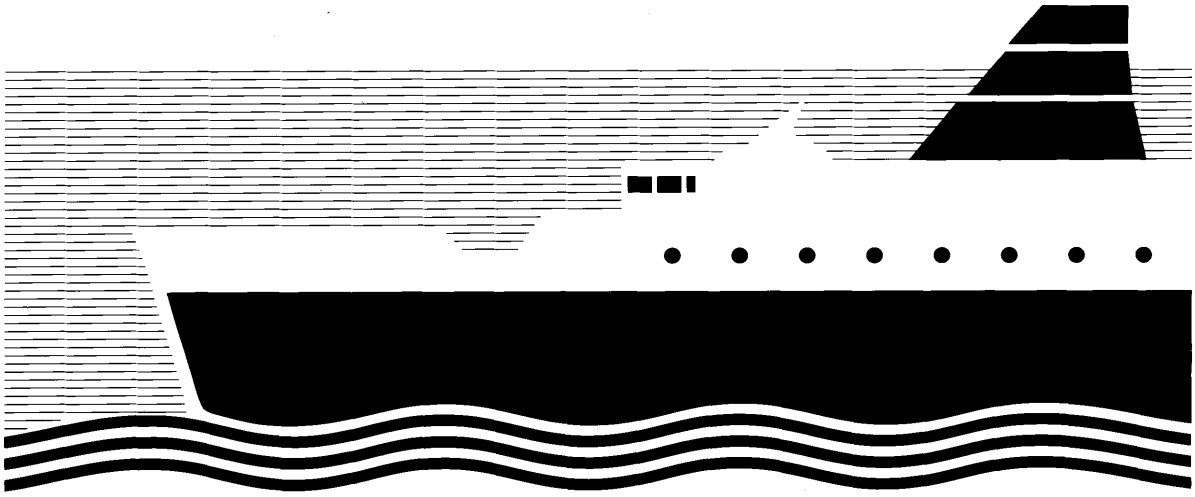
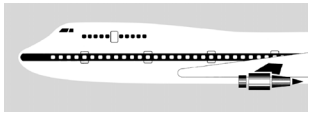
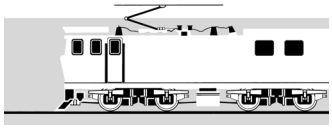


MARINE OCCURRENCE REPORT

03-202	**restricted limits passenger vessel *Triptych* and pleasure motor launch *Barossa*, collision, Rangitoto Channel, Auckland**	**18 February 2003**


TRANSPORT ACCIDENT INVESTIGATION COMMISSION
NEW ZEALAND

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.

The Commission may make recommendations to improve transport safety. The cost of implementing any recommendation must always be balanced against its benefits. Such analysis is a matter for the regulator and the industry.

Report 03-202

restricted limits passenger vessel *Triptych*

and

pleasure motor launch *Barossa*

collision

Rangitoto Channel Auckland

18 February 2003

Abstract

On Tuesday 18 February 2003, at about 1530, as the spectator fleet proceeded back towards Auckland Harbour after race 3 of the America's Cup regatta, the pleasure launch *Barossa* and the passenger trimaran *Triptych* collided in the vicinity of the entrance to the Rangitoto Channel. There were 10 people on board the *Barossa,* and 7 crew and 64 passengers on board the *Triptych*. During the collision 3 of those on the launch fell or jumped into the sea but they were rescued by other craft. No serious injuries were sustained and both vessels, although moderately damaged, were able to reach their berths under their own power.

Safety issues identified included:

- severe sea conditions generated by the wash from a very large fleet of vessels
- operating a vessel under sail while manoeuvring within a large fleet of vessels
- speed of vessels in close proximity of each other
- interaction between vessels operating in close proximity of each other
- visibility from the steering position of the *Triptych*.

Safety recommendations have been made to the Director of Maritime Safety, the Chief Executive Officer at the Auckland Regional Council and the owner of Triptych Cruises to address these issues.

(photograph courtesy of M. Snowden)

Barossa* fast across the bow of the *Triptych

Contents

Figures

Abbreviations

ARC	Auckland Regional Council
hp	horsepower
kW	kilowatt
m	metre/s
mm	millimetre/s
nm	nautical mile
UTC	co-ordinated universal time
VHF	very high frequency

Glossary

trimaran	vessel with 3 hulls

Data Summary

Vessel Particulars:

name:	*Triptych*	*Barossa*
type:	restricted limits passenger vessel	pleasure motor launch
construction:	trimaran	mono hull
motive power:	motor and sail	motor
length:	19.8 m	11.0 m
breadth:	14.8 m	
maximum passenger allowance:	78	N/A
Owner/operator:	Triptych Cruises	private

Date and time:	18 February 2003 at 1530[1]		
Location:	Rangitoto Channel Auckland		
Persons on board:	crew: passengers:	7 64	10
Injuries:	crew: passengers:	none none	none
Damage:	split in forward end of port hull		hole in hull at mid length starboard side above the waterline. Water damage to electrics and soft furnishings
Investigator-in-charge:	Captain D Monks		

[1] All times in this report are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode.

1 Factual Information

1.1 Narrative

1.1.1 On Tuesday 18 February 2003, the third race in the America's Cup regatta took place between the yachts *Team New Zealand* and *Alinghi*. Large numbers of spectator vessels, both commercial and private, sailed out to the racecourse (see Figure 1).

1.1.2 After the finish of the race, at about 1515, the competing yachts were towed back towards Auckland, via the Rangitoto Channel. The majority of the spectator fleet followed or kept pace with the yachts but some faster vessels went ahead of the fleet into the harbour.

1.1.3 As the fleet approached the Rangitoto Channel, the available width of water diminished so vessels started to converge and the separation between them decreased.

1.1.4 The historic schooner *Te Aroha* was heading southwards on the eastern side of the channel with the trimaran *Triptych* approximately 50 m on its starboard side. The trimaran, reportedly under sail alone, was slowly overtaking the *Te Aroha*. The private launch *Barossa* was overhauling both of these vessels and its skipper decided to pass between them.

1.1.5 When the *Barossa* was abeam the bows of the *Te Aroha*, the confused but predominately following sea caused the launch to roll heavily to starboard, swinging its bow to port. The launch came upright and the skipper corrected the deviation of course, turning to starboard, towards the *Triptych*. The nature of the sea also caused the launch's speed to fluctuate as the waves passed under it. The *Barossa* and the *Triptych* were now on converging courses with the launch slowly overhauling the trimaran. But when the launch was ahead of the trimaran it was caught on the back of a wave, lost speed and closed with the trimaran. The *Barossa's* starboard quarter initially made contact with the bow of the *Triptych*'s port hull. This contact was reported to be gentle, but was of sufficient force to turn the launch to starboard in front of the trimaran. Before the collision, as the launch was passing the trimaran, the skipper of the *Triptych* had called out to the *Barossa* warning them that they were approaching too close and to keep clear.

