert a collision by immediately turning towards the centre of the river. He saw the *jet-boat* also turning towards the centre of the river before the craft collided. He also recalled that there was a white water wake behind the *jet-boat*.
- 3.1.17. The *personal watercraft* driver said that he did not recall the impact of the collision; the next thing he remembered was being underwater and swimming for the surface. When he reached the surface of the river he looked around and could not see his passenger, but he did see one of the men from the *jet-boat* standing at the rear of the boat, and shouted to him to pick him up. He was also aware that he had injured his leg.

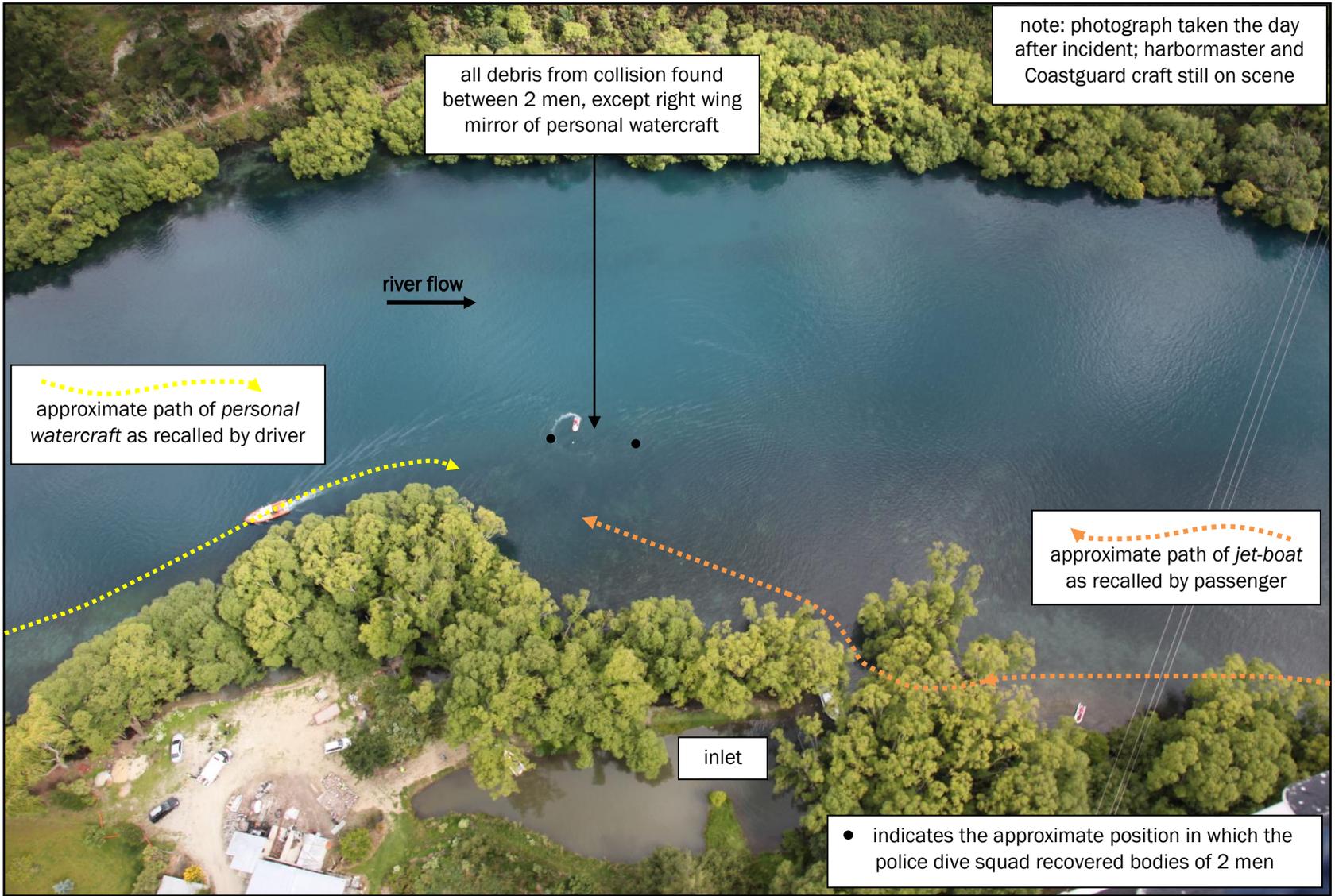
Post collision on scene

- 3.1.18. On the *jet-boat* the nephew gathered his composure and surveyed the scene around him. He could not see either of his companions in the water, but he could see the driver of the *personal watercraft* who was waving to him. The *personal watercraft* passenger was floating on her back nearby and appeared to be unconscious. He then used his cell-phone to call the emergency services on 111 and was put through to the fire service; the call was received at about 1925. He told the operator of the accident and that he thought that the collision had happened near the end of Glenda Drive near the airport on the lower Kawarau River, a road that ran close to the Shotover/Kawarau River confluence they had passed earlier. The nephew ended the call as he felt he had no further information to give and was more immediately concerned about assisting those he could see in the water and finding his missing companions.
- 3.1.19. The *jet-boat's* engine was still running, so the nephew steered the boat towards the *personal watercraft* driver in the water. The nephew was not familiar with driving jet-boats but managed to swing the stern around towards the injured *personal watercraft* driver and was then able to pull him onto the back of the boat.



Photograph courtesy of New Zealand Police

Figure 2
Aerial photography showing topography of accident site



Photograph courtesy of Maritime NZ

Figure 3
Close up view of accident site

- 3.1.20. The nephew then removed his boots, jumped into the water and swam to the unconscious *personal watercraft* passenger. He towed her back to the side of the *jet-boat* then got back on board.
- 3.1.21. About this time another *jet-boat* travelling upstream on the river with 3 people on board arrived at the scene. The driver of this second *jet-boat* pulled up alongside the accident *jet-boat* and assisted the nephew in pulling the unconscious *personal watercraft* passenger from the water. She was still breathing and was put into the recovery position.
- 3.1.22. Residents from the nearby houses heard the collision and called the emergency services and harbourmaster. One of the residents launched her kayak and paddled out onto the river, where she saw 2 *jet-boats* on the river. She was told that 2 men were missing and asked to search the river near where the *personal watercraft* had come to rest downstream on the true-right bank of the river, which she did.
- 3.1.23. The driver of the second *jet-boat* then took the controls of the accident *jet-boat*, because the nephew said that he did not know how to drive the boat. The 2 *jet-boats* were then directed by the kayaker to a small inlet that would be easily accessible to the emergency services from Boyd Road. She then continued with her search for the 2 missing men. When the *jet-boat* was secure in the inlet, the driver of the second *jet-boat* called 111 and updated the operator while his 2 passengers used his *jet-boat* to begin a search downstream for the 2 missing men.
- 3.1.24. The driver of the second *jet-boat* said that the fire service arrived on the scene immediately after the *jet-boat* was landed on the riverbank and they took over dealing with the boat and the injured. He also recalled that at about the same time the Queenstown Coastguard vessel arrived on the scene.
- 3.1.25. After searching downstream to the end of Big Bay, the kayaker returned upstream a little further from the bank, until she came to the *personal watercraft* stuck in the riverbank on the true-right side of the river with its engine still idling. She stopped the engine and began to search the opposite side of the river from her property. She abandoned her search a considerable time later and returned to her home and was debriefed by the police.

Emergency services' response

- 3.1.26. When the first 111 call was received at about 1925, from the nephew on the *jet-boat*, an appliance was despatched from Frankton Fire Station at about 1926 and instructed to head to Glenda Drive. While en route to Glenda Drive the officer in charge requested the police to call out the Coastguard. The harbourmaster had been alerted separately and had already contacted the Coastguard, which had activated pagers to summon the crew. The police and ambulance service were notified of the accident at about 1927.
- 3.1.27. An additional fire appliance was despatched from Queenstown at about 1927. Following the 111 call from the Boyd Road property at about 1930, giving a more exact location of the accident, the Frankton appliance already on its way to Glenda Drive continued there with the intention to look for any survivors who could have floated downstream. The Queenstown appliance was sent to the Boyd Road property.
- 3.1.28. The Queenstown fire appliance arrived on the scene at about 1939, and the crew immediately attended to the injured. At about the same time the Frankton fire appliance arrived at the Shotover/Kawarau River confluence and began to search from the riverbank for any survivors from the collision who could have floated downstream.
- 3.1.29. A Coastguard crew was assembled at Frankton Marina and arrived on the scene in the Coastguard's 8.5 m vessel at about 1939; about the same time as the first fire appliance. The harbourmaster arrived at Frankton Marina and along with additional Coastguard members responding to their pagers boarded *jet-boats* from the 2 commercial *jet-boat* operators, who were also responding to the emergency. Both these *jet-boats* arrived on the scene at about 1955, and under the instruction of the Coastguard they started to search the river for the 2 missing men. The harbourmaster recalled that when he arrived on the scene at about 2000, there were already about 12 craft on the river assisting.

- 3.1.30. A Queenstown ambulance was despatched at 1930, and arrived on the scene at about 1949. There was some confusion over the exact location of the accident, which led to a short delay. A helicopter was tasked by a local operator with joining the search for survivors. The helicopter was airborne by about 2050 and began searching the river.
- 3.1.31. Local divers with scuba equipment, having been alerted by the harbourmaster, were transferred to the Coastguard vessel and at about 2030 entered the water upstream of where the injured had been found. They searched the river for the missing men until about 2050, and were requested to cease the search by the police over safety concerns and given the low probability by that time of finding submerged survivors. The police dive squad based in Wellington had been alerted and was expected on the scene the next morning.
- 3.1.32. Searches by the emergency services and volunteers continued into the night, but were unsuccessful. At about 2225 the water-based searchers were stood down. A further attempt at searching for survivors was made using a locally based helicopter with night-vision glasses and thermal imaging cameras, but was unsuccessful. All remaining searchers were stood down at about 2300.

Recovery of the 2 men missing from the *jet-boat*

- 3.1.33. The search resumed the next morning. By about 1010, the river conditions had improved enough for spotters in a helicopter to locate the bodies of the 2 missing men on the riverbed (Figure 3). Police divers recovered the bodies at about 1230.

3.2. Vessel information

- 3.2.1. The *jet-boat* had been custom built for the uncle by a Christchurch boat dealer in 2001; it was a standard Hamilton type 151A, with an aluminium hull and fibreglass deck. The boat had a 6-litre Chevrolet engine that generated about 261.1 kW driving a Hamilton 212 standard jet unit. The manufacturer of the *jet-boat* estimated it had a top speed of about 48 knots (88 km/h).
- 3.2.2. The jet unit had an aftermarket Scott water jet 212 trim nozzle fitted. This allowed the trim of the jet unit nozzle to be trimmed down or up. The down position gave a lower planing speed and better handling. The up position gave more acceleration and top end speed.
- 3.2.3. The *personal watercraft* was a Sea-Doo GTX 155 and had been purchased by the father of the *personal watercraft* driver in December 2003. The boat was classed by Sea-Doo as a 2003 luxury performance model and had seating for 3 persons. It had not been modified.
- 3.2.4. The Sea-Doo had a 3-cylinder 4-stroke engine that developed about 115.6 kW giving it a top speed of about 46 knots (85 km/h).

