Report 09-204 : Coastguard rescue vessel *Dive! Tutukaka Rescue* collision with rocks, Taiharuru River entrance Northland, 4 March 2009; and
Report 09-207:Coastguard rescue vessel *Trusts Rescue*, heavy weather encounter, Manukau Bar, 31 May 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.

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.

Final Report

Marine inquiries 09-204 and 09-207

Coastguard rescue vessel *Dive! Tutukaka Rescue* collision with rocks, Taiharuru River entrance Northland
4 March 2009

Coastguard rescue vessel *Trusts Rescue*
heavy weather encounter, Manukau Bar
31 May 2009

Approved for publication: May 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.

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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.

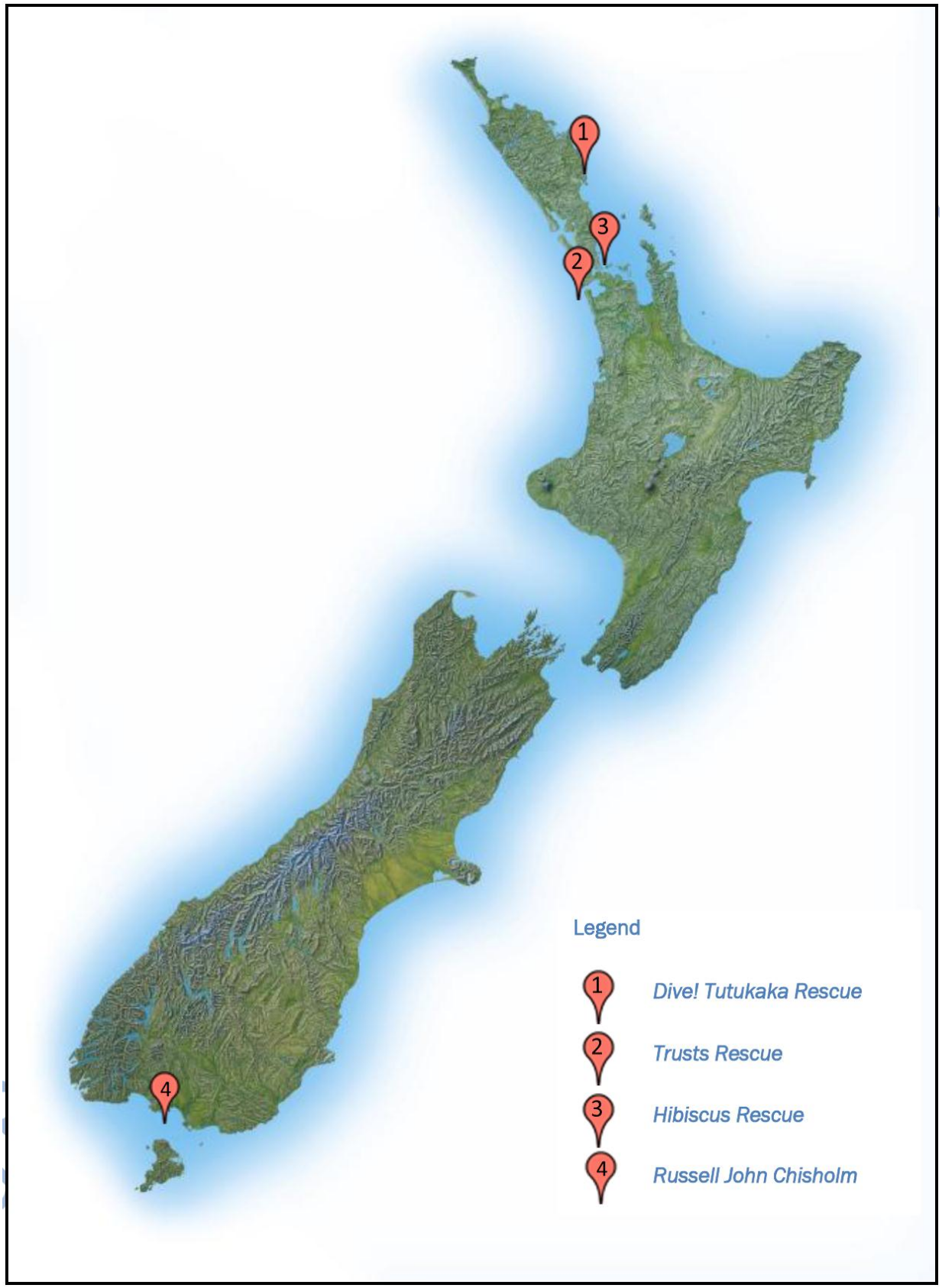
Ownership of report

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.