1.1.6 As the launch turned across the bow of the trimaran, the *Triptych's* anchor, which was stowed on the forward part of the centre hull, pierced the *Barossa*'s starboard side, below the deck. The trimaran's momentum exerted a rolling force on the launch, which heeled about 80° to port. The skipper of the *Triptych* put his engines astern, which eventually overcame the effect of the sail and brought the trimaran to a stop, before it moved astern. As the trimaran moved astern its anchor, which was still impaled in the side of the *Barossa*, pulled the launch upright before breaking free and allowing the 2 vessels to separate.

1.1.7 When the launch was heeled over to port, 3 people who were on the flying bridge of the launch jumped or were thrown into the water. While the 2 vessels were joined together, 4 others from the launch were able to climb onto the trimaran. The people in the water were picked up by 2 other small boats, and eventually transferred to the police launch *Deodar II*. Three people, including the skipper, remained with the *Barossa*.

1.1.8 Once the 2 vessels were separated, the remaining 3 crew on the *Barossa* checked its seaworthiness. They noted that the only significant damage was a large hole in the starboard side of the hull, amidships, above the waterline, where the trimaran's anchor had pierced it. The launch was not taking water, so the skipper decided to head back to its marina. On the journey back, the other 2 persons continued monitoring the damage and pumping the bilges.

1.1.9 Immediately after the collision, the skipper of *Triptych* issued lifejackets to the passengers and instructed his crew to check for damage. They found that the bow of the port hull was severely cracked above the waterline and forward of the collision bulkhead. The crew continued to monitor the main section of the port hull but no water entered that space. The trimaran's

skipper then also headed towards the marina to disembark his passengers. When close to North Head, the skipper noticed another boat being swamped. He turned to assist, but realised that other smaller boats were assisting the boat in difficulty, so continued on into the harbour. The mainsail was lowered outside the marina before the trimaran was berthed.

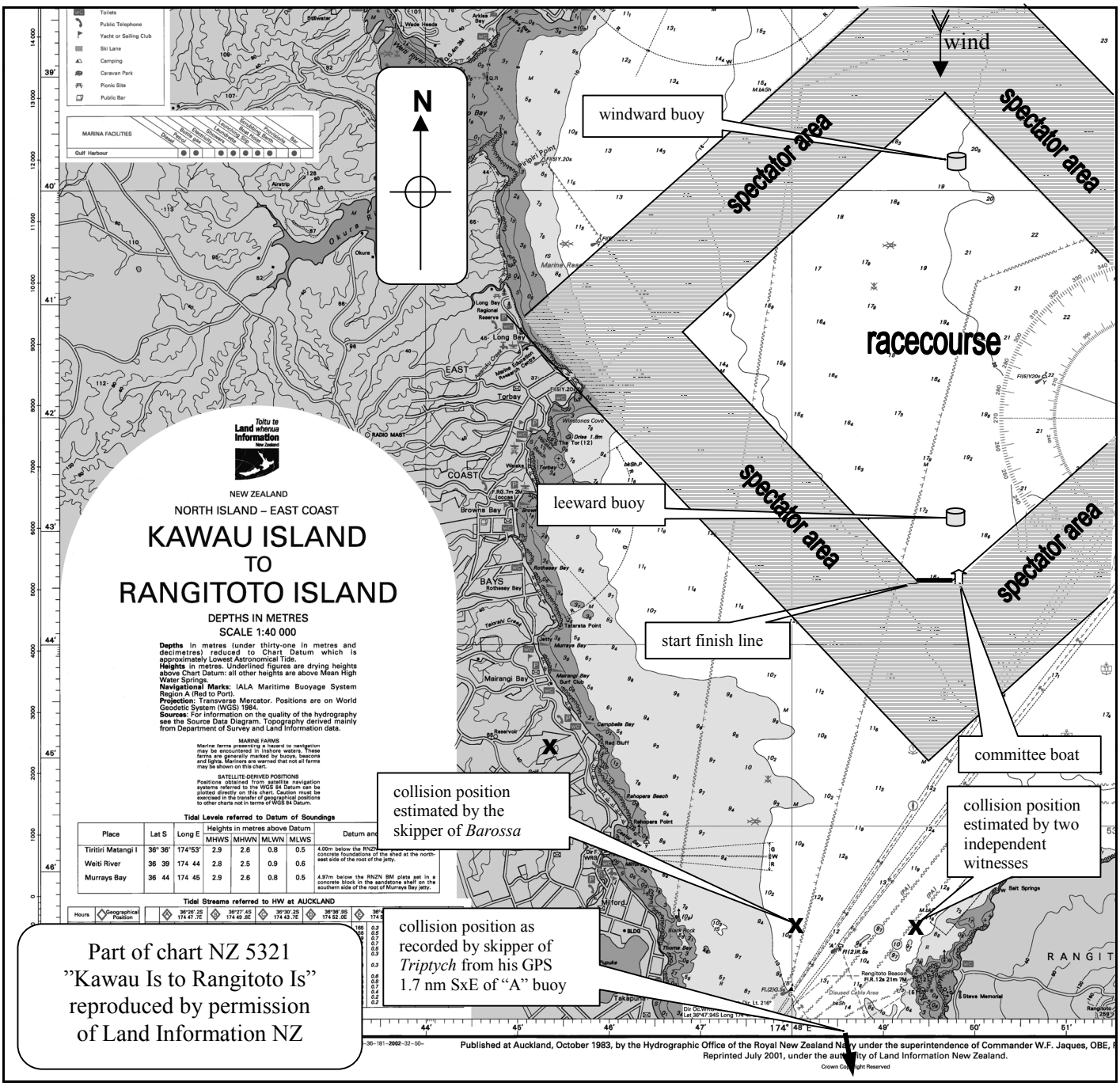


Figure 1
Chart showing position of the racecourse and estimations of collision position

1.2 Vessel and crew details

1.2.1 The *Triptych* was a restricted limits passenger vessel. It was a trimaran, 19.8 m in length with a beam of 14.8 m and a gross tonnage of 72. It was powered by sail and two 45 hp (33.6 kW) Perkins diesel engines mounted in the central hull. The *Triptych's* Safe Ship Management Certificate was issued by Nortel (1998) Ltd. and was valid subject to periodic inspections until 12 April 2006. The vessel was certified to carry 78 passengers.