3.3. Personnel information

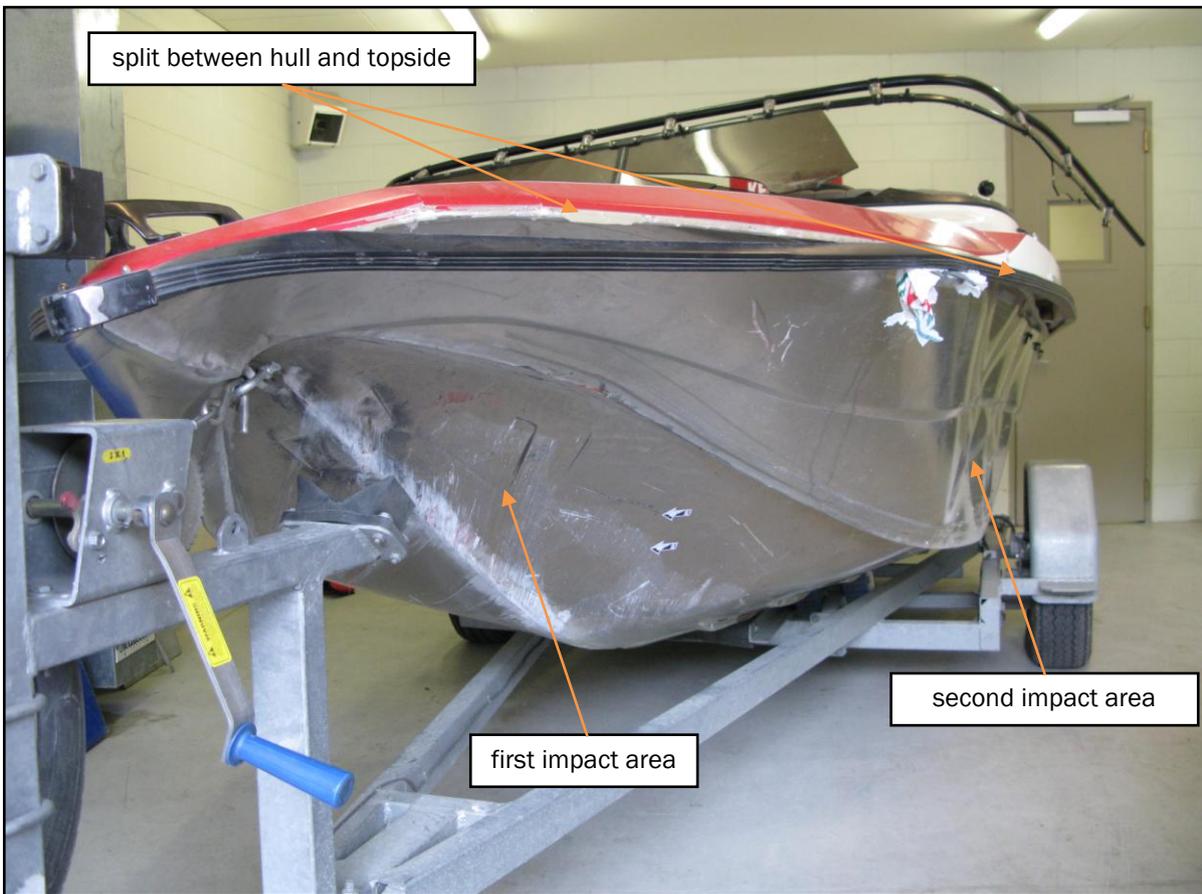
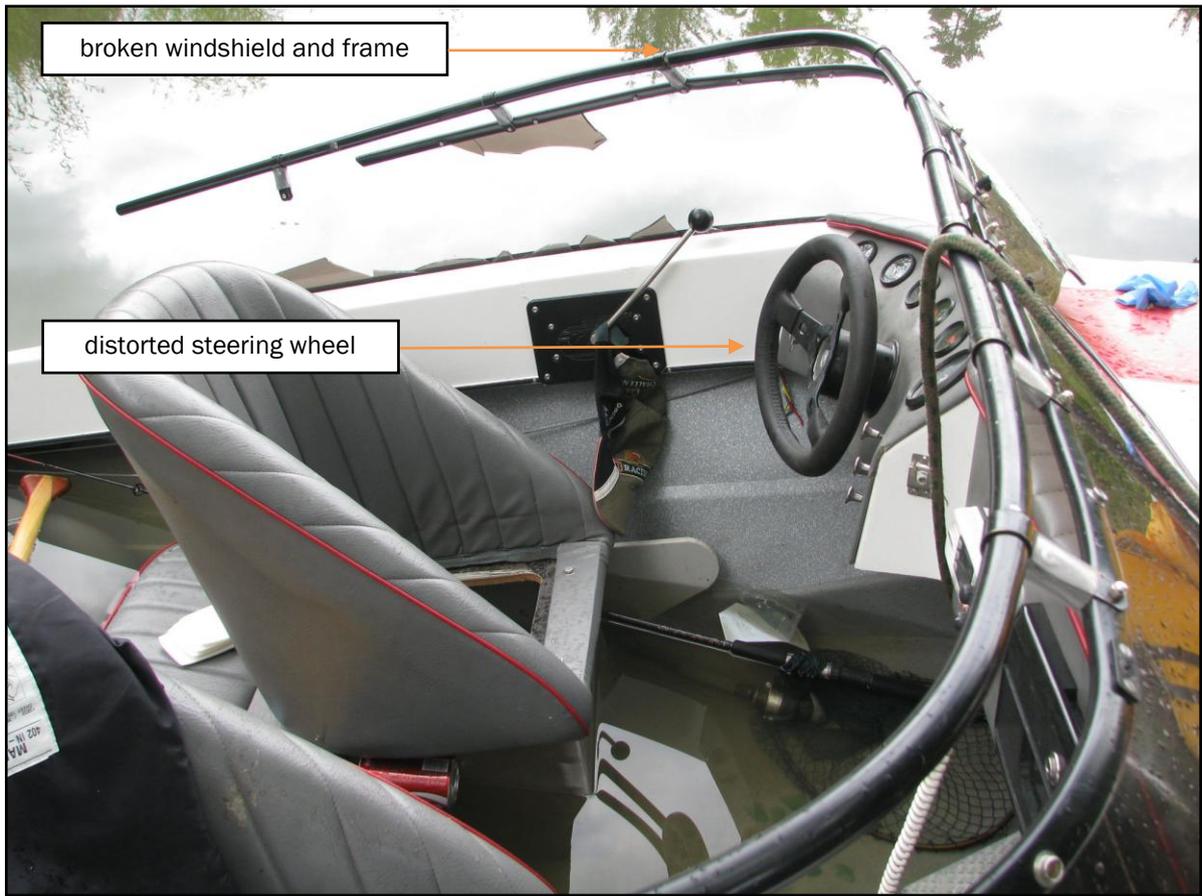
- 3.3.1. The *jet-boat* driver was described as an experienced jet-boater by his family and friends. In 2004 he had obtained a Boatmaster Certificate, which was a recreational qualification issued by the Coastguard Boating Education Service and endorsed showing that he had completed 100 hours of qualifying experience. He had joined the New Zealand Jet-boat Association in 1990 and was an active member of that Association. He had competed in and been a safety marshal at a number of jet-boat racing competitions.
- 3.3.2. The *personal watercraft* driver had been driving personal watercraft for about 6 years and had no formal marine qualifications. He knew the rules displayed on the local signage for the river and had a broad knowledge of local navigation and safety bylaws, but did not know the New Zealand Maritime Rules Part 22, Collision Regulations. A copy of a boating guide to Lake Wakatipu, published by Queenstown Lakes District Council, was on board the *personal watercraft* at the time of the collision.

3.4. Casualties

- 3.4.1. The coronial autopsy report said that the cause of death for the *jet-boat* driver (the uncle) was asphyxia from drowning and that there was evidence of a blunt-force injury to the head. It was noted that there was an expectation that such trauma would or could have caused unconsciousness.
- 3.4.2. The coronial autopsy report said that the cause of death for the *jet-boat* passenger (the friend) was asphyxia from drowning and he had sustained a depressed skull fracture from a blunt trauma. It was noted that there was an expectation that such trauma would have caused unconsciousness.
- 3.4.3. The *personal watercraft* driver suffered a broken femur but was kept afloat by his PFD while a rescue was made. He was later transferred to Dunedin Hospital for treatment.
- 3.4.4. The *personal watercraft* passenger sustained very severe head, neck and internal injuries, with signs of extreme trauma to the chest, abdomen and limbs. After initial treatment on the scene and at Queenstown Hospital she was transferred to Dunedin Hospital, where she remained in the intensive care unit for several weeks.
- 3.4.5. The surviving *jet-boat* passenger received bruising to his left side around the rib cage and suffered from shock. He was transferred to Queenstown Hospital and after assessment discharged the same night.

3.5. Damage and post-accident inspection

- 3.5.1. The *personal watercraft* and the *jet-boat* were initially inspected on the scene by a Maritime NZ jet-boat expert and Police before being taken to Queenstown Police Station. On 6 January 2009 an inspection was carried out of each craft by the same Maritime NZ jet-boat expert and investigators from the Commission who had arrived in Queenstown that afternoon.
- 3.5.2. Both craft were substantially damaged in the accident and subsequently declared constructive total losses.
- 3.5.3. An Inspection of the *jet-boat* showed that the boat had been struck on the port forward shoulder and amidships on the port side. The following damage was noted (Figure 4):
 - there was impact damage on port forward quarter with the hull pushed in about 300 millimetres
 - there was impact damage port side and amidships with failure of joint between hull and topside in that area
 - the windshield support frame had been dislodged and shield broken
 - the steering wheel and gear lever had been distorted
 - there was general damage to fittings.
- 3.5.4. An inspection of the *personal watercraft* showed that the boat had been predominantly damaged on its starboard side. The following damage was noted (Figures 5 and 6):
 - there was impact damage on starboard forward shoulder, cracking to resin and part of outer hull missing
 - there was impact damage to starboard aft quarter of hull, cracking and failure of joint between hull and topside
 - there was damage to the steering column and gauges.



Photographs courtesy of Maritime NZ

Figure 4
Damage to jet-boat



Photograph courtesy of Maritime NZ



Figure 5
Damage to *personal watercraft*



Figure 6
Damage to personal watercraft

- 3.5.5. After the accident the *personal watercraft* engine remained running because the “kill switch” had not operated. The kill switch is a device that is attached to the console on the *personal watercraft* and has a flexible cord normally secured to the driver by a clip. This is a safety feature: in the event of the driver parting company with the *personal watercraft*, the kill switch is pulled out from the console and the engine stops and electrics are isolated. The kill-switch was found still connected to the console and the cord and clip intact. The *personal watercraft* driver said that he thought he had clipped the cord to his PFD when he started the trip, but he had not double checked that it was secure.
- 3.5.6. The *personal watercraft* engine had a facility that would have recorded about 60 seconds of the engine running parameters leading up to the collision, had the engine stopped immediately after the collision. Because the kill switch had not been activated when the *personal watercraft*

driver was thrown into the water, the engine remained idling and the craft idled into the riverbank. It was a considerable time later that the engine was switched off by the kayaker. A specialist downloaded the available data from the engine but as anticipated it showed only the engine idling, so could not be used to corroborate the driver's estimate of the speed of the *personal watercraft* immediately prior to the collision.

3.6. Collision regulations

- 3.6.1. Because maritime activities involve vessels travelling internationally and on the high seas between State territorial waters, the International Maritime Organization through its conventions sets standards aimed at providing consistency for mariners regardless of where they are operating. States then adopt those standards (as they choose) into their own domestic laws. In New Zealand those standards are adopted in the form of Maritime Rules. Maritime Rules provide minimum standards for mariners to follow. The Maritime Rules can be enhanced or modified at local level through local government mechanisms such as bylaws, but such mechanisms should not lower the standards set by the Rules, except in special circumstances approved by the Director of Maritime NZ.
- 3.6.2. All vessels have a master (skipper) or a person in charge. Under the Maritime Transport Act 1994 (New Zealand Government, 1994) that person is responsible for the safety of the vessel, for the safety of all persons on board, and for complying with all Maritime Rules and any other regulations.
- 3.6.3. The International Maritime Organization Convention, the International Regulations for Preventing Collisions at Sea, 1972, or "COLREGs" as they are commonly known, was incorporated into New Zealand legislation in February 1998, through Maritime Rules Part 22, Collision Prevention (New Zealand Government, 2007).
- 3.6.4. Maritime Rules Part 22 applied to all New Zealand vessels, including any pleasure boats, naval ships and seaplanes whenever they were at sea or on inland waters (lakes, rivers) in any part of the world.

Speed of vessels

- 3.6.5. Rule 22.6 of Maritime Rules Part 22 concerned safe speed and, in part, stated:

Every vessel must at all times proceed at a safe speed so that proper and effective action to avoid a collision can be taken and the vessel can be stopped within a safe distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed, the following factors must be among those taken into account-

- (1) For all vessels-
 - (a) the state of visibility;
 - (b) the traffic density, including concentrations of fishing vessels or any other vessels;
 - (c) the manoeuvrability of the vessel, with special reference to stopping distance and turning ability in the prevailing conditions:

- 3.6.6. Maritime Rules Part 91, Navigation Safety Rules (New Zealand Government, 2008) was made to set basic navigation standards and replaced the Water Recreational Regulations 1974. Some provisions from the General Harbour (Nautical and Miscellaneous) Regulations 1968 in respect of anchoring, give-way rules, wakes and proximity to oil tankers and ships carrying dangerous goods were carried over also. The Rule stated that to establish a consistency of navigational safety around the country, a sub-group of the harbourmasters' special interest group had been formed in 2000. This group co-ordinated the drafting of a set of model navigational safety bylaws. The Maritime Safety Authority (now Maritime NZ) participated in this group and the invitation to comment on Maritime Rules Part 91 was based on the model bylaws that resulted from this process.

3.6.7. Maritime Rules Part 91 entered into force in 2004 and applied to:

- areas that were not subject to navigational bylaws; and
- where navigational bylaws were in force, if the bylaws were inconsistent with Part 91, in which case the bylaws shall be construed subject to Part 91.

3.6.8. A Maritime NZ advisory circular on Part 91 (New Zealand Government, 1994) said that in addition to complying with this Rule, skippers of vessels should use it as a code of conduct for behaviour on the water and that the Rule must be read and interpreted in conjunction with Maritime Rules Part 22, Collision Prevention, which applied to all vessels in all waters.

3.6.9. Under the Local Government Act 1974 (New Zealand Government, 1974), regional councils in New Zealand had the responsibility for navigational safety in their jurisdictions and had powers to make bylaws with respect to navigational safety.

3.6.10. Queenstown Lakes District Council, through a transfer of powers from Otago Regional Council, was responsible for navigational safety in the Queenstown area, including the Kawarau River. The Council had issued navigational bylaws for the district, some of which applied to the Kawarau River. The function of harbourmaster was contracted out to Southern Monitoring Services Limited.

3.6.11. Section 2.1.2 of part 2 (Navigation and Water Activities) of the Queenstown Lakes District Waterways Navigation and Safety Bylaw 2003 (Macalister Todd Phillips Bodkins, 2003) stated:

The person navigating or in control of any vessel shall navigate such a vessel with all due care and caution and at a speed and manner as to not endanger the lives of, or cause injuries to any person(s).