Source: mapsof.net

Locations of accidents

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Abbreviations

°	degree(s)
‘	minute(s)
CNR	Coastguard Northern region
Coastguard NZ	Royal New Zealand Coastguard Inc.
Coastguard Hibiscus	Coastguard Hibiscus Incorporated
Coastguard Riverton	Riverton Coastguard Incorporated
CRM	crew resource management
CRV	coastguard rescue vessel
EPIRB	emergency position indicating radio beacon
GPS	global positioning system
Hp	horsepower
kt	knot(s)
kW	kilowatt(s)
m	metre(s)
Coastguard Manukau	Manukau Coastguard
MetService	New Zealand Meteorological Service
MOC	Maritime Operations Centre
nm	nautical miles
NZDT	New Zealand daylight time
NZSAR	New Zealand Search and Rescue
NZST	New Zealand standard time
RCCNZ	Rescue Coordination Centre New Zealand
SAR	search and rescue
SAROP	search and recue operation
SSM	safe ship management
°T	degrees true
Tutukaka Coastguard	Tutukaka Coastguard Incorporated
UHF	ultra-high frequency
UTC	universal coordinated time
VHF	very-high frequency

Data summary

Vessel Particulars:

	09-204	09-207
Name:	*Dive! Tutukaka Rescue*	*Trusts Rescue*
Type:	rigid inflatable, rapid response vessel	rigid inflatable
Class:	non passenger	non-passenger
Limits:	inshore – Northland and Barrier	enclosed waters – Manukau, Raglan, Kaipara restricted inshore limits
Length:	9.50 metres (m)	12.5m
Breadth:	3.00 m	3.6 m
Weight:	3.88 tonnes	6.6 tonnes
Built:	AMF Boat Company Limited, Tauranga	Rayglass Boats, Auckland New Zealand
Propulsion:	2 x Yamaha 250 Hp [187.50 kW] 6-cylinder, 4-stroke outboard engines	2 x Suzuki 300 Hp [223.71 kW] 4-stroke outboard engines
Service speed:	maximum speed – 45 knots (kt) cruising speed – 26 to 30 kt	33 kt 24 kt
Owner/operator:	Tutukaka Coastguard Incorporated (Tutukaka Coastguard)	Manukau Volunteer Coastguard Incorporated (Manukau Coastguard)
Maximum persons on board:	11	12
Date and time:	4 March 2009, at about 0546[1]	31 May 2009 at about 2015[2]
Location:	Taiharuru River entrance	Manukau Bar
Persons on board:	crew: 5	7
Injuries:	crew: 2 seriously injured 3 moderately injured	one broken ankle, 6 other minor injuries
Damage:	bow stove-in inflatable pontoon punctured	pedestal of navigator's chair broken

[1] Times in this report (09-204) are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode.
[2] Times in this report (09-207) are New Zealand Standard Time (UTC + 12 hours) and are expressed in the 24-hour mode.

Figure 1
The *Dive! Tutukaka Rescue*

Photo: Tutukaka Coastguard Incorporated

1. Executive summary

On 4 March 2009, the Tutukaka Coastguard vessel *Dive! Tutukaka Rescue* was tasked to assist a recreational vessel in difficulty in Ngunguru Bay south of Tutukaka. It was night-time and the sea condition was rough. The crew of the Coastguard vessel became so focused on locating the vessel in difficulty that they lost awareness of where their own vessel was and struck a rock at a moderate speed. The *Dive! Tutukaka Rescue* was extensively damaged and several crew members were seriously injured in the collision.

On 31 May 2009, the Manukau Coastguard vessel *Trusts Rescue* was on a combined promotional and training exercise over the Manukau Bar at the entrance to Manukau Harbour. It was night-time and the sea conditions were moderate. The vessel was travelling at moderate speed when it encountered a series of large and steep waves that could not be seen in the dark in time to reduce speed. The vessel fell off the top of one wave into the following trough with enough force to break the casting securing the navigator's seat to the floor, and the skipper broke his ankle.

On 31 August 2009, the Riverton Coastguard Incorporated (Coastguard Riverton) vessel *Russell John Chisholm* was on a night training exercise south of Riverton. It was night-time and the sea conditions were moderate. The vessel was travelling at moderate speed when it encountered 2 large waves that caused the vessel to fall heavily into a trough, resulting in moderate injuries to 3 crew members.