1.2.2 The skipper, who was also the owner of the *Triptych,* held a commercial launchmaster's certificate. In addition, on the day of the collision, there was a sailing master/deckhand and 5 other crew members to serve the passengers and assist in operating the boat.

Figure 2
View forward from the steering position of the *Triptych*

Figure 3
***Triptych* steering position and view to port**

1.2.3 The steering position of the *Triptych* was about 14 m from the bow and on the port side of the centre hull. The skipper was steering from here at the time of the collision. A chair was fixed on a raised platform immediately behind the wheel (see Figure 3) sufficiently close to prevent a helmsman from standing between the wheel and the chair. From the steering position, forward vision was through 2 windows each about 1000 mm wide by 250 mm high. These windows looked out onto the cabin roof (see Figures 2 and 3). There was a sliding side window immediately to the port side of the steering position. Above the chair there was a small hatchway through which the skipper could put his head to improve his all round visibility. One of the passengers reported that at times during the day the skipper had used this hatchway. The skipper said that to improve his visibility he was standing on the chair at the time of the collision steering with his hands or feet as appropriate. The instrument panel and engine controls were immediately in front of the steering wheel (refer Figure 3).

1.2.4 The skipper of *Triptych* stated that at the time of the collision the trimaran was being propelled by the mainsail alone, but that the engines were running with the drive train de-clutched so that he could quickly engage the propellers in case of an emergency. He estimated the trimaran's speed to be between 6 and 7 knots. Other witnesses, both on the trimaran and on boats close by, were of the opinion that the engines were engaged and were assisting the propulsion of the trimaran.

1.2.5 The trimaran's 2 engines were each controlled by a single lever, which adjusted both speed and direction via Morse© cables connected to the throttle and gearbox. The control levers were on the port side of the instrument panel.

1.2.6 The *Barossa* was a semi-displacement (semi-planing) private motor launch, 11 m in length, and powered by a Cummins diesel engine, which gave it a maximum speed of about 18 knots.

1.2.7 The skipper of the launch had a commercial launchmaster's certificate and had spent many years as skipper of the pilot launch in Wellington. At the time of the accident there was no legislative requirement for the skipper of a recreational vessel to hold any qualifications. A number of the launch crew also had maritime experience, primarily on recreational vessels.

Figure 4
***Barossa's* steering position**

1.2.8 The skipper of the *Barossa* was conning the launch from the flying bridge. The steering position was towards the forward end of the flying bridge with a seat immediately behind the steering wheel (see Figure 4). There were clear plastic screens around the forward parts of the flying bridge. The removable zipped section immediately in front of the steering position, shown closed in Figure 4, was open at the time of the collision. At the after end of the flying bridge, the radar scanner and aerials were mounted on an arch, which was the only obstruction to all around visibility.

1.2.9 Two levers controlled the launch engine; one operated the gearbox to select ahead or astern and the other adjusted the speed.

1.3 Administration of the America's Cup

1.3.1 The America's Cup regatta was an international yachting event that was attended by thousands of spectators in various commercial and private vessels. The regatta spanned several months, starting with the Louis Vuitton Cup to decide which boat would challenge for the America's Cup.

1.3.2 On the 27 June 2002, the acting Minister of Transport declared, in the New Zealand Gazette, that the Louis Vuitton Cup and the America's Cup races were "Special Maritime Events" pursuant to section 200B of the Maritime Transport Act. The notice stipulated the areas affected, the period of effectiveness, the general conditions and requirements to manage the event, and who was responsible for management and enforcement.

1.3.3 The Ministry of Transport and the Auckland Regional Council (ARC) issued a temporary Notice to Mariners to advise seafarers of the major maritime event and to inform them of the restrictions that may be imposed. This notice was promulgated in Edition 18 of the New Zealand Notices to Mariners on 6 September 2002.

1.3.4 Prior to the commencement of the Louis Vuitton Cup on 1 October 2002, the ARC published a booklet "The America's Cup Boaties Guide" to inform spectators about the competition and to provide them with relevant safety information.

1.3.5 The venue of the regatta was the Hauraki Gulf, which was under the control of the ARC, its harbourmaster and enforcement officers. During race days, very high frequency (VHF) radio channel 18, was used by the harbourmaster and police to inform the spectator fleet of any special instructions, including course information and speed restrictions. This VHF channel also provided race commentary, which was overridden by the harbourmaster and police to broadcast safety messages.

1.3.6 The harbourmaster monitored the number of spectator craft by aerial observation and photography. The harbourmaster estimated that about 600 spectator craft were on the water on the day of the accident.

1.3.7 Patrol craft from ARC, police, navy and the coastguard were used to control the spectator fleet. In addition, the race organising committee had patrol craft but these were primarily used to provide security and control of the racecourse, and to prevent spectator boats encroaching onto the course.

1.3.8 On the day of the accident there were 18 patrol craft on the water; 11 police, 2 navy, 2 coastguard and 3 ARC. In addition, St John's Ambulance had 2 medical response craft in attendance. After the race, the 2 competition yachts each had 4 police boats and one ARC boat assigned to them for security. The remaining 8 patrol craft were assigned to monitor the spectator fleet.

1.3.9 The racecourse was diamond shaped and was aligned to the wind direction. The windward and leeward markers were 3 nm apart and positioned close to the apexes of opposite corners of the diamond. Spectator craft were required to remain outside the perimeter of the course and a speed restriction of 5 knots was in place up to a mile off. (see Figure 5).