3.6.12. Part 2.2 of the Bylaw concerned the speed of craft, and the general provision in section 2.2.1 stated that:

The operator of any vessel shall not allow the craft or any object towed by it to proceed at a proper speed greater than 5 knots within:

- 2.2.1.1 50 metres of any other craft or floating structure or person in or on the water,
- 2.2.1.2 100 metres of the shore or any structure,
- 2.2.1.3 100 metres of any craft that is flying Flag A of the International Code of Signals,
- 2.2.1.4 a Reserved Area when specifically permitted to as a condition of the reservation or by an [speed] uplifting.

3.6.13. The Bylaw Part 2.2 above reflected the intent of Maritime Rules Part 91 section 91.6, except that in the Rule speed was restricted to 5 knots within 200 m of the shore instead of 100 m in the Bylaw. In May 2009, the Queenstown Lakes District Navigation Bylaw 2009 (Council, 2009) came into force, which accurately reflected the provisions of Maritime Rules Part 91.

3.6.14. Under Part 91, provision was made in section 91.20 for permanent speed “upliftings”. Rule 91.20 stated in part:

A person may apply to have any speed limit prescribed in Rule 91.6 or navigational bylaws uplifted from waters specified in the application

- (a) where navigational bylaws are in force, by application in writing to the appropriate regional council; and
- (b) where the navigational bylaws are not in force, by application in writing to the Director.

3.6.15. A speed uplifting on Kawarau River was passed by Council resolution on 28 March 1990 by the Lakes District Waterways Authority. The public notice issued to notify of the uplifting only stated that the 5-knot speed limit had been uplifted. The uplifting on the Kawarau River was applied to the section of river between the Lake Wakatipu and Arrow River confluence, excluding an area marked by yellow buoys adjacent to the Zoological Gardens, in which the 5-knot limit remained in place. The uplifting applied to the part of the river where the accident took place.

- 3.6.16. In 1990 speed upliftings were also granted on areas of the Dart, Rees, Shotover, Upper Shotover, Makaroa, Wilkin and Mutukituki Rivers. Upliftings were also granted to facilitate high speed access lanes and water skiing on Lakes Wakatipu and Wanaka.
- 3.6.17. Under the Lakes District Waterways Authority (Shotover River) Empowering Act 1985 (New Zealand Government), public access to the Upper Shotover River was by permit only issued by the commercial jet-boat operator using the river, and access to the Lower Shotover River required contact to be made with the commercial operator on that stretch of river.
- 3.6.18. The Kawarau River was used by a number of commercial operators to run passenger trips prior to 1994. After the coming into force of the Resource Management Act 1991, Queenstown Lakes District Council issued resource consents to commercial operators that had been operating on the river prior to the coming into force of that legislation. The Council also issued resource consents to other commercial operators on other inland waterways at the time of and subsequent to the introduction of the Resource Management Act.
- 3.6.19. These resource consents outlined general conditions that the operators of commercial jet-boats had to follow. Although these conditions might have differed from resource consent to resource consent, they generally required the following from operators of commercial jet-boats on the Kawarau River:
- Boats will not travel within 5 m of the small islands, willowed edges and banks of the lakes and rivers except for safety reasons
 - Boat drivers will take all practicable steps to avoid disturbing anglers and wildlife. Boats will not travel within 20 m of any anglers
 - When approaching anglers, boats will slow and stay in mid channel to minimise disturbance to the angler and avoid creating wave action along the bank. When practical boats will stay in mid-channel and avoid any unnecessary disturbance to wildlife such as mallard ducks.

Narrow channels and rivers

- 3.6.20. Section 22.9 (1) of Maritime Rules Part 22, Collision Prevention was concerned with narrow channels and fairways, and stated:
- A vessel proceeding along the course of a narrow channel or fairway must keep as near to the outer limit of the channel or fairway which lies on its starboard side as is safe and practicable.
- 3.6.21. Section 91.17 of Maritime Rules Part 91 Safety of Navigation, stated in part that a person in charge of a vessel on a river must:
- (a) ensure that the vessel keeps to the starboard (right) side of the river channel.
 - (b) if going upstream give way to any vessel coming downstream
- 3.6.22. The Queenstown Lakes District Waterways Navigation and Safety Bylaw 2003 in force at the time of the accident reflected Maritime Rules Part 91. Part 2 Navigation and Water Activities section 2.8.8.1 stated:
- All vessels operating on rivers must keep to the right side at all times with boats going up river giving way to boats going down river.
- 3.6.23. Queenstown Lakes District Council had signs posted adjacent to the slip at Frankton Marina and on the Kawarau River, which advised of the speed uplifting on the river and the requirements for vessels travelling the river (Figure 7). It stated in part:
- upstream craft give way to downstream craft
 - keep right when travelling up and downstream



Photographs courtesy of Maritime NZ

Figure 7
Advisory signs at Frankton Marina

3.6.24. Queenstown Lakes District Council also published a boating guide leaflet for Lake Wakatipu, which gave general safety tips and information on navigational lights, give-way rules, rules of the water, water-ski and other designated areas and notes that the right-hand rule applied on all rivers. The leaflet quoted Maritime Rule 91.6, the speed of craft (not the 2003 Bylaw Parts 2.2.1.1 to 5) under the section “rules of the water”, and under “general boating safety tips” stated that users should know the collision-prevention rules, water recreation rules and local bylaws. The leaflet was free of charge and published on the Queenstown Lakes District Council website and available from the harbourmaster’s office and various locations throughout the district.

3.7. The requirements to wear personal flotation devices

3.7.1. Section 91.4 (1) operating requirements of Maritime Rules Part 91, stated:

No person in charge of a recreational craft may use it unless there are on board at the time of use, and in a readily accessible location, sufficient personal flotation devices of an appropriate size for each person on board.

3.7.2. The Queenstown Lakes District Waterways Navigation and Safety Bylaw 2003, section 2.1.4.1 in force at the time of the accident, stated that:

No person in charge of a vessel may use it or allow it to be used unless it carries at the time of use, and in a readily accessible location, sufficient life jackets of an appropriate size for each person on board; provided that any passenger in any vessel who is under the age of (10) years shall wear an appropriate sized and correctly fastened life jacket at all times.

3.7.3. Section 91.4 (6) of Maritime Rules Part 91 stated:

Despite rule 91.4(4), no person in charge of a recreational craft may use that craft in circumstances or other situations cause danger or a risk to the safety of a person on board, unless every (sic) person on board is wearing a properly secured personal flotation device of an appropriate size for that person.

3.7.4. The Queenstown Lakes District Waterways Navigation and Safety Bylaw 2003, section 2.1.4.3 was in force at the time of the accident and stated that:

No person in charge of a pleasure craft may use that craft, or allow it to be used in circumstances where tides, river flows, visibility, rough seas, adverse weather, emergencies or other situations result in a danger to the safety of persons on board, unless every person on board is wearing a lifejacket of an appropriate size for that person.

- 3.7.5. Queenstown Lakes District Waterways Bylaw 2003 did not specify the type of lifejacket that was to be worn. But Maritime Rules Part 91 defined the standards to which PFDs were to be certified.
- 3.7.6. The *personal watercraft* driver and his passenger were both wearing type 402 inshore waters lifejackets which were certified to NZS 5823:2001 Buoyancy Aids and satisfied the requirements of Maritime Rules Part 91.
- 3.7.7. At the time of the accident the *jet-boat* carried sufficient type 402 inshore lifejackets for each person on board. These were also certified to NZS 5823:2001 and satisfied the requirements of Maritime Rules Part 91.
- 3.7.8. The Maritime NZ website had a page that gave advice on the types of lifejacket and PFD (Maritime NZ, n.d.), which on the subject of type 402 lifejackets stated:

These provide at least 71 Newtons of buoyancy and must have a buoyant collar to support the wearer's head. They are quite comfortable to wear continuously while boating, and are the most common PFDs found on recreational craft.

However, while they must not allow the wearer to tilt forward of vertical, they are not designed to keep an unconscious person's head and face above water. This type of PFD must be marked "May not be suitable for all conditions". The effectiveness of this PFD is considerably reduced in rough or breaking seas or surf. The PFD will give support in the water for an extended period.

- 3.7.9. In December 1999, the Pleasure Boat Safety Advisory Group published its final report on recreational boat safety (Pleasure Boat Safety Advisory Group, 1999). The Group was made up of representatives of 16 boat safety organisations and was set up to answer the question; "Is there a boating safety problem in New Zealand?" The report stated that accident analysis indicated 2 problem areas: a lack of safety equipment; and insufficient operator knowledge. The report made 13 recommendations, one of which was requiring the wearing of PFDs when operating all types of small, open, recreational craft.
- 3.7.10. In 2000, the Pleasure Boat Safety Advisory Group used its final report (ibid) as the foundation for a boating safety strategy in New Zealand. Maritime NZ provided secretariat and background information to the Group, which became known as a forum.
- 3.7.11. The requirements to carry lifejackets/PFDs mentioned in Maritime Rules Part 91 and the Queenstown Bylaws were introduced in 2003. That same year a national campaign promoting lifejacket-wearing began.
- 3.7.12. In 2006 a review of this strategy began, called the 2007 Review of the New Zealand Pleasure Boat Safety Strategy (National Pleasure Boat Safety Forum, 2008) the review report was published in March 2008.
- 3.7.13. The 2007 review report recommended that lifejackets be worn as a default, and that Maritime Rules Part 91 and Navigation Safety Bylaws be amended to state that wearing a lifejacket in a recreational vessel under 6 m long was mandatory unless the skipper decided it was not necessary because there was a low risk of danger.
- 3.7.14. In October 2009, Maritime NZ launched a "lifejacket wearing campaign", which coincided with the beginning of public consultation on the proposed change to Maritime Rules Part 91 that would require:

All persons in vessels under 6 m long to wear their lifejackets by default at all times, unless the master said it was safe to take them off.

The proposed change to Maritime Rules Part 91 was due to be signed off by the Minister of Transport on 13 September 2010 and due to enter into force on 1 April 2011. The proposed Maritime Rules Part 91 had at the time of publication of this report been excluded from the Rule amendment signed by the Minister pending the availability of updated statistical information to support the proposal.

3.7.15. On 5 May 2009, 17 months before the entry into force of the then-proposed Rule change, Queenstown Lakes District Council adopted the Rule change into its bylaws. The Southland, Waikato and Wellington regional councils did the same on 1 July 2009. When adopting the proposed Rule changes, on the issue of lifejackets the Queenstown and Southland regional councils went further than the proposed Rule changes and made the wearing of lifejackets compulsory in vessels under 6 m in length. The Queenstown Lakes District Navigation Safety Bylaw 2009 (ibid), Part 2 section 2 1.4 (h) lifejackets provided:

The person in charge of a vessel shall ensure that every person on board a Recreational Craft that is less than 6 metres in length shall wear a properly secured lifejacket.

3.7.16. Maritime NZ produced comprehensive information for recreational boat users in a booklet and a DVD titled "Safe Boating in New Zealand", which was available free of charge. The booklet was first produced in 2005 and the first DVD version in 2006. Advice given in that publication to personal watercraft users was that it was mandatory to wear lifejackets (New Zealand Government, 2010). Maritime NZ advised that this was its interpretation of Rule 91.4 (6) of Maritime Rules Part 91, meaning that the operation of a personal watercraft inherently caused a risk to the safety of persons on board.

3.8. Statistics on recreational boating fatalities and lifejackets

3.8.1. The 2007 Review of the New Zealand Pleasure Boat Safety Strategy (National Pleasure Boat Safety Forum, 2008) contained information on the recreational boating fatality rates in New Zealand between October 1998 and October 2006 for inland waterways and coastal areas. The statistics showed that the fatality rate in 2006 had reduced to about a third of the level in 2000.

3.8.2. The review with respect to fatalities noted that there were nearly always one or more of four key factors contributing to recreational boating fatalities:

- the failure to wear lifejackets
- the inability to communicate distress
- bad weather
- alcohol.