On 6 March 2010, the Coastguard Hibiscus Incorporated (Coastguard Hibiscus) vessel *Hibiscus Rescue One* had been tasked to assist a vessel in distress on the eastern side of Tiri Tiri Matangi Island in the Hauraki Gulf. It was night-time and the sea conditions were slight to moderate. The vessel had just left the shelter of the Gulf Harbour Marina when the crew lost awareness of where their vessel was in relation to the shoreline and the vessel ran aground on submerged rocks at high speed. There were minor injuries only, but the vessel sustained damage to its 2 outboard engines and minor damage to the hull.

The Transport Accident Investigation Commission (Commission) made the following observations:

- each occurred at night
- 3 occurred when the skipper was at the helm rather than a dedicated helmsperson
- 3 occurred during inclement weather
- in each case there had been inadequate planning before the vessels departed the base
- in each case there was inadequate crew resource management (CRM)
- 3 involved below-standard navigation for dedicated emergency response vessels.

These observations led the Commission to look at the Coastguard NZ systems and the wider search and rescue (SAR) system in which Coastguard NZ operated.

The report discusses the inherent risk of SAR work and how the sense of urgency associated with such work can adversely affect decision-making processes from initial tasking to the completion of the task. The decisions for tasking such vessels should not be made by one person only, and should preferably involve someone unaffected by the sense of urgency. Planning is a fundamental requirement for the success of such operations. The Commission has made safety recommendations to improve the process for tasking SAR vessels and improve the planning before a task begins.

Night navigation for small craft in rough seas presents unique challenges for coastguard crews. The Commission has made recommendations to lift the standard of training for Coastguard NZ crews, particularly around night navigation, the use of electronic navigation equipment and enhancing training in CRM.

The Commission has also made a recommendation on the suitability of the Coastguard NZ vessels for the task, particularly in relation to the types and distribution of the vessels and how they best fit in with the much larger pool of SAR resources available to the organisations co-ordinating SAR operations (SAROPS).

Finally, the Commission makes a recommendation on ensuring that the qualifications of Coastguard NZ crews are compatible with the non SAR work occasionally undertaken and that the operating areas to which the craft have been assigned are compatible with the SAR areas they have to cover.

2. Conduct of the inquiries

09-204, *Dive! Tutukaka Rescue*

2.1. At about 1000 on 4 March 2009, the Commission was notified by Maritime New Zealand of an accident that had happened early that morning. The Commission opened an inquiry and on the same day 2 investigators travelled to Tutukaka to commence the investigation. On arrival they carried out a preliminary inspection of the damaged vessel. Also in attendance was an investigator from Maritime New Zealand, and the chairman and secretary of Tutukaka Coastguard.

2.2. On 5 March 2009, the Commission's investigators interviewed the non-hospitalised members of the crew of the *Dive! Tutukaka Rescue* and the chairman and secretary of Tutukaka Coastguard

2.3. On 6 March 2009, further investigation of the integrated navigation system was carried out by the manufacturer's accredited technician in the presence of a Commission investigator. Because the crew were relying on the global positioning system (GPS) for navigation at the time of the collision, the navigator's display panel was retained by the Commission so that further tests could be carried out.

2.4. On 13 March 2009, an investigator travelled to Auckland to carry out interviews at Coastguard Northern Region (CNR) headquarters and to collect data from the "Track-Plus" system.

2.5. On 25 March 2009, an investigator travelled to Auckland with the navigator's display panel to witness tests carried out on the display by the manufacturer's accredited agent.

2.6. On 7 April 2009, an investigator returned to Tutukaka to carry out interviews with the remainder of the crew who had been discharged from hospital.

2.7. On 22 April 2009, an investigator travelled to Tauranga to witness the refitting of the navigator's display panel into the vessel and subsequent testing.

2.8. The narrative detailing the events leading up to the accident is based on the interviews given by the crew of the coastguard rescue vessel (CRV), radio messages supplied by the Maritime Operations Centre (MOC) [3] in Wellington, radio and track data supplied by CNR in Auckland and downloads of data from the integrated navigation system on board the CRV. There were no other witnesses to the collision.

09-207 *Trusts Rescue*

2.9. On 4 June 2009, the Commission was notified by Maritime New Zealand of an accident that had happened 4 days earlier on 31 May 2009. The accident involved a CRV crossing the Manukau Bar at the entrance to Manukau Harbour on the west coast of North Island.

2.10. On 9 June 2009, after conducting preliminary inquiries to determine the circumstances of the accident, the Commission believed that similar safety issues to those already identified in the *Dive! Tutukaka Rescue* accident could exist, so it opened a separate inquiry.

2.11. On 10 June 2010, an investigator travelled to Auckland to commence the investigation. On 10 and 11 June the investigator interviewed all members of the crew of the *Trusts Rescue,* the one non-crew member who had been on board at the time of the accident, and the signalman based at South Head at the entrance to Manukau Harbour. The investigator also carried out a preliminary inspection of the damaged vessel.