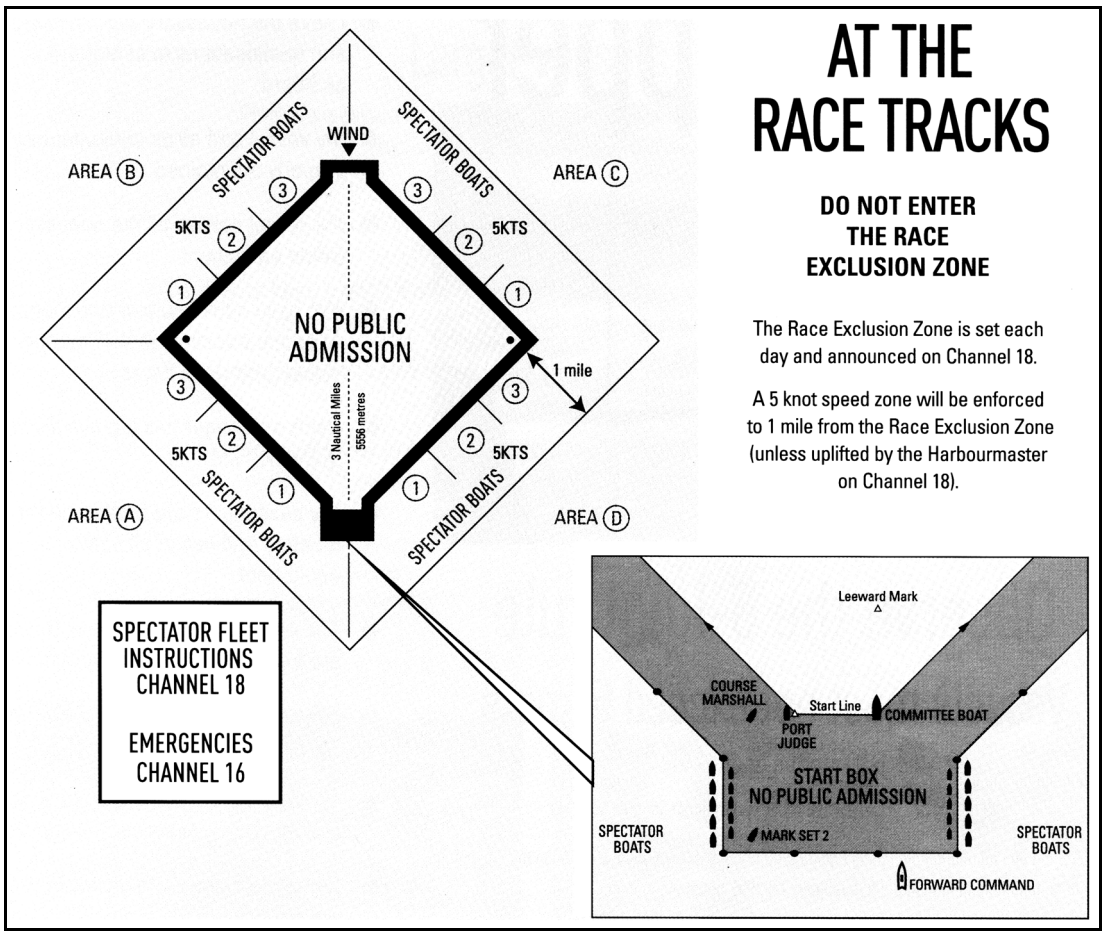


Figure 5
Excerpt from the America's Cup boaties guide, showing areas where spectator craft were allowed to operate and the speed restrictions in place

1.3.10 On completion of the race, the competition yachts were towed back to the harbour by their support craft. The harbourmaster reminded spectator craft, on VHF channel 18, of the 10 knot speed restriction south of "A" buoy.

1.3.11 On the day of the accident, the course chosen for the race had the start and finish line about 3.5 nm north by east of "A" buoy. The northerly wind dictated that the course was aligned north to south (see Figure 1). Consequently, there was only about 2 nm between the limits of the spectator boat area and the Rangitoto Channel.

1.3.12 Approaching the Rangitoto Channel, the spectator fleet was compressed by the reducing available width of the channel and so the distance between each vessel was decreased.

1.3.13 In the previous America's Cup regatta of 2000, the harbourmaster identified that there might be a problem with boats under sail only, especially in the vicinity of North Head. For that regatta he put in place a "no sailing" restriction. After monitoring the behaviour of the spectator fleet it was decided that the restriction was unnecessary and had not been put in place for this regatta.

1.4 Wake and its causes

1.4.1 The speed and efficiency of a vessel was dictated by its hull form. There were 3 main types of hull design; displacement, semi-displacement (semi-planing) and planing. Displacement hulls, as the name suggests, displaced their own weight in water and never achieved sufficient speed or hydrodynamic lift to plane. Planing hulls were designed so that when sufficient speed was achieved, hydrodynamic lift caused the boat to rise in the water, leaving only a small amount of the hull in the water, thus friction was reduced and a high speed achieved. Planing boats had a high power to weight ratio and remain on the plane as long as they could maintain sufficient

power. Semi-displacement hulls attempted to combine the advantages of displacement and planing boats. The hull shape produced a certain amount of hydrodynamic lift as speed increased but the boat did not usually achieve full plane. Planing and semi-displacement hulls were designed to operate at their service speed because when operating at lower speeds, they suffer from a lack of directional stability[2].

1.4.2 In general, when operating in displacement mode all hull forms caused little wake, but as speed increased so does the wake. When more power was applied to planing and semi-displacement boats to increase speed and provide hydrodynamic lift, more wake was created until they achieved the plane where less hull was in the water resulting in less wake being produced. The greatest wake occurred during the transitional phase between displacement and planing. The actual speeds for the beginning and end of the transitional phase depended on the particular hull form, but were usually between about 7 and 15 knots.

1.4.3 The 5-knot speed restriction in force around the racecourse ensured that no boats were in the transitional phase and consequently wake was kept to a minimum. However, after the end of the race, as boat speeds increased, semi-displacement and planing boats entered their transitional phase, resulting in an increase in their wake.

1.4.4 The prevailing 10 to 15 knot northerly wind produced a moderate sea on top of which was the confused sea generated by the various wakes of the spectator fleet, creating what has been described as the washing machine effect. The resulting seas were from every direction with fluctuating height and frequency together with aerated water.

1.4.5 The 3 persons that entered the water said that the aerated water reduced their buoyancy and made staying afloat difficult.

1.5 Speed restrictions

1.5.1 The Water Recreation Regulations 1979, and the Auckland Regional Council Navigation Safety Bylaws 2001, specified a maximum speed of 5 knots for small vessels when they were within 50 m of another vessel, raft or person in the water, and within 200 m of the shore or structure.

1.5.2 On 21 March 2003, Maritime Rules Part 91, Navigation Safety Rules, came into force. This part superseded the Water Recreation Regulations 1979 and carried over some provisions of the General Harbour (Nautical and Miscellaneous) Regulations 1968. Part 91 set basic navigation standards to complement and supplement local bylaws put into place by regional and district councils. Although Part 91 was not in force at the time, the Auckland Regional Council had incorporated its provisions when they drafted the Navigation Safety Bylaws in 2001.

1.5.3 Under the special powers given to the harbourmaster by section 200B of the Maritime Transport Act 1994, he had divided the Rangitoto Channel into areas where the speed and type of vessel was controlled (see Figure 6):

- the inner harbour and the area to the west of the starboard hand channel markers up to 36° 46.7'S, had a maximum speed of 10 knots
- the channel between the port and starboard channel markers was reserved for commercial shipping and vessels specifically authorised by the harbourmaster
- a 100 m wide channel to the east of the port hand channel markers was a designated express lane, where normal rules applied

[2] "Fast Boats and Rough Seas" by Dag Pike 1989

- the area to the east of the express lane was undesignated and standard speed rules applied.