Regarding the wearing of lifejackets, the review stated:

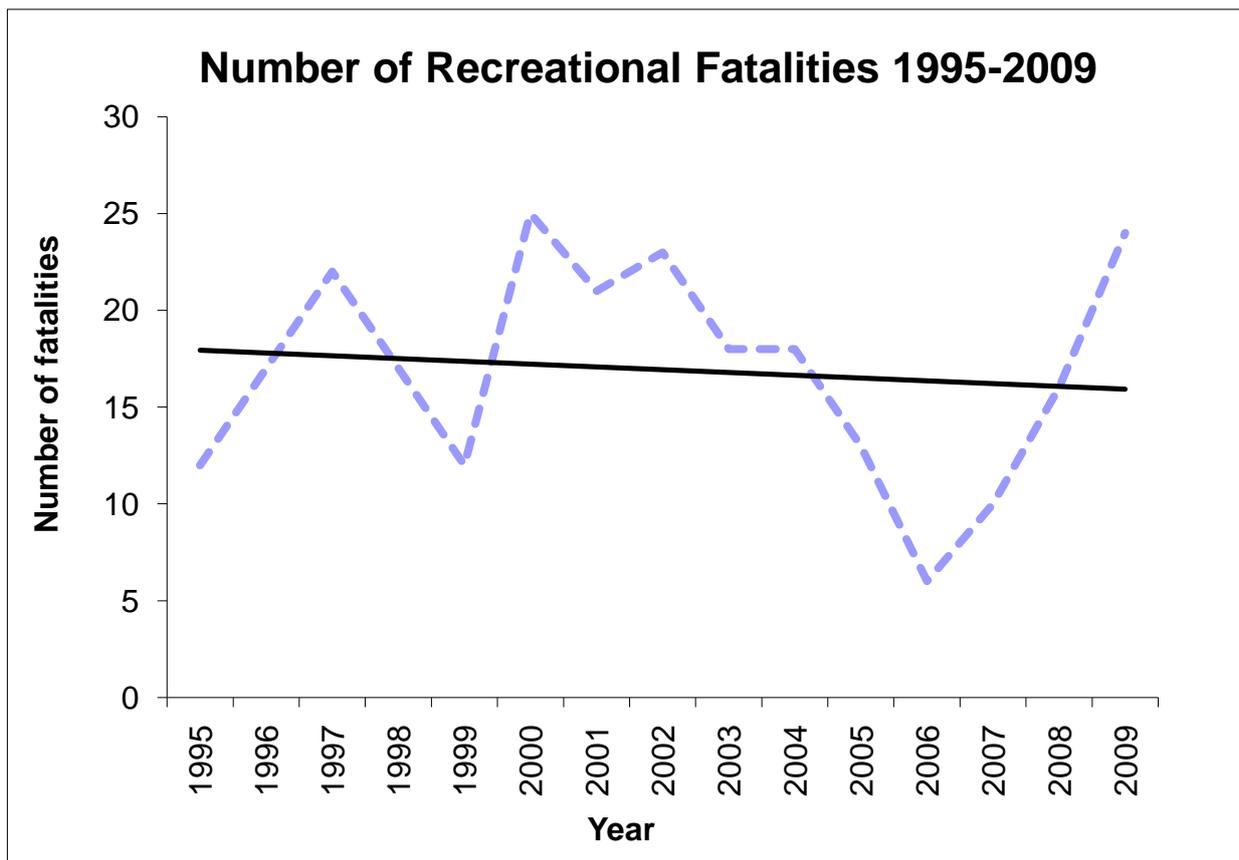
The failure to wear lifejackets in small craft that are prone to capsize (those less than 6 m in length) remains the principal reason for loss of life in boating accidents, even while the increased use of lifejackets has saved lives.

3.8.3. Statistics from the 2007 review indicated that wearing a lifejacket would have had a high likelihood of preventing a fatality in 66% of the accidents recorded.

3.8.4. Fatality statistics were published by the National Pleasure Boat Safety Forum (National Pleasure Boat Safety Forum, November 2009). Some errors were later found and the final figures recorded by Maritime NZ were as follows:

- 41 accidents resulted in 46 deaths in the 35 months between January 2007 and November 2009
- 34 fatalities would almost certainly have been avoided if lifejackets had been worn
- 16 fatalities would probably have been avoided if suitable communication equipment had been carried and useable following an immersion incident
- 8 fatalities had alcohol as a contributing factor.

3.8.5. A graphical representation of fatality statistics supplied to the Commission by Maritime NZ is shown in Figure 8.



Graph courtesy of Maritime NZ

Figure 8
Graph of recreational fatalities in New Zealand 1995 to 2009

3.8.6. In the graph above the purple line represents the fatalities during each year. The black line represents the overall trend of fatalities over the period and shows there has been an overall drop in fatalities. The graph also shows that between 2000 and 2006 there was a significant drop in the number of fatalities, and between 2006 and 2009 this number had begun to increase again.

3.8.7. The statistics above did not take into account the number of recreational vessels in use, which was believed to have increased over the period. The 2009 estimate, provided to the Commission from Maritime NZ, for the number of recreational vessels in use, which included unpowered vessels such as kayaks, was 528,358.

3.9. Other close-quarters occurrences on the Kawarau River

3.9.1. During the course of the inquiry the Commission was notified by Maritime NZ of 2 close-quarter situations on the Kawarau River in 2009. Both these incidents had involved a local commercial jet-boat operator and the harbourmaster. The Commission did not open an inquiry into these 2 incidents.

3.9.2. On 15 January 2009, the Queenstown harbourmaster advised Maritime NZ of an incident involving a commercial jet-boat in which the jet-boat was alleged to have been operated in breach of its resource consent, within 5 m of the willow trees lining the riverbank.

3.9.3. The circumstances were reported by the harbourmaster who witnessed the incident and supported by statements of the 2 National Institute of Water and Atmospheric Research (NIWA) employees involved. The NIWA employees were working in the shallows maintaining a flow-measuring tower, which required them to transit slowly across the river. The NIWA employees said that they had made the normal notification by email to the harbourmaster to inform commercial jet-boats of their presence on the river. It was reported that as the NIWA employees were launching their boat, a commercial jet-boat came around a blind bend brushing the willow trees and narrowly missed the harbourmaster's stationary personal watercraft on which he was

sitting close to the riverbank. The notification submitted by the harbourmaster to Maritime NZ advised that the close encounter was being investigated by the Manager Compliance of Lakes Environmental.

- 3.9.4. In a second reported incident on 9 July 2009, both the harbourmaster and a commercial operator notified Maritime NZ of a close encounter incident involving their respective jet-boats on the Kawarau River.
- 3.9.5. The harbourmaster, who had been driving a private jet-boat with 3 passengers on board reported that a commercial jet-boat had been in the wrong channel on the wrong side of the river and stated that he had been drifting downstream in the centre of the river and then accelerated on the plane. He did not believe a close quarters had situation existed.
- 3.9.6. The commercial jet-boat driver reported that he had slowed down from 85 km/h to 55 km/h and moved to avoid the private jet-boat travelling in the same direction, which then powered up and turned into the path of his boat, oblivious to his presence. He then took avoiding action, which resulted in his boat taking a line to the left of a central river island.
- 3.9.7. Queenstown Lakes District Council confirmed that it had fully investigated both incidents.

4. Analysis

4.1. Introduction to the issues

- 4.1.1. The Kawarau River could be legitimately used by any number of recreational and commercial groups: power-driven recreational craft of different types; self-propelled craft such as kayaks; and commercial jet-boats operating under resource consents, for example. Typical types of boating activity on the river included commercial trips for hire and reward, sight-seeing, fishing and sport. Other non-boating activities included swimming and fishing from and around the riverbanks. The various rules, regulations, bylaws, advisory notices and resource consents should have been compatible with each other to allow the legitimate river activities to co-exist in relative harmony and safety.

The collision

- 4.1.2. This report discusses the location, movement and actions leading up to the collision between the 2 craft involved and compares these with the governing rules and legislation, particularly in relation to speed.

Uplifting of speed restrictions and resource consents

- 4.1.3. The issue of speed crosses over into areas of local bylaws and other local government mechanisms for issuing resource consents and uplifting speed restrictions.

Licensing recreational boat users

- 4.1.4. Knowledge of collision-prevention rules and other legislation governing the use of vessels on waterways is critical to safe boating. This report examines the issue of educating versus licensing commercial jet-boat drivers and recreational boat users

Survivability

- 4.1.5. When a marine accident occurs, the outcome can be influenced by a number of factors including: the emergency response and whether those involved were wearing a PFD (commonly referred to as a lifejacket) the report discusses these factors and the rules and bylaws governing the use of lifejackets. Because 3 of the 5 people in the accident received serious head injuries, the merits of protective headgear are also discussed.

Alcohol and boating

- 4.1.6. The Commission has determined that alcohol was not a factor contributing to this accident, but it was on board the *jet-boat* and the occupants had imbibed small quantities. Given the statistics available for the involvement of alcohol in fatal accidents in New Zealand, this report examines that issue as well.

4.2. The collision

Speed

- 4.2.1. The collision rules require all vessels to travel at a safe speed at all times, which means that both craft should have been travelling at a speed that would have enabled proper and effective action to be taken to avoid a collision, including stopping within a safe distance appropriate to the circumstances and conditions. In this case a “condition” was the willow trees restricting the drivers’ view. A “circumstance” was the possibility of other vessels or water activities taking place on the other side of the willow trees. These activities could have ranged from people swimming to people launching boats of any description, and included people fishing from boats as the *jet-boat* had been doing at times in the period leading up to the collision.
- 4.2.2. The Commission has formed the view that neither craft was travelling at a safe speed before the collision, and that this was one of 2 proximate causes for the 2 craft colliding. The second proximate cause was the *jet-boat*’s travelling on the incorrect side of the river immediately before and at the time of the collision (this second cause is discussed in more detail in the

following section of this analysis). The Commission has formed the view that both craft were travelling at an unsafe speed because they were travelling too fast and too close to the willows that restricted their visibility around what was a blind corner.

- 4.2.3. During consultation on the draft final report, it was put to the Commission that the position of the collision was further out in the river than shown in this report, and that this meant both craft were travelling further away from the riverbank; the suggestion being that this contradicted the conclusion that both craft were travelling at an unsafe speed. The Commission does not accept this argument for 3 reasons. The first reason is that if they were travelling far enough out from the riverbank to render the speed at which they were each travelling as safe, they should have seen each other in time to avoid the collision, which they did not; they collided. The second reason is that 2 of the surviving witnesses (one from each craft) were broadly consistent with their estimation of the path travelled by each craft prior to the collision, and the information shown in this report is based on those estimations. The third reason is shown in Figure 3, which gives the position in which the bodies and wreckage were found on the river bed, spread over about 15 m. Making allowance for the fact that both craft turned away from the riverbank shortly before impact, the possible trajectory of the persons ejected from the boat, and the effect of the river current on the bodies and debris as they sank, the estimated tracks shown on Figure 3 are plausible.
- 4.2.4. The speed of the *jet-boat* at the time of the collision was not recorded or directly observed by the nephew seated in the back of the boat, but he did say that it had been on the plane. The *personal watercraft* driver said that he saw a wake behind the boat. The evidence therefore points to the *jet-boat* having been on the plane as it approached the willow trees that obscured the driver's view upriver. According to the builder of the boat, it would then have to have been travelling at least 13 to 17 knots (about 24 to 32 km/h). This speed is the minimum at which it could have been travelling; it could have been travelling faster.
- 4.2.5. The *personal watercraft* driver said that he was travelling at about 48 km/h when he rounded the trees and collided with the *jet-boat*. Using the above estimates, the minimum closing speed as the craft came within sight of each other would have been about 72 to 80 km/hour (about 22 m per second)
- 4.2.6. In this case neither vessel could have stopped in time. The *personal watercraft* was fitted with a reverse bucket designed only for manoeuvring. In fact the manufacturer warned against it being used to achieve a high-speed stop because the unrestrained driver would likely be thrown forward into the handle bars or over the handle-bars into the object being avoided. A turn away was therefore his only meaningful option to avoid collision. Similarly the *jet-boat* did have a reverse mechanism but not enough time to use it effectively to avoid a collision. A feature of water-jet propelled craft is that they require forward propulsion to maintain any meaningful steerage, because they do not have a dedicated rudder. These are all factors that drivers of water-jet-propelled craft should consider when determining a safe speed. The distance between the 2 vessels when they appeared from behind the willow trees could not be established with any accuracy, but the time each driver had to react was a matter of seconds rather than minutes.
- 4.2.7. The collision-prevention rules contain a section dedicated to which vessel or vessels should give way and what action each should take to avoid getting into a "close-quarters" situation. The rules say that if a stand-on vessel finds itself so close that collision cannot be avoided by the action of the give-way vessel alone, it must take whatever action will best avoid collision. If the situation were head-on or nearly head-on, each craft was required to adjust its course to starboard. If the *personal watercraft* had been approaching from the *jet-boat's* port side, the *personal watercraft* would have been the give-way vessel, and the rules provided that it should have turned to starboard or reduced speed to allow the *jet-boat* to pass ahead. By travelling so close to the willow trees on his starboard side, the *personal watercraft* driver denied himself this opportunity to avoid any craft he met from ahead, or any craft that might have emerged from the direction of the riverbank and willow trees.
- 4.2.8. There is, however, little point in analysing this scenario to establish which vessel was the give-way vessel and what the correct action should have been, because from the time each driver saw the other vessel, collision would have been almost inevitable because both were travelling too fast for approaching what effectively was a blind corner. Each driver was therefore in a

recognise-and-react situation to avoid collision. In other words, by not travelling at a safe speed, each gave no opportunity to avoid a close-quarters situation developing in the first place.

- 4.2.9. The human tendency is to respond in the direction away from a negative stimulus, such as an obstacle on a collision course (Green, 2009). If the 2 craft had been approaching at a small angle, it is likely that the *personal watercraft* driver heading downstream would have first seen the *jet-boat* to his right, so would have turned left. The *jet-boat* driver heading up river would have seen the *personal watercraft* to his left, so would have turned right. As well as trying to avoid each other, each driver would have been aware of the willow trees close on one side, another obstacle or negative stimulus to be avoided. The result would have been both drivers turning towards the centre of the river, and thus towards each other.
- 4.2.10. In a collision scenario, the human response is the time the driver takes to identify an object as a hazard, work out the required response and then react, or put another way, the mental processing time plus the time to operate the steering mechanism. No matter what the capability of the vessel there is inevitably a delay caused by the human response to a situation, which must be factored in (Green, 2009).
- 4.2.11. The human response is complex and depends on a number of factors including whether there is an expectation of encountering another craft, the visibility of the craft to be avoided, the physical capability and age of the operator, the presence of distractions, and the complexity of the response required to steer or stop a craft.
- 4.2.12. This accident occurred at about 1930, a time when possibly neither driver was anticipating other traffic (low expectation). A definitive reaction time is hard to determine. Typical reaction times quoted for road users are about 1.5 seconds, or put another way at a speed of 50 km/h a distance of about 20 m will have been travelled before the driver responds, but then generally car drivers have higher expectations of encountering problems. In a boat this highlights the importance of having adequate sight lines to see potential hazards when travelling at higher speeds; the greater the speed, the greater the distance covered before an evasive manoeuvre is effected (Green, 2009).