2.12. The Commission also obtained an after-cast from the New Zealand Meteorological Service (MetService) detailing the weather and sea conditions at the time of the accident.

2.13. The narrative detailing the events leading up to the accident is based on the interviews given by the crew on board the CRV, the interview with the non-crew member on board the CRV, radio messages and track data supplied by CNR. Owing to the position and time of the accident there were no other witnesses to the accident.

[3] All coastal radio stations were operated out of the Marine Operations Centre in Wellington

Other incidents

2.14. On 31 August 2009 and 6 March 2010 two further accidents occurred involving CRVs. The Commission did not open inquiries into those 2 events, but the Coastguard NZ internal reports were received and information drawn from the reports in considering the analysis of this report.

General

2.15. Because of the common issues arising out of the 4 events the Commission elected to combine them all into this one report.

2.16. On 20 April 2011, the Commission approved the circulation of a draft final report to interested persons.

2.17. The draft final report was sent to 23 interested persons with a request that submissions be forwarded to the Commission no later than 13 May 2011. Submissions were received from Royal New Zealand Coastguard Incorporated (Coastguard NZ), the New Zealand Search and Rescue (NZSAR)Council, Tutukaka Coastguard, and the Ministry of Transport.

2.18. On 26 May 2011, the Commission approved the publication of the final report.

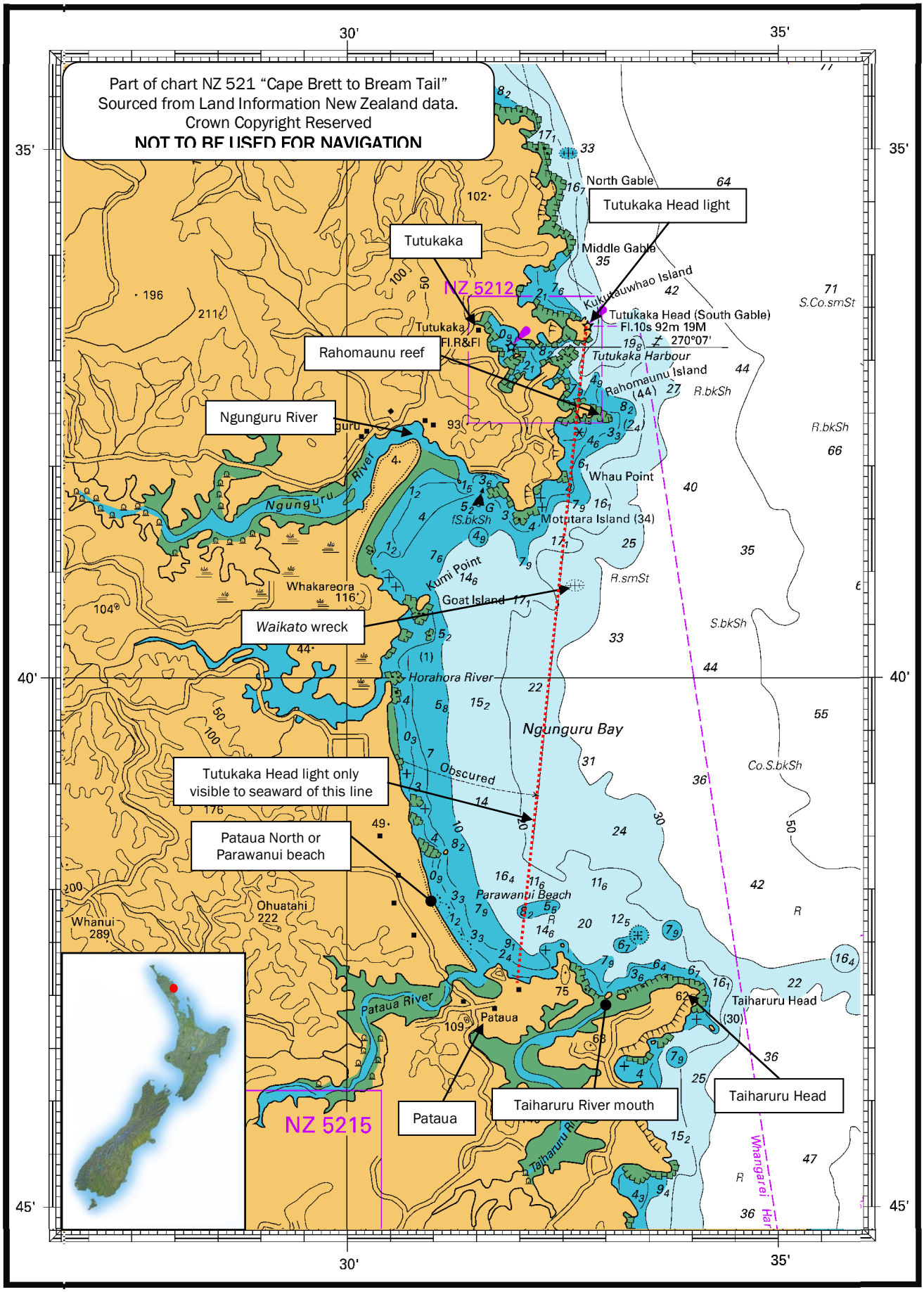


Figure 2
Chart of the general area

3. Factual information 09-204

3.1. Narrative

Initial rescue

3.1.1. At about 0343 on 4 March 2009 , the yacht *Indian Summer* broadcast a message on very high frequency (VHF) radio channel 16 that "we're anchored in the bay between Tutukaka Head and Taiharuru Head in some distress; quite big waves". Whangarei Maritime Radio responded, qualified the position and requested further details of the situation. The *Indian Summer* replied that "we're about 200 m off the beach, the vessel is light blue and equipped with a 406 megahertz emergency position indicating radio beacon (EPIRB), and the vessel did not have a GPS, a call sign or a liferaft". The crew on board were wearing lifejackets and were in "no immediate danger". Whangarei Maritime Radio advised that it would monitor the situation and call them back in 10 minutes.

3.1.2. At about 0403, Whangarei Maritime Radio called the *Indian Summer* and asked for an update on the situation. The *Indian Summer* replied that there were 2 males on board and they believed their position was south of the lighthouse at Tutukaka, but closer to Taiharuru Head. They advised that they could see street or house lights. It was quite windy with quite large waves. Whangarei Maritime Radio concluded that the *Indian Summer* was located off Parawanui Beach close to Te Whanga Head and advised the *Indian Summer* accordingly and that the MOC would call them every 15 minutes for a situation update. MOC then advised Rescue Coordination Centre New Zealand (RCCNZ) of the situation.