The speed restrictions excluded those plying registered ferry operations.

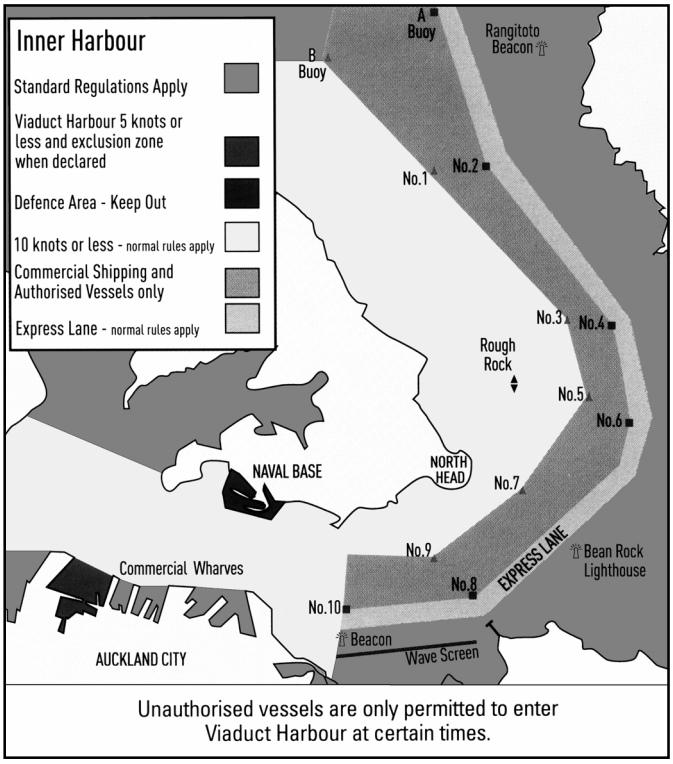


Figure 6
Excerpt from the America's Cup boaties guide, showing areas of speed restrictions

1.5.4 When the race finished, the harbourmaster enforced a 5-knot speed restriction for 10 minutes to enable the competition yachts to be taken under tow. After that, there was no speed restriction until the boats entered the Rangitoto Channel. However, the majority of the fleet reportedly limited their speed to less than 10 knots on their return to the harbour.

1.5.5 The confused and irregular sea made it difficult for smaller boats to maintain a steady course and speed. The *Te Aroha* and the *Triptych*, being larger and heavier vessels, were less affected than the smaller *Barossa* and were able to maintain a relatively steady course and speed.

1.5.6 The 10-knot speed limit was below that necessary for planing and semi-displacement boats to achieve the plane and consequently they would have been less directionally stable and more liable to roll heavily than if they were at their normal service speed. The *Barossa* was reported to have taken a heavy roll to starboard shortly before the collision. A launch, of similar design to the *Barossa*, can be seen rolling heavily beyond the coupled vessels in Figure 7.

(photograph courtesy of M. Snowden)

Figure 7
Photograph taken immediately before the vessels separated after the collision

1.6 Maritime Rules Part 22 – Collision Prevention

1.6.1 The *Barossa* was overtaking the *Triptych* and the *Te Aroha*; therefore, Part 22.13 applied. It stated the following:

> 22.13 Overtaking
>
> (1) Despite anything contained in subsections 1 and 2 of section 1 of this Part, **any vessel overtaking any other must keep out of the way of the vessel being overtaken**. [emphasis added]
>
> (2) A vessel will be considered to be overtaking when coming up to another vessel from a direction of more than 22.5 degrees abaft its beam, that is, in such a position where at night the stern light, but neither of the sidelights of the vessel being overtaken, would be visible.
>
> (3) When a vessel is in any doubt as to whether it is overtaking another, it must assume that it is and act accordingly.
>
> (4) Any subsequent alteration of bearing between the two vessels—
>
> (a) does not make the overtaking vessel a crossing vessel within the meaning of this Part; and
>
> (b) does not relieve the overtaking vessel of its duty to keep clear of the overtaken vessel until it is finally past and clear.

This rule required that an overtaking vessel must keep out of the way until it was past and clear, irrespective of how that vessel was powered. So, the *Barossa* was obliged to keep clear of the *Te Aroha* and *Triptych* until it was finally past and clear.

1.6.2 Part 22.5 referred to keeping a proper lookout; and stated:

> 22.5 Look-Out

> Every vessel must at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and the risk of collision.

1.6.3 Part 22.6 referred to safe speed, and stated in part:

> 22.6 Safe Speed
> 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 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:
> (d) at night, the presence of background light such as from shore lights or from the backscatter of the vessel's own lights:
> (e) the state of wind, sea, and current, and the proximity of navigational hazards:
> (f) the draught in relation to the available depth of water.

1.7 Position of the collision

1.7.1 There was confusion about the position of the collision (see Figure 8). The majority of the boats in the fleet were unaware of their precise position because they were generally following the competition yachts back into the harbour and were focussed on their own position relative to other vessels around them rather than using navigation aids for navigation.

1.7.2 After the collision, the skipper of the *Triptych* took a position from his GPS, 36° 48.35'S 174° 49.05'E, which put the collision inside the channel and about 1.7 nm south-by-east of "A" buoy. The skipper of *Barossa* assessed his position to be 0.4 nm north of and midway between "A" and "B" buoy. Other witnesses, including the police unit that attended the accident, noted the position of the collision as north of the Rangitoto Beacon, just outside the Rangitoto Channel. Contemporaneous photographs appeared to confirm that the collision occurred to the north of "A" buoy.

1.7.3 Other than maintaining the 5-knot restriction around the racecourse for 10 minutes after the race, the harbourmaster had not imposed any special speed restrictions north of "A" buoy. So the fleet was able to proceed at any speed provided that the 5-knot rule for vessels within 50 m of each other and the safe speed required by Maritime Rules part 22.6 were observed. South of "A" buoy the 10-knot restriction was in place to the west of the main shipping channel. On their return from the racecourse, the majority of the spectator fleet reportedly observed the 10-knot restriction but in general ignored the 5-knot rule.