Finding – One main proximate cause of the collision was that the *jet-boat* and *personal watercraft* were both travelling too fast as they approached each other from behind overhanging willow trees, leaving insufficient time to see each other, recognise the danger and take effective avoiding action. They were not travelling at a safe speed, and in the case of the *personal watercraft* the driver had left himself no room to perform the preferred evasive manoeuvre of turning to starboard.

Finding – As a consequence of Queenstown Lakes District Council's uplifting of the Bylaw speed restriction, both the *personal watercraft* and the *jet-boat* were under no specific speed restriction except the requirement to travel at a safe speed as required by the overarching Maritime Rules and the general Bylaw requirement to navigate with due care and caution and at a speed and manner as not to endanger or cause injury to any person.

Right versus left side of river

- 4.2.13. The primary purpose of the *jet-boat* trip was fishing. Fishing was a permitted activity anywhere on the Kawarau River. On the day of the accident the weather conditions made the true-right side of the river more suitable for fishing. For the first part of the trip, when travelling down stream, the *jet-boat* stayed on the true-right side of the river, which was consistent with the various rules and local bylaw.
- 4.2.14. On the return trip the *jet-boat* fished and travelled upstream on the same true-right side of the river, because that was still the side that afforded the better river conditions for fishing. The driver of the commercial *jet-boat* that passed them shortly before the collision confirmed that the *jet-boat* was stopped and fishing within the willow trees, as close as 200 m down river of where the collision occurred. There are 2 questions to consider: was the *jet-boat* entitled to be on that side of the river to engage in fishing; and should it have made its way up-river on the true river right, exploring the regions near the riverbank for fishing spots?

- 4.2.15. Nothing could be found in any bylaws or the Maritime Rules that prevented fishing as an activity on the Kawarau River on either side of the river, so yes; the jet-boat was permitted to fish on the true river right. On the second question, whether the jet-boat was legally entitled to be moving slowly upstream close to the riverbank and willow trees on the true river right, is a question of mixed fact and law on which is not necessary for the Commission to make a finding. However, it is clear that the jet-boat was entitled to be fishing on that side as long as it was keeping well out of the main channel where high-speed downriver traffic should have been travelling. From a pure safety perspective it may well have been safer for such a craft to make its way slowly up the right bank (on the footpath as it were) than to cross and re-cross the river to find a new fishing spot. The reasons for this are explored below.
- 4.2.16. Figures 2 and 3 show what the nephew described as the path taken by the *jet-boat* immediately before the collision, weaving in and out of 2 willow arches close to the side of the riverbank for about 250 m. The description the nephew gave was that the *jet-boat* had been on that side since heading upriver from below the confluence of the Kawarau and Shotover Rivers.
- 4.2.17. Looking at the various rules around narrow channels and waterways, the Commission finds it evident that the common intent of them was to separate vessels proceeding along narrow channels, fairways and waterways, including rivers, rather than to restrict certain maritime activities to one side of the river or the other. Maritime Rules Part 22 (which mirrored the international collision-prevention regulations) refers to vessels “**proceeding along** the course of a narrow channel”, keeping as far right as “is safe and practicable”. Maritime Rules Part 91 is less specific in that it simply states that vessels should keep to the starboard side of the river, with no mention of distinguishing those that are proceeding along the river from those engaged in other activities. The Queenstown Bylaws is less specific again in saying “all vessels **operating** on rivers” must keep to the right side. However, the notices posted by Queenstown Lakes District Council near launching ramps to explain the Bylaws were worded differently; directing jet-boat operators to “keep right when **travelling up or downstream**”, which was closer to the meaning given in Maritime Rules Part 22. (emphasis added).
- 4.2.18. The definition of a narrow channel has perplexed the maritime industry for many years. The international collision-prevention regulations, which are mirrored by New Zealand’s Maritime Rules Part 22, did not have a definition for narrow channels, and the international conference that drafted the 1972 collision-prevention regulations rejected a proposal to include such a definition of “narrow channel” because the issue was too complex to define appropriately. The conundrum is that what might be a narrow channel for one type of craft will not necessarily be a narrow channel for another. An example would be an estuary-type harbour typical of many around New Zealand. At high water there is a great expanse of water that is easily navigable by shallow draught vessels, but deeper-draught vessels can only safely navigate within the deepwater channels through which the main body of water flows with the change in tide. These channels are sometimes, but not always, marked as such with a variety of markers. A similar situation exists in the fairways or entrances to commercial ports, where the actual entrance channels are wide but the channels within which large, deep-draught vessels can navigate are narrow.
- 4.2.19. Some rivers fall into the same category as the estuary harbours described above. Some are deep, swift flowing and can generally be navigated by jet-boats up to the riverbanks, notwithstanding some obstructions such as willow trees that grow in the river. Other rivers, or parts of rivers, are wider and have deeper channels within the main body of water, depending on the river level, which is constantly changing. The international collision-prevention regulations allow for this by recognising and defining a vessel that is constrained by its draught. Such ships may display special signals and are given special rights of way over more shallow-draught vessels, but this would not be practicable for smaller vessels operating on a river.
- 4.2.20. Another factor to consider is the manoeuvrability of the vessel concerned. The driver of a highly manoeuvrable jet-boat, for example, might not feel particularly constrained by the narrowness of a section of the river, but the driver of a deeper-draught and less manoeuvrable vessel might do.
- 4.2.21. Maritime Rules Part 91 and the Queenstown Lakes District Council Navigation Bylaws appear on the face of it to accept that most rivers are in fact narrow channels either in part or in entirety, because they have applied the keep-right rule to all rivers.

- 4.2.22. The Kawarau River near the scene of this accident is generally wide and deep, albeit with a distinct deeper channel within its banks. For the most part the types of craft that use this waterway are not constrained by their draught and are usually highly manoeuvrable. If it is accepted that the Kawarau River is a narrow channel, and the Commission believes that logically it is, the narrow channel rules apply, and these apply to all types of vessel, recreational and commercial. The narrow channel rule does not, however, override other parts of Maritime Rules Part 22, such as the requirement to travel at a safe speed; neither does the narrow channel rule mean keep as far right in the river as a vessel can or is allowed. The Rule says to keep as far right is as safe and practicable, the intent being to prevent 2 craft meeting head-on in the middle of the channel.
- 4.2.23. The problem arises though when the type of activity typically undertaken by craft on the Kawarau River, high-speed close encounters with willow trees and other objects to enhance the thrill aspect of the trip means they are travelling further to the right side of the channel than is safe and practicable, putting them in conflict with other users who are permitted to be there in the vicinity of the riverbanks. In other words, they may not be abiding by other parts of Rule Part 22; in particular, and in this case, the requirement to travel at a safe speed.
- 4.2.24. Narrow waterways all over the world are frequently followed by craft either entering or departing a facility, or simply transiting through an area. A channel is often lined by features that will require vessels to cross rather than follow narrow waterways to access those features. Such features can range from commercial port facilities to recreational swimming beaches. In some cases, designated “inshore zones” are reserved for vessels not needing to use the main waterway, which are used to relieve congestion in the main channel. The Kawarau River does not have designated inshore zones and does not have the same amount of activity as a busy shipping channel or fairway, but the various river users need to access any part of the river and its banks for different reasons, so the Commission believes the principles around right of access are similar.
- 4.2.25. Considering the *jet-boat* involved in this accident, for example, when it began travelling up river but was still moving from one fishing spot to another, it could have crossed to the other side of the river, then travelled upriver for a short distance and crossed the river again to the new location, and repeated this sequence each time in search of a new fishing spot. This could however, have potentially placed the *jet-boat* in conflict with boats travelling both up and down the river, so whether it would have been safer to do that or stay close on the true river right bank (and out of the main channel) at slow speed is a judgement call, depending on how often the driver intended to stop, or whether it was more practicable to remain on the true river right in order to search for the next fishing spot.
- 4.2.26. If all river users had been complying with the requirement to travel at a safe speed, meaning any boat travelling close to the willow trees or other structures obscuring the intended path ahead would have been doing so at an appropriate speed, the *jet-boat* should not have been at risk when doing the same. The problem was that the previously established appropriate speed of 5 knots had been uplifted. Although this uplifting did not absolve drivers’ responsibility to travel at a safe speed, at least we know the *personal watercraft* driver did not understand the concept of safe speed, nor it would seem did the commercial *jet-boat* drivers who routinely travelled a similar line and at a similar speed to that of the *personal watercraft* on the day. The driver of the *jet-boat* in this accident was local and presumably knew the track that the commercial *jet-boat* drivers and some recreational craft followed, and for that reason in this case it was unwise for the *jet-boat* driver to be making his way upriver on the true river right side.
- 4.2.27. It could not be established what the intended path of the *jet-boat* would have been had the collision not happened. The driver could have been powering up to cross to the other side of the river to either fish or return to Queenstown, or he could have been about to round the clump of willow trees then move on to another fishing spot on the same side of the river.
- 4.2.28. A point to consider though is that the *jet-boat* could have been in exactly the same position while making its way downriver, powering up to proceed to the next fishing location, but then on the correct side of the river. Alternatively, any boat could have reached that point and decided to return to Queenstown. In any of these scenarios, the *jet-boat* would have at some stage left

the small bay and proceeded into the main channel, as it might have been doing immediately prior to the collision.

- 4.2.29. The speed restriction of 5 knots within 200m of the shore (100m within the Queenstown district) was put in place to protect the kind of activity in which the *jet-boat* had been engaged, fishing close to the bank and also to protect swimmers and those engaged in other water-based leisure activities.
- 4.2.30. The *personal watercraft* was proceeding downstream on the true river right side of the river and was therefore on the correct side of the river. The driver was aware of the speed uplifting, and because he was not aware of the requirement in Maritime Rules 22 to travel at a safe speed, he was under the impression that there was no limit to the speed at which he could travel regardless of how close he was to the riverbank. He said this thinking was reinforced by his having observed the commercial jet-boats routinely travelling at high speeds close to the willow trees along a similar track to the one he had taken. He was, however, mindful of other river users, having reduced speed slightly shortly before the collision, because of his local knowledge that swimmers often frequented the riverbanks in that area, but as mentioned above his craft was still travelling at an unsafe speed for the chosen path.

Finding – Leading up to the collision the *personal watercraft* had been travelling on the correct side of the river (true river right), and the *jet-boat* was permitted to be on that same side to engage in fishing or similar activity, because those activities were permitted anywhere on the river.

Finding - At the time of the collision the *jet-boat* was not engaged in fishing and a further main proximate cause of the collision was that it was travelling too fast on the incorrect side of the river when it should have been making its way across to the other side of the river or staying close to the willows at a safe speed and in a manner that did not impede other traffic travelling down the true river right side.

Finding - The wording of the Queenstown Lakes District Council Bylaw that said all vessels “operating” on the river must keep to the right side was not consistent with the intent of the overarching Maritime Rules Part 22, and could mislead river users, already under no specific speed restriction, to thinking all river traffic or activity on the right side of the river would be travelling in the same direction.

4.3. Speed uplifting

- 4.3.1. Normally the 5-knot rule would apply to most rivers, because they are generally less than 400m wide, the minimum width a river has to be to allow a boat to remain 200 m from either shore, except in the Queenstown district where this distance had been reduced to 100 m.
- 4.3.2. Maritime NZ advised that the 5-knot limit within 200 m distance from shore provides a safe area for swimmers and other recreational users at beaches and along the shore-line, and it also provides a safety zone when headlands, bridges, wharfs and similar structures block the views of other craft in the same area (New Zealand Government, 1994).
- 4.3.3. Any uplifting of such speed restrictions is effectively a reversal of the protections put in place to mitigate the identified risks. Such a decision should only follow a formal reassessment of the overall risks, and should not take effect until other protections are put in place to mitigate any risks identified as being unacceptably high. Speed upliftings made under Maritime Rules Part 91 required consultation with the Director of Maritime NZ, and would only be approved after a risk assessment had been made to ensure the uplifting did not compromise safety. Alternatively speed upliftings could be made under bylaws, but in those cases Maritime Rules did not require that a risk assessment be made. The Commission considers this to be an omission in the legislation that should be addressed through consultation between Maritime NZ and local government entities.