3.1.3. At about 0412, CNR telephoned MOC to say that it had been monitoring the conversation on VHF channel 16 and if required it had a Coastguard vessel at Tutukaka. MOC advised that the crew were not in immediate danger and just wanted it to know where they were, and that MOC was monitoring the situation.

3.1.4. At about 0425, CNR again telephoned MOC to advise that it would be willing to task its vessel at Tutukaka if required. MOC and CNR discussed their mutual concern about the *Indian Summer*'s situation with an onshore wind. CNR said that if the *Indian Summer* required it would task its vessel.

3.1.5. At about 0426, MOC called the *Indian Summer* for an update of the situation. The *Indian Summer* stated that the waves were getting bigger. MOC asked what motive power the *Indian Summer* had on board, to which it replied a 10.5 Hp engine and a "little bit" of petrol. The *Indian Summer* then requested Coastguard assistance. At about 0428 MOC telephoned CNR and informed it that *Indian Summer* had requested assistance. CNR said that it would task its vessel and gave an estimated time to arrival of about 45 minutes.

3.1.6. At about 0429, MOC called the *Indian Summer* and informed it that the Coastguard from Tutukaka would come to its assistance. MOC also informed the New Zealand Police (Police) Northern Communications Centre and updated RCCNZ.

3.1.7. At about 0430, CNR paged the members of Tutukaka Coastguard for "boat callout", which meant it was a non-urgent incident. If it had been an urgent case the page would have been "Urgent – boat callout" and all active personnel would have been required to attend the vessel.

3.1.8. Two of the duty crew, including the duty skipper, and 3 non-duty crew answered the call-out and on arrival at the vessel commenced readying it for departure. At about 0448, the duty skipper contacted CNR and requested the job details. CNR passed on the details of the *Indian Summer* as far as it knew, including the location that had been determined as Parawanui Beach, also known locally as Pataua North Beach. The majority of the crew overheard where the *Indian Summer* was located and the duty skipper gave a short briefing that it was a yacht called the *Indian Summer*, Pataua River Mouth, 2 persons on board, heading in a southerly direction.

3.1.9. At about 0452, the *Dive! Tutukaka Rescue* departed its berth in the Tutukaka Marina with the skipper and 4 crew on board. Senior crew member 1 was the helmsman and senior crew member 2 was the navigator. The skipper was standing between the helmsman and navigator. Senior crew member 3 and trainee crew member 1 were stood at the rear of the cockpit.