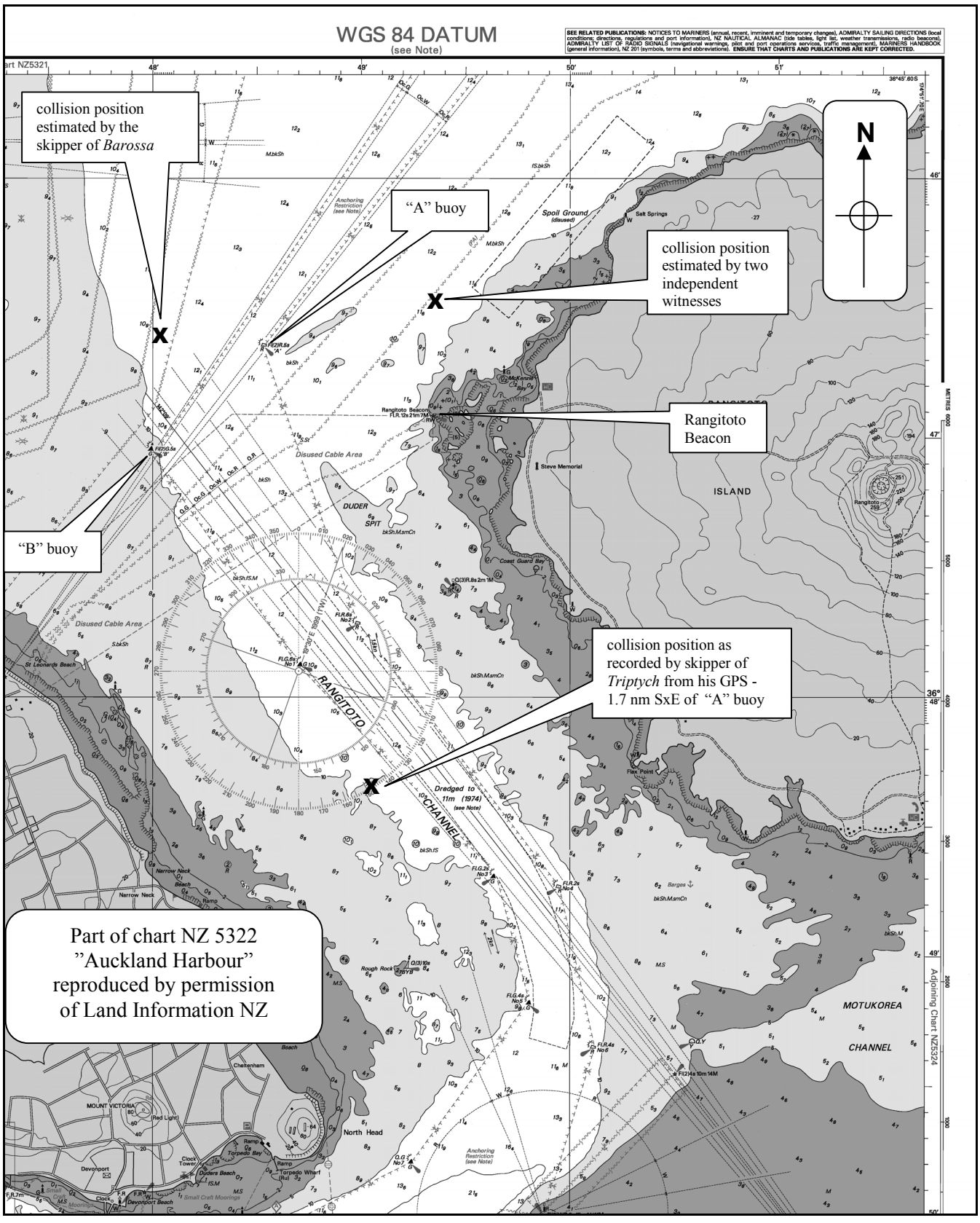


Figure 8
Chart of Rangitoto Channel showing disparity of the estimated positions of the collision

1.8 Weather

1.8.1 When the race finished, the wind was recorded at the committee boat as 005°(T) at 12.5 knots. The visibility was good.

1.9 Interaction

1.9.1 Bernoulli's theorem stated that the pressure of a fluid at a point is dependant on its speed past that point. When a vessel moves through the water, an increase in water pressure occurs at the bow and, to a lesser degree, at the stern. At the same time, there is a reduction in pressure amidships (see Figure 9). When 2 or more vessels are operating in close proximity, interaction between the varying water pressures about their hulls can cause rapid and unexpected loss of control and direction of one or more vessels.