- 4.3.4. In a statement made to the police after the accident, one local resident described the Kawarau River traffic as a mix of river users, including:
- large commercial jet-boats
 - commercial fishing guides
 - smaller private jet-boats (some of the racing variety)
 - personal watercraft
 - non-motorised craft (recreational canoes/kayaks, rubber and metal dinghies)
 - people floating on tyre inner tubes and other inflatable devices
 - swimmers
 - fishermen on the riverbanks.
- 4.3.5. Queenstown Lakes District Council acknowledged that all of these activities were known to take place on the river and all were permitted. There is little known data recording the level of activity, but these are activities that should have been considered as part of a risk assessment before the uplifting.
- 4.3.6. On 18 October 2010, the Commission was notified of a collision between a commercial jet-boat and a recreational boat on the Kaituna River in the Bay of Plenty region. The Commission enquired into the permit to operate given to the commercial jet-boat company and the uplifting of the speed restriction on that stretch of water, which in that case applied only to that jet-boat operator.
- 4.3.7. The Kaituna River is narrower and windier than the Kawarau River and lined with overhanging vegetation on both sides for much of the jet-boat trip. Amateur video footage taken by a passenger on a commercial jet-boat trip shows the boat travelling at high speed around corners where it was not possible to see clearly the water immediately ahead. Given that the same range of river activities permitted on the Kawarau River was also permitted on the Kaituna River, there is a question whether those routine commercial trips were being conducted at safe speeds, and whether an effective risk assessment had been conducted for that stretch of water before the speed uplifting was approved.
- 4.3.8. In 1990, the section of the Kawarau River where the incident took place was subject to a speed uplifting, which was granted to legalise high-speed operations on the river, including commercial jet-boats. The uplifting was made before Maritime Rules Part 91 came into force; however, once it did the bylaw became subject to that Rule (Application section of the Rule). The speed uplifting did not specify which parts of the bylaw (or later Rule 91) had been uplifted. The Lakes Environmental compliance manager at the time of the accident said that he thought the uplifting applied only to the 5-knot limit within 200 m of the shore; however, the bylaws did not make this distinction.
- 4.3.9. A historical review of the legal status of the Kawarau River speed uplifting raised the question of whether the uplifting had been valid. Legal opinion sought by the Commission differed from that provided by Queenstown Lakes District Council, which is perhaps indicative of how complex the relationship is between maritime acts and rules and local government legislation. The Commission does not, however, consider this point material to the cause of this accident, because the intent of Queenstown Lakes District Council was to uplift the speed restriction; it believed that it had done so, and river users behaved as though it had done so. This is, however, an issue that the Council will need to address together with Maritime NZ.
- 4.3.10. In New Zealand, all other legislation governing speed on the water is subject to the safe speed requirement in Maritime Rules Part 22, and theoretically, if every river user kept to the principles of safe speed, a speed uplifting should not create any additional risks, because users would travel at speeds commensurate with the prevailing conditions and activities that were and might be occurring around them, but a low percentage of river users would have been taught the concept of safe speed because there was no requirement for recreational users to hold marine qualifications. The *personal watercraft* driver hadn't and he thought he was travelling at a safe speed immediately prior to the collision.
- 4.3.11. Given the situation on the Kawarau River, and possibly on the Kaituna River as well, and add to that the complexity of the historical relationship between acts, regulations, rules and bylaws, it

is feasible that similar problems would be identified in other waterways and in other regions. This is an issue that would benefit from a review to ensure consistency in bylaws and consistency in water safety standards across all New Zealand regions, so that both recreational and commercial users know what to expect regardless of the waterways they might be using.

Finding - The Bylaws and Maritime Rules Parts 22 and 91 were in part designed to protect people swimming, fishing and engaging in other recreational activities near shorelines from the risks posed by higher-speed craft. Queenstown Lakes District Council removed that protection when it uplifted the speed restriction, which increased the risk to all river users and increased the potential for fatal accidents such as this to occur.

Finding - An inconsistency exists in legislation, where for speed upliftings granted under Maritime Rules Part 91 risk assessments must first be made to ensure that reasonable safety standards are not compromised, but when speed upliftings are granted under local government bylaws, there is no such requirement.

4.4. Commercial jet-boat operations and resource consents

- 4.4.1. During the inquiry into this accident involving 2 recreational craft, the Commission examined the system in which the 2 craft were operating to better understand the circumstances that may have contributed to the collision. That system included the regulation of the activities permitted on the river. Most of the Maritime Rules and Bylaws of course applied to all river users. A high percentage of the river activity involved commercial jet-boat operations, and the Commission found evidence that the speeds and tracks routinely taken by some commercial jet-boats on the Kawarau River were unsafe, so the inquiry was extended to examine that aspect as well.
- 4.4.2. Resource consents issued to commercial jet-boat operators generally mentioned “when practicable” keeping to mid channel to avoid wash eroding the banks and avoid disturbing wildlife and anglers, but in any event travelling no closer than 5 m from overhanging willow trees.
- 4.4.3. These conditions of resource consent did not apply to non-commercial users of the river, who were permitted to use the same stretch of water without these specific restrictions, albeit under the same requirement to travel at a safe speed. The Commission considers that having large commercial jet-boats travelling at high speed 5 m from the willow trees is not safe if there is the potential for other unseen river users to be in the vicinity. Replace the *personal watercraft* in this accident with a commercial jet-boat fully loaded with passengers and the outcome would have had the potential to be significantly worse. This style of driving by commercial operators had been a longstanding practice in the area, one that the *personal watercraft* driver was emulating on the day of the collision.
- 4.4.4. Queenstown Lakes District Council acknowledged to the Commission that the resource consents issued to the commercial operators did not exempt drivers from the requirement to travel at a safe speed, yet it has been common knowledge in Queenstown that the commercial jet-boat operators routinely “work the willows” at high speed to enhance the thrill aspect of the trip. Anyone had only to view the various forms of advertisement to see that. The Commission has obtained evidence that some drivers were exceeding the limits of the resource consent and driving closer than 5 m from the willow trees. Queenstown Lakes District Council too had received complaints of these violations, and had access to video evidence provided by Lakes Environmental taken on a trip to monitor compliance with the resource consent provisions. That footage showed the commercial jet-boat operating within 5 m of the willow trees with poor sight lines at high speed.
- 4.4.5. Shortly after this accident, an incident was notified to the Commission where a commercial jet-boat was travelling at high speed along its usual line, close to (reported as nearly brushing) the willow trees, and came close to a scientific research vessel monitoring river levels and flow. In order to perform this monitoring the research boat was required to at times be in amongst the willow trees. The presence of the research boat had been notified to the commercial jet-boat operator the day before. The harbourmaster was also on site stationary in the shallows on his personal watercraft, and the jet-boat narrowly missed him. It was the opinion of the

harbourmaster and NIWA employees at the time that the jet-boat driver had not seen the harbourmaster until he had gone past.

- 4.4.6. There have not been many reported near misses on the Kowarau River, so it is difficult to say how serious the risk is, but if this accident is an example of what can happen under the current system, a serious safety issue exists on the Kowarau River given that an uplifting has been granted. The situation may also exist on other rivers where a speed uplifting has been granted.
- 4.4.7. This is not to say that this should spell the end of commercial jet-boat operations on the Kowarau River. In its submission on this report Maritime NZ put it quite succinctly that, "Where a cliff face or vertical riverbank exists and there is no possibility of other craft or activity due to the area being clearly visible, then high speed close to the shore may well be safe. However, where there is a bend in the river that limits visibility or low-lying land possibly with trees or other vegetation overhanging the river, the requirements to travel at safe speed (Maritime Rules 22.6) indicate that slowing down and/or travelling at a greater distance from the shore is required".
- 4.4.8. The Commission concurs with this statement from Maritime NZ. All that may be required is for commercial jet-boat operators to review their driving lines to ensure their craft are always travelling at a safe speed.

Finding - Although there was no commercial jet-boat involved in this accident, the *personal watercraft* was following a line similar to what had been routinely followed at similar speeds by commercial jet-boats several times each day for several years, meaning that commercial jet-boat operations had operated in contravention of the Maritime Rules' requirement to travel at a safe speed.

4.5. Recreational and commercial jet-boating qualifications

- 4.5.1. Recreational boat users are not required to have training in the collision-prevention rules, so a low percentage are likely to be aware of only the basic give-way rules often published in educational media. This does not mean they do not have to comply with them; quite the opposite, but there is an underlying flaw in principle with a system that relies on, in this case, river users knowing the intricacies of the various rules, regulations and bylaws, yet does not require those users to demonstrate knowledge of them.
- 4.5.2. There is a situation in Queenstown district that suggests even the commercial jet-boat operators on the Kowarau River do not fully understand the concept of safe speed. The jet-boats routinely "work" the willow trees to create a greater impression of speed and the perception of near-collision with the trees, although driving lines are followed that have the boats drifting away from the obstructions even when seemingly pointing at them. Under the terms of the resource consents granted to commercial jet-boats, they are required to remain at least 5 m out from the willow trees, which is purported to provide some increased margin of safety for collision avoidance and help to minimise erosion of the riverbanks caused by wake. Commercial jet-boats are also required under the terms of their resource consents to avoid disturbing anglers by keeping 20 m away.
- 4.5.3. Like recreational boat users, commercial jet-boat operators are not required to hold a Maritime Document (issued by the Director of Maritime NZ) that requires an in-depth knowledge and understanding of the collision-prevention rules, the only requirement being to undergo a minimum of 50 hours' driver training and to comply with the basic river rules of keeping right and upriver traffic giving way to downriver traffic.
- 4.5.4. The issue of whether to require some kind of licence for recreational boating has been long debated in New Zealand. Until now the preferred option has been one of education over regulation.
- 4.5.5. Boat users holding licences is no guarantee of ensuring compliance with the rules, as has been clearly demonstrated in other modes of transport where licensing is required; driving a car for example. Licensing users does, however, mean that at some point each user has demonstrated

sufficient knowledge of the rules. In most cases this will mean a higher standard of compliant behaviour.

- 4.5.6. Where the system relies heavily on compliance with the rules, such as a river where speed restrictions have been uplifted, licensing drivers to ensure they are better educated would mitigate the risk better than relying on voluntary education, because a greater proportion of those boat users who would normally abide by the rules would have a better understanding of them. This argument can be applied to any boating activity in any area, and would apply also to commercial jet-boat drivers. The Commission has not been able to rationalise why some form of licensing for recreational boat users has not been introduced to New Zealand, nor why it is not planned for the immediate future. There is currently a disparity in licensing standards between those for recreational boat users and those for users of other types of transport vehicle such as cars and aeroplanes. The Commission therefore concludes that some form of licensing for recreational boat users should be introduced to New Zealand legislation. Boat registration as a means of identifying non-compliant users would likely become a necessity, but the 2 issues should be treated separately.
- 4.5.7. The Commission concludes also that there is a disparity in licensing standards between those for commercial jet-boat drivers and those for drivers of other commercial craft, where the former are not required to hold Maritime Document requiring them to demonstrate an in-depth knowledge of the collision-prevention rules, in spite of operating on lakes and rivers together with recreational and other types of commercial craft.

Finding – The fact that there was no requirement for commercial jet-boat drivers to hold Maritime Documents requiring them to have an in-depth knowledge of the collision-prevention rules did not relieve them of their responsibility as the person in charge of their respective craft to understand and comply with all national Maritime Rules and bylaws.

Finding - The fact that there was no requirement for the drivers of the *jet-boat* and the *personal watercraft* to hold maritime qualifications did not relieve them of their responsibility as the person in charge of their respective craft to understand and comply with all national Maritime Rules and local bylaws.

Finding - Until through either local bylaws or Maritime Rules recreational water craft users and commercial jet-boat drivers are required to acquire and demonstrate knowledge of rules around collision-prevention, the risk of accidents caused by knowledge-based errors will remain high, increasingly so with any future increases in maritime activity.

4.6. Response to incident

- 4.6.1. The location of the accident meant that it was heard by people living close by, who were able to raise the alarm promptly and go to the assistance of those involved in the collision.
- 4.6.2. The initial location given by the nephew on the *jet-boat* was not accurate. This was understandable given his limited knowledge of the river and that he was in a state of shock, but his call did raise the alarm and got the emergency services activated. His actions in rendering assistance to those nearby in obvious distress rather than continuing to talk on the telephone when he felt he had no more useful information to give in the circumstances were understandable. In the event, another call a few minutes later gave the emergency services a more precise location.
- 4.6.3. The arrival of another jet-boat on the scene assisted in the prompt retrieval of the 2 *personal watercraft* passengers from the water and, together with the efforts of people from the nearby house meant, that the search for the 2 missing men from the *jet-boat* was initiated quickly.
- 4.6.4. The response of the emergency services was also quick, with the first fire crew arriving as the injured were being put ashore. In response to the updated information, the first fire appliance continued to Glenda Drive to search for possible survivors who were known to be missing, which was prudent given the information available at the time.

- 4.6.5. Prompt notification and activation of local assets meant that the Coastguard vessel, a number of commercial jet-boats and the harbourmaster were at scene on the river quickly to assist in the search for the 2 missing men from the *jet-boat*. Local divers also responded but their search was suspended because of safety concerns and the fading light. Every emergency response is different, so there will inevitably be variations in response and nearly always lessons to be applied. The emergency response to this accident was about as good as could be expected under the circumstances.

Finding - The emergency response to the collision was well co-ordinated and effective, and possibly saved the life of the *personal watercraft* passenger whose injuries were life-threatening.