3.1.10. The navigator was conning the vessel out of the harbour using his multifunction display, which was showing the chart with GPS overlay. The 2 crew members at the rear of the cockpit were also indicating in which direction to go to remain on the leading lights behind the vessel. The helmsman found it difficult to maintain the required track from the instructions received and the multifunction display in front of him.

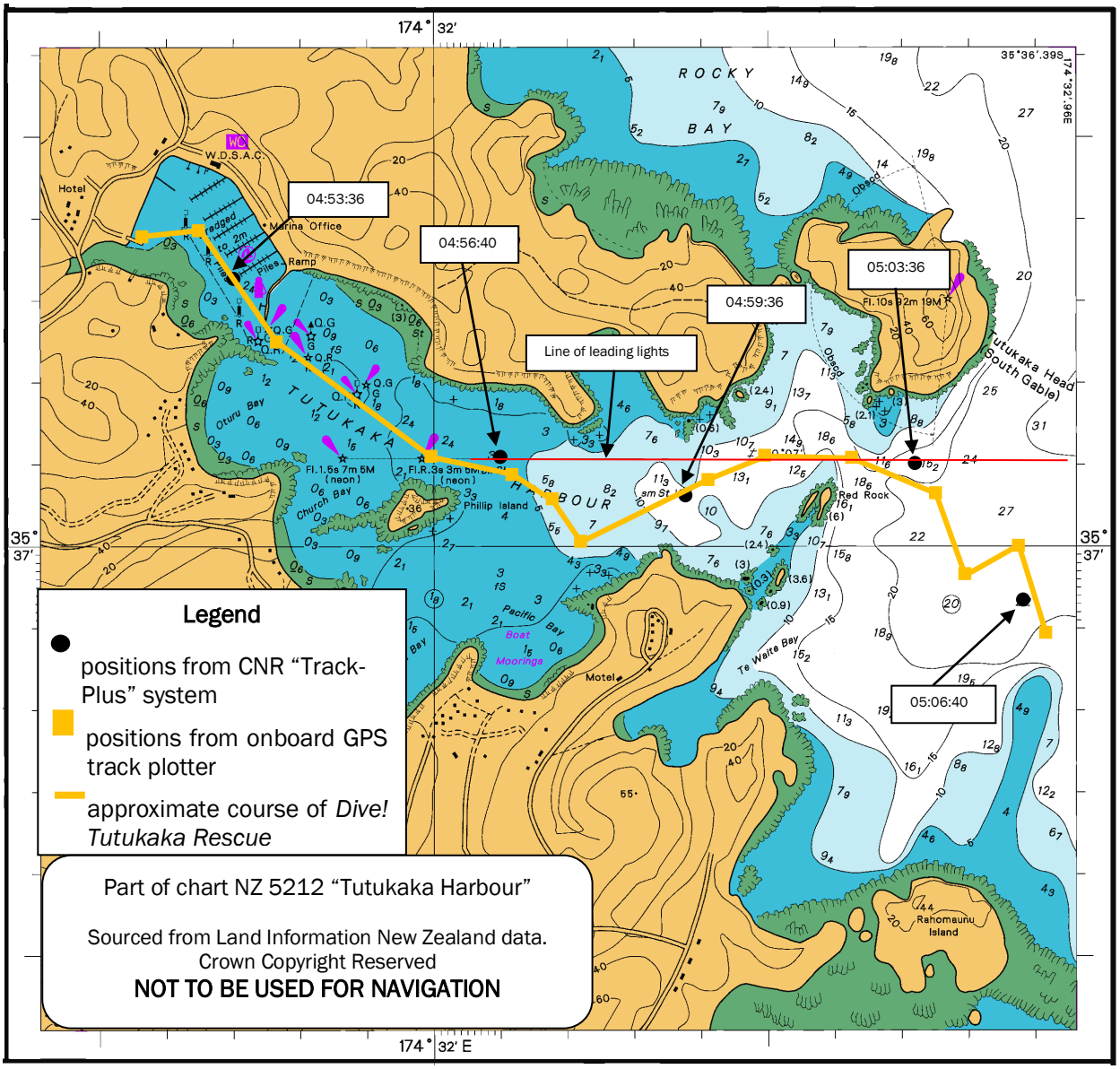


Figure 3
Approximate track of the *Dive! Tutukaka Rescue* leaving Tutukaka Harbour