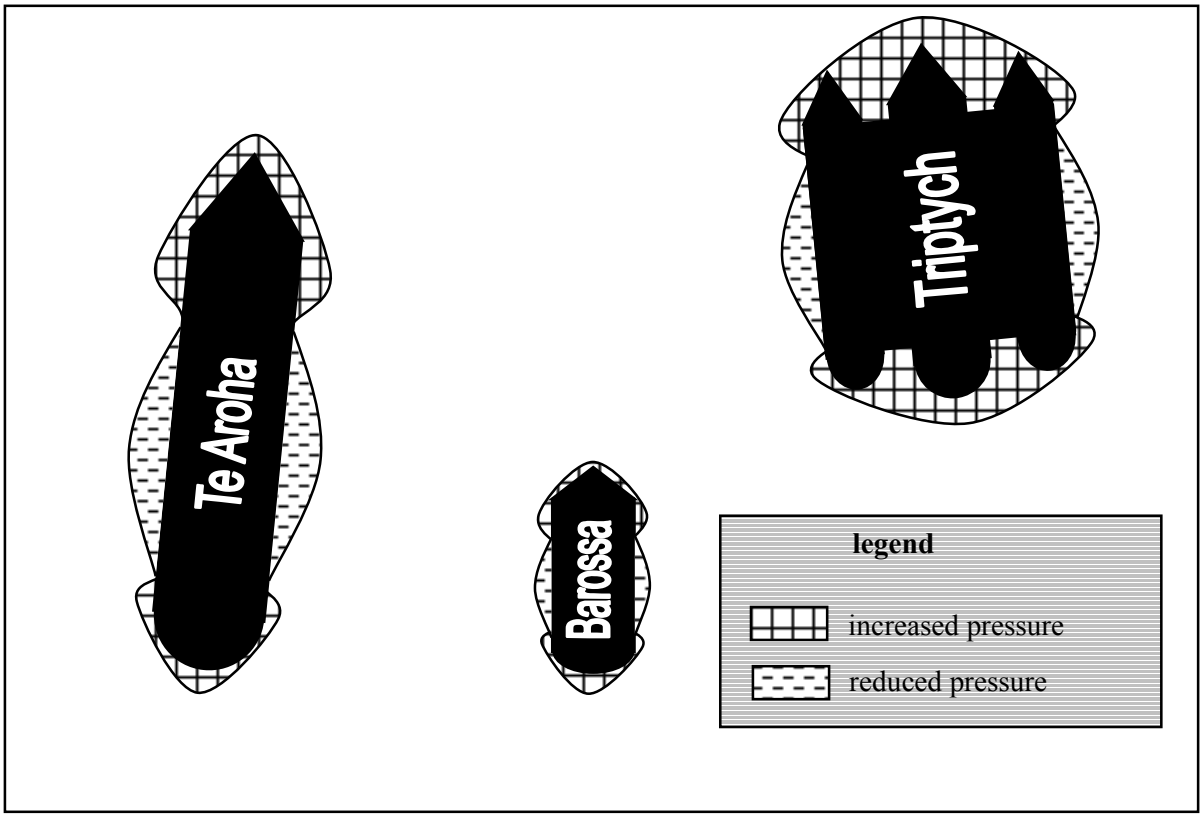


Figure 9
Illustration of hydrodynamic pressure waves created by vessels moving through the water

1.9.2 A small vessel is usually at greater risk of being affected than a large vessel. The extent of the interaction depends upon the speeds of the vessels, the distance between them and the depth of water. On this occasion, the *Barossa* was travelling at just below 10 knots and was passing through a narrow gap between the 2 larger vessels and so was liable to be affected.

2 Analysis

2.1 The decision by the skipper of the *Barossa* to pass between the *Te Aroha* and the *Triptych* was imprudent in the prevailing sea conditions. Once he had decided on this course of action, he was required to keep clear of the other vessels until finally past and clear.

2.2 The *Te Aroha* and the *Triptych* were on converging courses when the *Barossa* started to overtake, so by the time the launch was between the other 2 vessels, the distance between them was significantly reduced.

2.3 There was probably interaction between the 3 vessels. When the *Barossa* passed the *Te Aroha* the pressure variations between the 2 vessels would have affected the smaller launch, probably resulting in the *Barossa* initially being drawn towards the larger vessel before being pushed away and towards the *Triptych*. At that point, interaction between the *Barossa* and the *Triptych* would have drawn the launch towards the trimaran.

2.4 When operating in the transitional phase, the wake caused by planing and semi-displacement vessels would have been more than if they were operating in displacement mode. The myriad of wakes from the spectator fleet resulted in a confused and irregular sea, which was likened to a washing machine.

2.5 The prevailing northerly wind created a sea that was following the returning fleet. The prevailing sea combined with the wake from the spectator fleet, made it difficult for smaller vessels to maintain a steady course and speed. This would have been particularly noticeable on planing and semi-displacement boats like the *Barossa*, which were operating in the transitional phase and consequently less directionally stable than they would have been at normal service speeds. Larger vessels such as the *Te Aroha* and the *Triptych* would have been less affected by the sea conditions and more able to maintain a steady course and speed.

2.6 The 2 nm distance between the limit of the spectator area and the Rangitoto Channel did not allow the spectator fleet to become staggered, so a large percentage of the estimated 600 spectator craft entered the channel at about the same time. In this situation it was likely that virtually every vessel had another within 50 m of it, so the whole fleet should have been travelling at less than 5 knots.

2.7 The description of the initial collision between the *Barossa* and the *Triptych* was that the 2 vessels moved towards each other. This was probably caused by a combination of interaction and each vessel being on the opposing sides of a wave trough. The initial contact between the vessels was slight but because it was close to the stern of the launch, a long way from its pivot point, a large turning moment resulted. This caused the launch to be slewed around in front of the trimaran, where its hull was pierced by the anchor stowed on the front of the trimaran's centre hull.

2.8 When the anchor pierced the hull of the *Barossa*, it became caught under the launch's deck. The forward momentum of the trimaran caused the launch to roll heavily to port. The trimaran did not over run the launch because the anchor remained fast and stopped the launch capsizing. If this had not happened, the launch would have been rolled over completely and probably run over by the trimaran, which might have led to the launch sinking. When the launch was cast across the front of the trimaran, it acted as a brake and reduced the forward momentum of the vessels, assisting the trimaran to stop. When the trimaran stopped and reversed under the astern engine power, the anchor, which was caught under the deck of the launch, pulled the launch upright before the vessels separated.

2.9 When the 2 vessels collided, the trimaran had its mainsail set and secured by a preventer, and so the wind continued to exert a force on the trimaran. The skipper of the *Triptych* did not, or could not, lower the mainsail and so the trimaran maintained its wind powered forward momentum until the engines were able to provide sufficient astern power to overcome the force generated by the sail. Under power alone little force would have been exerted by the wind on the trimaran and so it would have been able to stop and reverse more quickly.

2.10 The skipper of the *Triptych* stated that at the time of the accident the trimaran was being propelled by sail alone, however he had the engines running, but in neutral, in case of an emergency. The skipper had used the engines intermittently throughout the afternoon. At the time of the collision, a number of witnesses could hear the noise of the diesel engines, see rippled water about the stern and thought the trimaran was going faster than possible under the mainsail alone and so concluded that the trimaran was under power as well as sail. Whether the engines were engaged or not at the time of the collision could not be established.

2.11 Although in a previous regatta the harbourmaster had recognised a potential problem of vessels operating under sail alone in congested waters and had imposed a "no sail" area around North Head, there was no such restriction in place during the 2003 America's Cup regatta.

2.12 With respect to the cause and outcome of the collision, the confusion over the position was largely irrelevant. It might have been pertinent had the vessels involved been travelling at excessive speed but the evidence suggests that they were all travelling below 10 knots.

2.13 The people who entered the water from the flying bridge of the launch were fortunate that they were not drawn into the trimaran's propellers or run over by other following vessels. They were also lucky that there were a number of smaller boats able to respond immediately and rescue them without delay, particularly because of the reduced buoyancy in the aerated sea.

2.14 The steering position of the Triptych did not allow the helmsman to stand behind the wheel, he either had to sit on the chair or stand on it or stand to one side of it. When standing on the chair it would have been difficult to reach the wheel with one's hands so necessitating steering with the feet.

2.15 Although each skipper was aware of the presence of the other vessel as evidenced by the skipper of the *Triptych* calling out to the other vessel, their actions or lack of them, indicated that they were not aware, until it could not be avoided, that a collision was imminent. The all round visibility from the steering position of the launch was good and its skipper should have been able to see the developing situation. The visibility from the steering position of the trimaran was not good, and was made worse by the passengers sitting and standing around the decks so, the skipper may not have noticed the launch closing on his port side. However, the skipper of the *Triptych* was standing on the chair behind the steering position, with his head through the hatchway and so his visibility should have been sufficient for him to see the situation developing. The launch was lower in the water than the trimaran which might have further reduced the launch's visibility from the trimaran.