4.7. Survivability and personal flotation devices

- 4.7.1. A high-speed collision in any vehicle has the potential to cause serious injury to those involved, as was the case in this accident. Recreational jet-boats and personal watercraft have no means of restraint and little is afforded in the design of either craft to protect those on board in the event of a head-on collision.
- 4.7.2. The damage to the *jet-boat* and *personal watercraft* showed that the 2 craft collided at a slight angle as they both turned towards the centre of the river, with the starboard bow of the *personal watercraft* making first contact with the port bow of the *jet-boat*. Other impact marks made it likely that the *personal watercraft* was swung around from the force of the initial impact and the starboard rear quarter of the *personal watercraft* then struck the port side of the *jet-boat* hull adjacent to the driver's seat.
- 4.7.3. During this time both the *personal watercraft* driver and his passenger received impact injuries from the hull of the *jet-boat*. At some point the passenger struck the left side of the *jet-boat*, receiving serious injuries to her head and body that rendered her unconscious. The *personal watercraft* driver's right femur was broken, probably trapped between the *personal watercraft* and *jet-boat* hull when they collided before he too was thrown into the water.
- 4.7.4. Both of the men in the front of the *jet-boat* were catapulted forward on impact and received head injuries either as they exited the boat or on impact with the water. In the collision the effect would have been similar to that experienced by an unrestrained passenger in a motor vehicle experiencing a sudden change in momentum.
- 4.7.5. The rear seat of the *jet-boat* was of similar design to the front seat, but wider. The nephew seated there was fortunate that the dynamics of the impact resulted in his being thrown up rather than out of the boat, receiving only minor injuries.
- 4.7.6. Based on the recovery of the 2 people on the *personal watercraft* and the prompt arrival of assistance on the scene, it is almost certain that had the 2 men ejected from the *jet-boat* been wearing lifejackets they would have remained afloat and been located promptly.
- 4.7.7. Any injury on the water has the potential to have serious consequences because of the attendant risk of drowning if the casualty cannot remain afloat, or is rendered unconscious.
- 4.7.8. Both men had received head injuries in the collision and the pathologist's report for the coroner concluded that it was likely they were both unconscious when they entered the water. Both bodies were recovered only a short distance from the collision site, meaning that both men had sunk soon after entering the water. The chances of survival (without lifejackets) of the 2 men ejected from the *jet-boat* in an unconscious state were remote.
- 4.7.9. The 2 men were probably alive when they entered the water. The friend had a serious head injury but it was potentially survivable, as was the less severe head injury the driver received. The *personal watercraft* passenger had more severe injuries than the 2 men and survived because her lifejacket kept her afloat, meaning rescuers could locate and resuscitate her promptly.

- 4.7.10. There are a number of lifejackets available on the market for recreational users. The type 402 inshore-waters PFD was one of the most common. Although it was of a type not guaranteed to keep an unconscious person's head above water, in this case in the smooth waters of the river it prevented the *personal watercraft* passenger drowning. The accident highlights not only the importance of wearing a lifejacket but also the importance of selecting the most suitable type. For example, in the circumstances of this accident a manually inflated lifejacket might not have kept the *personal watercraft* passenger afloat as she had no time to inflate the jacket before she hit the water in an unconscious state.
- 4.7.11. Under the Maritime Rules and Bylaws existing at the time of the accident the driver of the *jet-boat* complied with the requirement to carry a sufficient number of suitable lifejackets for everyone on board. Under the Bylaws the wearing of lifejackets was not compulsory other than for children under 10 years of age.
- 4.7.12. The Maritime Rules and Bylaws at the time of the accident left it to the discretion of the skipper of the boat to decide when it was necessary to wear a lifejacket.
- 4.7.13. On a small vessel travelling at speed on a river, there is often little time to react if an accident occurs, and there is a higher risk of injury. Wearing a lifejacket increases the chances of survival if the wearer ends up in the water, and the flotation pads usually around the torso area offer some protection from impact.
- 4.7.14. It is not known why the *jet-boat* driver on this particular trip did not wear a lifejacket himself or insist his passengers did. The surviving passenger said that whether or not to wear lifejackets was not discussed before or during the trip.
- 4.7.15. The *personal watercraft* driver complied with the requirements of both Maritime Rules Part 91 and local Bylaws with respect to the requirements to wear PFDs on all recreational craft in a situation where there was a danger to the safety of those on board. This was consistent with the advisory notice issued by Maritime NZ that personal watercraft wearers must wear a PFD.
- 4.7.16. The proposed change to the Maritime Rules requiring all people to wear lifejackets on vessels under 6 m long unless the master said it was safe to take them off was reflected in the Queenstown Lakes District Council Navigation Safety Bylaw 2009 (ibid), which came into force in May 2009. The Bylaws went a step further than the proposed Rule change and made the wearing of lifejackets compulsory in such vessels, removing that discretion. Had such a bylaw existed and been complied with by those on the *jet-boat* it is possible that nobody would have died in this accident.
- 4.7.17. The statistics show that people in small craft, typically under 6 m in length, are still not wearing lifejackets despite educational programmes promoting their wear. It is difficult to comprehend how the new wording of the proposed Maritime Rule, which still leaves whether to wear a lifejacket up to the discretion of the person in charge, will change that significantly. With some local government bodies mandating the wearing of lifejackets, future statistics by area should give some indication of how effective this will be in reducing fatalities. Until then, educational programmes that do appear to have made a difference in the past should continue.
- 4.7.18. Three of the 5 people involved in this accident received serious head injuries. At the time of the accident both craft were travelling well below the maximum speeds of which they were capable, which emphasises the potential risks of such injuries. Both Maritime NZ and the National Pleasure Boat Safety Forum have recognised the risk of a head injury where a person is moving at speed and may come to a sudden stop in situations such as a collision.
- 4.7.19. The use of helmets by personal watercraft users engaged in legitimate racing events in New Zealand is a requirement of the sport's governing body, the New Zealand Jet Sports Boating Association. There is no such requirement outside this sphere of operation. The benefit of helmets has been recognised but the evidence is that helmets are not commonly worn by personal watercraft users during normal use, which is often conducted at high-speed with a high risk of the user being thrown into the water during normal activity.
- 4.7.20. There are a number of other activities where the benefit of wearing a helmet has been recognised: cycling, snow skiing, motorcycling, white-water kayaking and white-water rafting to

name a few. Given the protection they can provide, it would seem that wearing them on a personal watercraft would be wise and there may be a case for it to be mandatory.

- 4.7.21. Whether wearing a helmet in a jet-boat or any other craft capable of high speed is practicable will require some research.

Finding - Wearing an appropriate lifejacket almost certainly saved the life of the *personal watercraft* passenger when she became incapacitated from her injuries.

Finding - The 2 deceased *jet-boat* occupants were likely rendered unconscious from injuries sustained when they were ejected from the boat in the collision. Had they been wearing lifejackets they might have been located in time to prevent their deaths.

Finding - The mandatory wearing of lifejackets in vessels less than 6 m in length as adopted by some local government authorities will likely save more lives than if wearing a lifejacket is left up to the discretion of the person in charge of a vessel, because despite educational programmes that promote wearing lifejackets, some boat users continue to not do so.

Finding - Had protective helmets been worn, the extent of the serious injuries sustained by 3 of the 5 people involved when the craft collided might have been reduced.

4.8. Alcohol and recreational boating

- 4.8.1. Tests on the deceased driver of the *jet-boat* did not reveal any traces of alcohol. Tests on the deceased *jet-boat* passenger revealed trace levels of alcohol that would not have caused impairment. These findings were consistent with the description given by the survivor as to the amount of alcohol that had been consumed on board.
- 4.8.2. Both the *personal watercraft* driver and the surviving *jet-boat* passenger said that they volunteered to take an alcohol test after the collision, but tests were not made. In this case there is no evidence that alcohol was a factor in this accident, but the Commission believes that impairment of boat driver performance is an issue that will need to be addressed, particularly if legislation is introduced to set standards for recreational boat licensing. Currently there are no rules limiting the level of alcohol and other performance-impairing substances for recreational and commercial boat drivers, yet the act of driving a boat is equal to, if not more demanding than, driving a car on the road, and the consequences can be the same, as shown by the boating casualty statistics in section 3.8.5.
- 4.8.3. Between 2000 and 2007 alcohol was identified as a factor in 18% of recreational boating fatalities in New Zealand, and was found to have been a contributing factor in 8 fatalities over a 35-month period (National Pleasure Boat Safety Forum, 2008).
- 4.8.4. As long as there is no limit to the allowable level of alcohol and other performance impairing substances for drivers in charge of commercial and recreational boats, and as long as there is no legal mechanism for testing blood-alcohol limits for such drivers, the risk to the public is likely to remain unacceptably high.

Finding - Although alcohol was not considered a factor in this accident, it was present on board the *jet-boat* and had been consumed in small quantities. Until legislation is made setting limits of alcohol and other performance-impairing substances for commercial and recreational boat drivers, the risk of substance-impairment-related accidents will be elevated.

5. Findings

- 5.1 As a consequence of Queenstown Lakes District Council's uplifting the Bylaw speed restriction, both the *personal watercraft* and the *jet-boat* were under no specific speed restrictions, except the requirement to travel at a safe speed as required by the overarching Maritime Rules and the general Bylaw requirement to navigate with due care and caution and at a speed and manner as not to endanger or cause injury to any person.
- 5.2 Leading up to the collision, the *personal watercraft* had been travelling on the correct side of the river (true river right), and the *jet-boat* was permitted to be on that same side to engage in fishing or similar activity because those activities were permitted anywhere on the river.
- 5.3 One main proximate cause of the collision was that the *jet-boat* and *personal watercraft* were both travelling too fast as they approached each other from behind overhanging willow trees, leaving insufficient time to see each other, recognise the danger and take effective avoiding action. They were not travelling at a safe speed, and in the case of the *personal watercraft* the driver had left himself no room to perform the preferred evasive manoeuvre of turning to starboard..
- 5.4 At the time of the collision the *jet-boat* was not engaged in fishing and a further main proximate cause of the collision was that it was travelling too fast on the incorrect side of the river when it should have been making its way across to the other side of the river or staying close to the willows at a safe speed in a manner that did not impede other traffic travelling down the true river right side.
- 5.5 The wording of the Queenstown Lakes District Council Bylaw that said all vessels '**operating**' on the river must keep to the right side was not consistent with the intent of the overarching Maritime Rules Part 22, and could mislead river users, already under no specific speed restriction, to thinking all river traffic or activity on the right side of the river would be travelling in the same direction.
- 5.6 The Bylaw and Maritime Rules Parts 22 and 91 were in part designed to protect people swimming, fishing and engaging in other recreational activities near shorelines from the risks posed by higher-speed craft. Queenstown Lakes District Council removed that protection when it uplifted the speed restriction, which increased the risks to all river users and increased the potential for fatal accidents such as this to occur.
- 5.7 An inconsistency exists in legislation where for speed upliftings granted under Maritime Rules Part 91 a risk assessment must first be made to ensure that reasonable safety standards are not compromised, but when speed upliftings are granted under local government bylaws, there is no such requirement.
- 5.8 Although there was no commercial jet-boat involved in this accident, the *personal watercraft* was following a line similar to that which had been routinely followed at similar speeds by commercial jet-boats several times each day for several years, meaning that commercial jet-boat operations had operated in contravention of the Maritime Rules' requirement to travel at a safe speed.
- 5.9 The fact that there was no requirement for commercial jet-boat drivers to hold Maritime Documents requiring them to have an in-depth knowledge of the collision-prevention rules did not relieve them of their responsibility as the person in charge of their respective craft to understand and comply with all national Maritime Rules and bylaws.
- 5.10 The fact there was no requirement for either driver of the *jet-boat* or the *personal watercraft* to hold a maritime qualification did not relieve them of their responsibility as the person in charge of their respective water craft to understand and comply with all national Maritime Rules and local Bylaws.
- 5.11 Until through either local bylaws or Maritime Rules recreational water craft users and commercial jet-boat drivers are required to acquire and demonstrate knowledge of rules around collision-prevention, the risk of accidents caused by knowledge-based errors will remain high, increasingly so with any future increases in maritime activity

- 5.12 The emergency response to the collision was well co-ordinated and effective, and possibly saved the life of the *personal watercraft* passenger whose injuries were life-threatening.
- 5.13 Wearing an appropriate lifejacket almost certainly saved the life of the *personal watercraft* passenger when she became incapacitated from her injuries.
- 5.14 The 2 deceased *jet-boat* occupants were likely rendered unconscious from injuries sustained when they were ejected from the boat in the collision. Had they been wearing lifejackets they might have been located in time to prevent their deaths.
- 5.15 The mandatory wearing of lifejackets in vessels less than 6 m in length as adopted by some local government authorities will likely save more lives than if wearing a lifejacket is left up to the discretion of the person in charge of a vessel, because despite educational programmes that promote wearing lifejackets, some boat users continue to not do so.
- 5.16 Had protective helmets been worn, the extent of the serious injuries sustained by 3 of the 5 people involved when the craft collided might have been reduced.
- 5.17 Although alcohol was not considered a factor in this accident, it was present on board the *jet-boat* and had been consumed in small quantities. Until legislation is made setting limits of alcohol and other performance-impairing substances for commercial and recreational boat drivers, the risk of substance-impairment-related accidents will be elevated.

6. Recommendations

General

- 6.1 The recommendations that follow are generally limited to navigation in enclosed waters or waterways, and mainly in relation to recreational boating, but in some cases commercial boating activities are affected as well.

The Commission makes the recommendations to the Ministry of Transport for matters that might require changes to rules or other legislation.

For matters around uplifting speed restrictions, the Commission makes recommendations to both Local Government New Zealand and Maritime New Zealand because either the Director of Maritime New Zealand or any Local Government entity may take such action.

For the matter of resource consents issued that are inconsistent with Maritime Rules, the Commission makes its recommendation to both the Director of Maritime New Zealand and the Chief Executive of Queenstown Lakes District Council because both entities have responsibilities for upholding navigation safety.