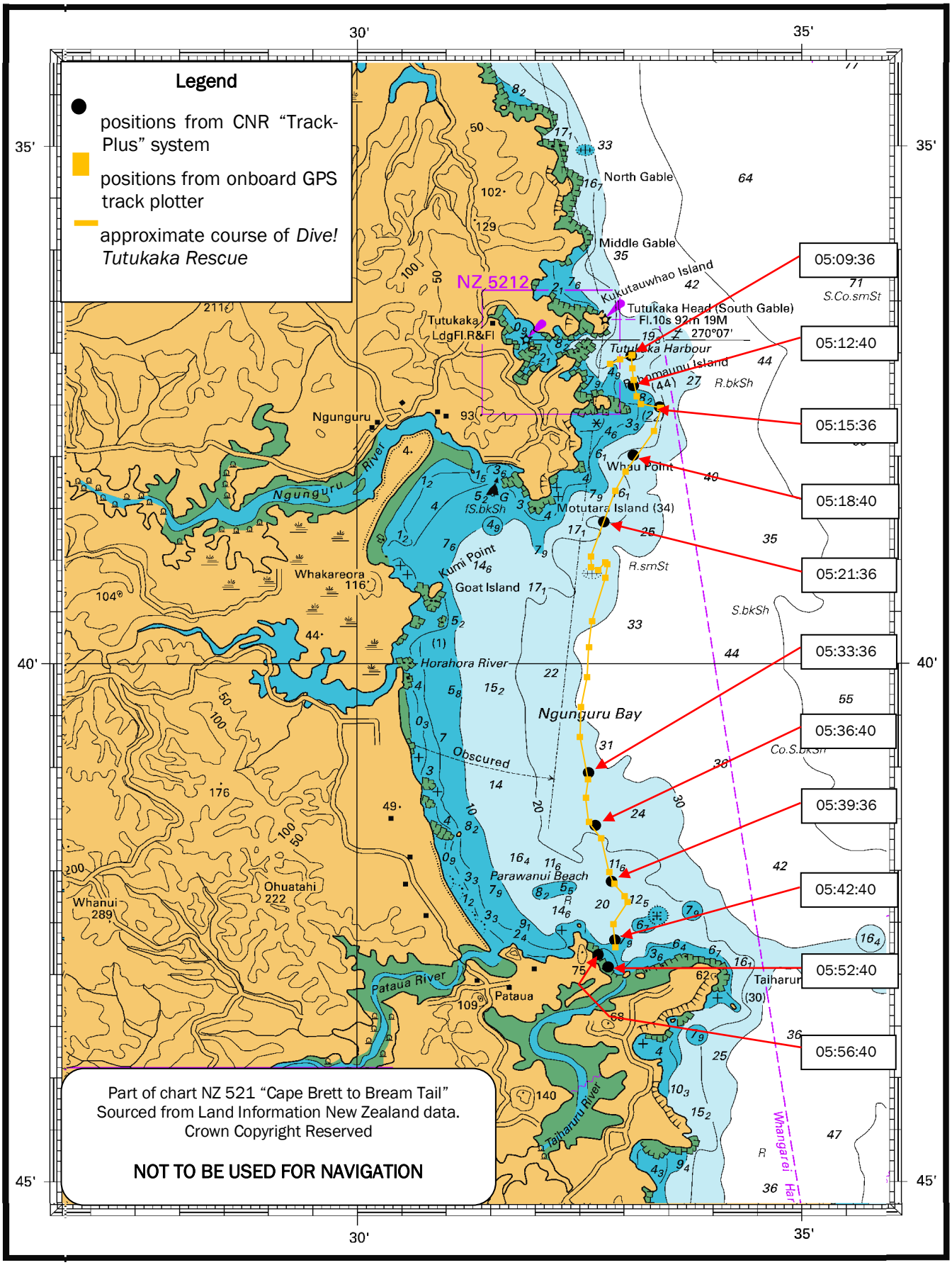


Figure 4
Approximate track of *Dive! Tutukaka Rescue* across Ngunguru Bay

3.1.11. As the *Dive! Tutukaka Rescue* approached the entrance to the harbour, the navigator switched on the vessel's radar and displayed the picture on his display alongside the chart display. The helmsman was then able to display the radar picture on his display which was a slave to the navigator's master display. The skipper then instructed the navigator to plot a course to the Rahomaunu Reef waypoint. This course was displayed as a line on the radar and on the chart display the helmsman was then able to follow.

3.1.12. After the vessel had cleared the harbour, senior crew member 2 declared that he was feeling unwell owing to the movement of the vessel. The skipper, who knew that this crew member suffered from sea-sickness when looking at instruments in bad weather, instructed senior crew member 1 to relinquish the helmsman's position and take up navigation while he took over the helmsman's position himself.