2.16 Standing on the chair would have increased the time it took the skipper of *Triptych* to react to the collision. To adjust the engine controls, the skipper had to drop down onto the chair before being able to reach the control levers situated on the port side of the instrument panel.

2.17 Each vessel was able to safely make it back to its berth. The hole in the hull of the launch caused by the *Triptych's* anchor was large but it was above the waterline. The launch suffered water damage to its electronics from the seawater that washed on board when it was heeled over by the trimaran, but this did not interfere with any critical systems. The only damage to the trimaran was a badly cracked area on the forepart of the port hull, above the waterline and forward of the watertight collision bulkhead. There were no injuries to any of the persons on either vessel.

2.18 The skipper of the *Barossa* had extensive recreational experience in Cook Strait and was a qualified launch master who had operated in severe weather conditions while transferring pilots to and from ships at the entrance to Wellington Harbour. His time on the pilot vessel should have made him aware of the effects of interaction, but he probably would not have previously experienced the washing machine effect. None of his experience prepared him for the unusual conditions experienced on the return to Auckland. Crew from the launch compared the sea conditions to those experienced in the Terawhiti rip, a tidal rip near Wellington.

2.19 The ARC and its harbourmaster had anticipated the problems that could be expected from the large numbers of spectator craft during the Louis Vuitton Cup and the America's Cup regattas. They had requested that the regattas be declared "Special Maritime Events" pursuant to section 200B of the Maritime Transport Act, and had made special rules to control the behaviour of the spectator fleet. Patrol craft were used to monitor and enforce the restrictions.

3 Findings

Findings and safety recommendations are listed in order of development and not in order of priority.

3.1 The *Barossa* and *Triptych* collided as they approached Rangitoto Channel in the company of a large spectator fleet returning to Auckland after race 3 of the America's Cup.

3.2 The decision by the skipper of the *Barossa* to pass through the limited space between two larger vessels was unwise because the sea conditions and the effects of interaction meant he was unable to keep clear as required under Maritime Rules.

3.3 With both vessels going in the same direction, the contact between the stern of the *Barossa* and the bow of the *Triptych* was the worst possible, because the maximum turning moment was induced in the launch, causing it to turn into the path of the *Triptych*.

3.4 The *Triptych's* anchor pierced the launch below its deck and prevented the *Barossa* from being capsized. It also assisted righting the launch.

3.5 Operating under sail in the congested waters delayed the *Triptych's* skipper's ability to stop his vessel immediately after the collision. In addition, the skipper's reaction time was increased because he was standing on the chair behind the steering position and could not immediately reach the engine controls.

3.6 Neither skipper was keeping an adequate lookout.

3.7 It is probable that the collision occurred outside a designated speed restriction area. However, the distance between most vessels in the fleet was less than 50 m and so all vessels should have complied with the 5-knot rule; this they failed to do. In addition, the concentration of vessels might have dictated that a safe speed, as prescribed under Maritime Rules Part 22.6, would have been less than that of the majority of the fleet.

3.8 The confusion over the exact position of the collision was understandable owing to the close proximity of a large number of vessels, where the vessels' position relative to those around them was of more importance than a geographical location.

3.9 The damage to each vessel was not sufficient to seriously affect its seaworthiness and they were both able to return to their berths under their own power.

3.10 The sea conditions were such that it was difficult for smaller vessels to maintain a steady course or speed, particularly those that were operating in the transitional phase, well below their service speed, and so were less directionally stable.

3.11 The confused and irregular sea condition was due in part to the wakes from the large spectator fleet. Planing and semi-displacement boats operating in the transitional phase exacerbated this.

3.12 The short distance from the racecourse to the Rangitoto Channel was insufficient to allow the fleet to spread out so there was not enough sea room for each vessel.

3.13 The *Triptych* and its crew were properly certificated for a restricted limit passenger operation.

3.14 The skipper of the *Barossa* was qualified; even though legislation at the time did not require him to be. A number of the other crewmembers on *Barossa* were experienced on recreational and commercial vessels.

4 Safety Recommendations

4.1 On 31 July 2003 the Commission recommended to the Director of Maritime Safety that he:

4.1.1 develop a marine notice for recreational and commercial boating users, to advise and warn them of the effects of wake produced by large concentrations of spectator craft in close proximity (032/03).

4.2 On 31 July 2003 the Commission recommended to the Chief Executive of the Auckland Regional Council that he:

4.2.1 introduce restrictions on boats operating without motorised propulsion during future special maritime events where concentrations of spectator craft are expected (026/03).

4.2.2 include in future publications for special maritime events advice on the effects of wake produced by large concentrations of craft. Such advice should include the information contained in relevant marine notices (027/03).

4.2.3 develop a procedure to ensure that the 5-knot rule is promoted and enforced, particularly during future special maritime events (028/03).

4.3 On 25 June 2003 the Chief Executive of the Auckland Regional Council replied in part:

> We will be implementing safety recommendations 026/03, 027/03 and 028/03 and these will be included in the planning for and, the operation of future events which are designated as major maritime events under the legislation contained in Maritime Transport Amendment (No. 2) 1998. Such arrangements will be communicated to the public as part of the overall public education programme which we provide for major events. Most of the recommendations are event-driven and we cannot be specific about the date of implementation until event dates have been established.
>
> I would add that the promotion and enforcement of the 5-knot rule remains central to Auckland Regional Council's education and enforcement in the Auckland Region.

4.4 On 31 July 2003 the Commission recommended to the owner of Triptych Cruises that he:

4.4.1 in conjunction with the safe ship management company, investigate the forward visibility from the steering position of the *Triptych,* with special reference to passengers on the foredeck and put in place operating procedures to ensure that the skipper's visibility is not obstructed while the vessel is underway. Such measures should be included in the safe ship manual (029/03).

4.5 On 13 August 2003 the owner of Triptych Cruises replied in part:

> We will implement an inclusion in the safe ship manual to specifically include instructions to the skipper to ensure that the briefing expressly covers this request every time and that the skipper is to ensure that at all times that any passengers on the foredeck remain in a seated position whilst the vessel is underway. We will consult with the Safe Ship Management Company to ensure the wording receives their approval, and that they are in agreement with the proposals in that regard. We will notify the Commission as soon as the manual has been updated with that change.

Approved for publication 30 July 2003

Hon W P Jeffries
Chief Commissioner

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