New recommendations

- 6.2 The following recommendations are not listed in any order of priority.

Recommendation 1

- 6.3 When a speed uplifting is granted by local government organisations or by Maritime New Zealand, this is effectively a reversal of measures taken to mitigate a previously identified risk of accidents occurring between craft travelling at high speed and other recreational water activities.

In the case of the Kawarau River, it is a safety issue that few additional measures have been taken to mitigate the additional risks that the speed uplifting has created. This situation probably exists on the Kaituna River and therefore could also exist in other waterways where the speed restrictions have been uplifted.

A second safety issue is that there is an inconsistency between Maritime Rules Part 91 where speed upliftings applied for under Rule 91.21 require a risk assessment, and then if successful, public notification and notification in the Gazette, and speed upliftings enacted by navigation bylaws that are not subject to risk assessment, approval by the Director, and publication in the Gazette.

The Commission recommends that the Director of Maritime New Zealand and the Chief Executive of Local Government New Zealand address these 2 safety issues through the appropriate forum with local government organisations with a view to achieving an appropriate level of safety and consistency in safety standards on affected inland waterways. (002/11)

On 22 October 2010, the Director of Maritime NZ replied, in respect to the draft recommendation:

The use of high speed craft in rivers has been a part of both recreational and commercial activity in New Zealand for several decades. This is possible only by the use of 'speed upliftings' which exempt the area from the 5 knot speed restrictions near land. Almost every navigable river in the country has been uplifted or has large sections which are uplifted seasonally. From time to time a temporary uplifting is issued, often for a specific event such as a jet-boat marathon. Speed uplifting are also used in rivers, lakes and coastal areas for activities such as water-skiing and PWC use.

A range of safety issues are considered before a speed uplifting is issued. The safety of other users is given high priority. It is therefore rare to have areas where numbers of other users, whatever the water activity, are likely to present. The nature of the

environment, particularly in relation to visibility and sufficient room to operate are also given careful consideration.

When speed restrictions (namely the requirement for craft not to exceed 5 knots within 200 metres of shore or 50 metres of another vessel) have been uplifted, the onus is placed on the applicant to ensure the safety of other river users.

When MNZ issues a temporary speed uplifting in the areas under its jurisdiction, the responsibility for safety of all users is placed on the applicant who requested the uplifting. This is made clear and an example of a temporary uplifting is included below:

**MARITIME RULES PART 91, NAVIGATION SAFETY:
SPEED UPLIFTING FOR EVENTS**

In response to your letter dated xxxxx, I am please to advise that the Navigation Safety Rule will be suspended at XXXX, as set out below to hold power boat events.

This uplifting applies only to the five knot restriction within 200 metres of the shore and within 50 metres of other vessels. All other requirements of the Navigation Safety Rule still apply.

While we can grant suspension of the Navigation Safety Rule we cannot close the lake to other users or craft, and you will have to clear this with the other users.

The dates to which this suspension applies are as follows:

Date	Event	Place
23 Oct 2010, 1600 to 1830	Power boat marathon.	XXXX

The granting of this approval is subject to the following conditions:

- 1. The safety of the public is of paramount importance and is your responsibility*
- 2. Any oil or fuel spillage must be promptly and effectively dealt with. Any spillage shall be promptly reported to the appropriate Regional Council and Territorial Local Authority.*
- 3. Any litter remaining after the event must be removed from the water or adjoining land so that the area is left in a tidy condition.*
- 4. The even must be advertised in a local newspaper not less than seven or more than 14 days before each event.*
- 5. The advertisement must clearly identify the area to which it applies, give dates and times, the nature of the event and the responsible organising body.*
- 6. The club must obtain the approvals required by the territorial local authority.*
- 7. Emergency services shall be notified and arrangements made to respond as may be required.*

When a speed uplifting is permanently in force, the advice to all water users is contained in bylaws and signage at boat launching places. While this situation has been in place for many years, there have been areas where safety concerns still exist. Parts of the Shotover River are effectively closed to other users when tourist jet-boat operations are taking place. It is possible for the authority which controls the river to reserve areas for specific purposes, thereby effectively closing a river or an area when this is considered necessary on safety grounds.

While boating speed restrictions have been put in place through Maritime Rules Part 91 and Navigation Safety Bylaws, these requirements can be considered as an addition/explanation to Maritime Rules Part 22 – Collision Prevention (in effect the International Regulations for Preventing Collisions). These regulations require all vessels to travel at a safe speed. While the “5 knot rule” is appropriate for operations on larger bodies of water such as lakes for in coastal areas, it has not

been considered practical much of the time on rivers, hence the uplifting of the speed restriction in many rivers.

An analogous situation exists on the country's roads, with the designated safe speed on many roads increasing from 50k/h to 100k/h on the open road. Rather than address the issue by putting in place additional safety measures, roads where it is sufficiently safe to operate at 100k/h (or some other limit) have been identified. The same consideration is given to safety before speed in an area is uplifted for boating activities.

In summary, therefore, MNZ considers that there are sufficient legal remedies in place under existing legislation for both regional councils and MNZ to address any additional safety risks that may arise from the uplifting of speed restrictions on rivers.

On 16 March 2011, the Director of Maritime NZ, replied to the final recommendation:

In respect of the second safety issue raised under this recommendation, MNZ expects to meet with Local Government NZ prior to the end of June.

No reply was available from Local Government New Zealand at the time of print.

Recommendation 2

- 6.4 Maritime Rules Part 80 required commercial jet-boat drivers to undergo a minimum of 50 hours' training before being licensed to drive commercial jet-boats, but the Rule did not require the drivers to hold formal Maritime Documents requiring them to demonstrate an in-depth knowledge of the collision-prevention rules (Maritime Rules Part 22) and other maritime skills required of drivers of other types of commercial craft.

While acknowledging that some jet-boat operations do not require interactions with other craft (the Shotover Jet is one example), most commercial jet-boats operate on rivers and lakes where they must coexist with recreational and other commercial craft.

The Commission recommends to the Secretary of Transport that he liaise with the Director of Maritime New Zealand to address this safety issue, either by a change to the Maritime Rules or through some other appropriate forum. (003/11)

On 16 March 2011, the Director of Maritime NZ replied to the final recommendation:

Maritime Rule Part 82, which incorporates a new licensing system for jet boat drivers, is scheduled for introduction in October 2011.

On 16 March 2011, the Manager Maritime and Freight of Ministry of Transport replied to the final recommendation:

The recommendation proposes that the Secretary for Transport liaise with the Director of Maritime New Zealand to address the safety issue of commercial jet-boats' interactions with recreational and other commercial craft, either through a change to maritime rules or through another appropriate forum.

Maritime New Zealand has developed a revised maritime rule for jet-boat operations, Maritime Rule Part 82, Commercial Jet Boat Operations (River). The rule is due to be submitted for the Minister of Transport's approval later this year, and if approved will come in to force on 1 October 2011.

A key change under Part 82 is a requirement for operators to establish programmes of competency assessments to ensure the initial and ongoing competence of jet-boat drivers. One of the aims of the assessment requirements is to ensure that drivers are competent when transferring between different types of jet-boat and areas of operation, as well as to manage the risk of experienced drivers becoming over-confident. Maritime New Zealand has advised that the structured training programme for competency assessments is likely to include testing for knowledge of relevant maritime rules, including Part 22, Collision Prevention.

These arrangements, once implemented, are expected to give effect to recommendation 003/11.

Recommendation 3

- 6.5 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)

On 22 October 2010, the Director of Maritime NZ replied, in respect to the draft recommendation:

The issue of whether pleasure boat skippers should be licensed has probably received more consideration over many years by a very wide range of people than any other aspect of recreational boating. The advantages and disadvantages of introducing such a measure were very carefully evaluated in 2000 when the National Recreational Boating Safety Strategy was first developed, and again in 2007 when the strategy was comprehensively reviewed and updated. It continues to be assessed by the National Pleasure Boat Safety Forum on an ongoing basis.

To date, the Forum has not been persuaded that the introduction of a generic 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 rationale for this approach is set out in detail in the 2007 update of the National Safety Strategy and will not be repeated here. MNZ would note, however, that where other overseas jurisdictions have introduced skipper licensing, we are not aware of any that have been able to demonstrate a sustained reduction in fatalities or accidents as a direct consequence.

MNZ does not, therefore, support this recommendation at this time.

On 16 March 2011, the Manager Maritime and Freight of Ministry of Transport replied to the final recommendation:

The recommendation addresses the safety issue surrounding the absence of a requirement for the person in charge of a recreational craft to demonstrate knowledge of collision avoidance rules. It is recommended that the Secretary for Transport recommend rules or some other mechanism to require the person in charge of designated recreational craft to hold a licence or certificate that requires the holder to be educated to identified standards.

The Secretary is not in a position to make any recommendation for introduction of a licensing regime. Before contemplating any such proposition, it would be necessary to consider existing options for improving boat users' awareness of their existing legal obligation to comply with collision prevention rules. It would also be necessary to gauge the scale and severity of this safety risk relative to other recreational safety risk factors confronting the recreational boating community.

The National Pleasure Boating Safety Forum was established in 2000 to monitor boating safety trends and develop strategies for addressing key risk factors. The Forum brings together the full spectrum of organisations with a part to play in boating safety, and is well placed to consider the full range of approaches to the safety issue that the Commission has raised.

The Ministry of Transport will refer the Commission's recommendation for discussion at the next meeting of the Forum, to be held on 12 May 2011.

Recommendation 4

- 6.6 Until legislation is made setting limits for and testing of alcohol and other performance impairing substances for recreational and commercial boat drivers, the risk of alcohol-related accidents will be elevated.

It is recommended that the Secretary for Transport address this safety issue by promoting appropriate legislation to set maximum allowable levels of alcohol and other performance impairing substances for persons in charge of recreational and commercial craft, and supporting legislation to allow testing for such levels in these cases. (005/11)

On 22 October 2010, the Director of Maritime NZ replied, in respect to the draft recommendation:

This issue is currently part of a wide ranging consideration by the Ministry of Transport of the use of alcohol and drugs in the transport sector. A maximum blood-alcohol level for skippers of pleasure craft underway has been recommended by the National Pleasure Boat Safety Forum.

That said, it is surprising that this report makes a recommendation in respect of this issue, given the Commission's provisional finding in paragraph 3.11 that "*alcohol was not considered a factor in this event*". MNZ's concern is that despite this explanation, the reputations of those who were involved in this accident might, quite unintentionally, be tarnished by its inclusion.

On 16 March 2011, the Manager Maritime and Freight of Ministry of Transport replied to the final recommendation:

The recommendation is that the Secretary for Transport promote legislation to set limits and establish a testing regime to address the risk of recreational and commercial boating accidents due to the use of alcohol or other performance-impairing substances.

Recreational and commercial boating is one of three areas of transport activity where no alcohol and drug limits or testing regime yet exists. The introduction of such a regime in any of these areas would be a major policy decision for government that would need to be informed by a thorough understanding of the problem and the policy options. The Ministry therefore intends to develop a report to government on the feasibility of a compulsory post-accident and incident drug and alcohol testing regime for the aviation, maritime and rail transport sectors.

Accordingly, implementation of recommendation 005/11 would only be practicable once the relevant policy work had been undertaken by the Ministry, and then only if the results indicated that a drug and alcohol testing regime is a feasible option.

Recommendation 5

- 6.7 Some commercial jet-boats on the Kawarau River have been travelling at unsafe speeds in contravention of Maritime Rules. A similar situation probably exists on the Kaituna River, and possibly on rivers in other areas as well.

It is recommended that the Director of Maritime New Zealand and the Chief Executive of Local Government New Zealand work with local authorities to address this safety issue. (006/11)

On 22 October 2010, the Director of Maritime NZ replied, in respect to the draft recommendation:

The requirement for all vessels to operate at a safe speed is universally applicable. Safe speed is defined in Maritime Rules Part 22 and modified by specific speeds and distances contained in Part 91 and local bylaws. The ability to restrict other craft from operating in an area can be used to mitigate risks. Rule 22.6 includes specific requirements for skippers to consider when deciding on what speed is safe. It is reasonable to expect authorities to include these requirements, where appropriate, when giving consideration to granting consents to operate vessels in restricted areas.

No reply was available from Local Government New Zealand at the time of print.

Recommendation 6

- 6.8 Three of the 5 persons involved in this accident received serious head injuries and 2 of these died as an indirect result.

There are a number of other activities where the benefit of wearing a helmet has been recognised: cycling, snow skiing, motorcycling, white-water kayaking and white-water rafting to name a few. Given the protection they can provide, it would seem that wearing them on a personal watercraft would be wise and there may be a case for it to be mandatory.

Whether wearing a helmet in a jet-boat or any other craft capable of high-speed is practicable will require some research.

It is recommended that the Director of Maritime New Zealand work with the National Pleasure Boat Safety Forum and the New Zealand Jet Sports Boating Association on an educational campaign for the voluntary wearing of safety helmets on personal watercraft engaged in high risk water activities, with a goal of mandating their use. (007/11)

On 16 March 2011, the Director of Maritime NZ replied to the final recommendation:

MNZ is planning to discuss the use of helmets for personal water craft users at the next National Pleasure Boat Forum which is scheduled for May 2011. In the meantime, the use of helmets in high speed boating activities continues to be promoted in a range of educational material.

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