3.1.13. At about 0509, as the *Dive! Tutukaka Rescue* proceeded towards the Rahomaunu Reef waypoint, MOC heard the crew calling the *Indian Summer* on VHF 16 to establish whether the persons on board the *Indian Summer* could see the *Dive! Tutukaka Rescue*.

3.1.14. At about 0516, as the vessel approached the Rahomaunu Reef waypoint, the skipper requested the navigator to plot the course for the *Waikato* waypoint located over the top of the wreck of the *Waikato*. Once the course was displayed on the screens the skipper was able to steer the vessel along the displayed course line to the waypoint.

3.1.15. At about 0524, as the vessel approached the *Waikato* waypoint, the majority of the crew heard the waypoint proximity alarm sound and the skipper asked for a waypoint off Pataua. The navigator scrolled through the available waypoints on his master display but was initially unable to find a waypoint near Pataua. Senior crew member 3 from his position behind the navigator suggested that he just put the equipment's cursor over clear water about 200 m off the beach and plot a course to this position. The skipper suggested putting the cursor 100 m off the beach and plotting a course. However, the navigator found a waypoint labelled "Patuau [sic] Beach" in position 35 degrees (°) 42.365 minutes (') south 174° 33'.400 east and entered this position, giving a course line to follow.

3.1.16. While the vessel was in the vicinity of the *Waikato* waypoint the track, downloaded from the equipment after the accident, showed a series of alterations of course, at one point nearly reversing the track before heading in the direction of the Patuau [sic] Beach waypoint. After the accident, when asked about these alterations, none of the persons on board could remember their being made (see Figure 4).

3.1.17. At about 0537, as the vessel headed towards the next waypoint senior crew member 3, the trainee crew member and senior crew member 2 were looking for the *Indian Summer's* lights to starboard. The crew called the crew on the *Indian Summer,* who said they could see the Coastguard vessel's lights. A short time later the *Indian Summer* radioed that the *Dive! Tutukaka Rescue* was passing them and the yacht was to starboard of the rescue vessel.

3.1.18. As the *Dive! Tutukaka Rescue* proceeded across Ngunguru Bay, senior crew member 3 moved forward and stood between the navigator and the skipper on the helm. Noting that the helmsman's radar was full of clutter, he mentioned this to the skipper, who replied that he could do nothing about it.

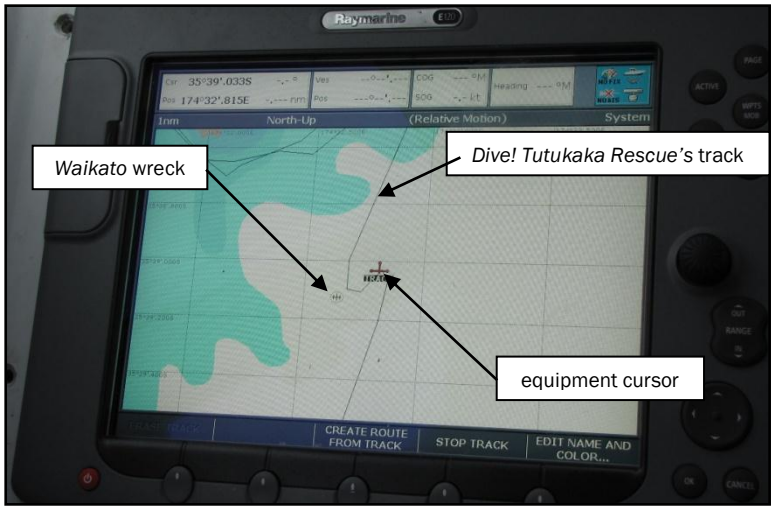


Figure 5
Screenshot of onboard display showing alterations of course at the *Waikato* wreck

3.1.19. At about 0542, the *Dive! Tutukaka Rescue* made a radio call to the *Indian Summer* "I think we can see you now", referring to having seen a light ahead of the *Dive! Tutukaka Rescue*. One of the crew members had just said to the skipper that he thought the light was a house on the shore, when seconds afterwards senior crew member 3 saw right ahead a rock illuminated in the beam of the vessel's spotlight. He managed to shout "Rock" before the vessel hit the rock bow on. The speed of the vessel at the time was estimated to be about 15 kt.

3.1.20. The crew were thrown violently around the cockpit, 2 sustaining serious injuries and the remaining 3 sustaining moderate to serious injuries. Senior crew member 3 was the first to recover, and seeing that the helm was unmanned he took up the helm position. Both motors had stopped, so he attempted to start them but was only successful with the starboard motor. He put the motor astern and got the vessel away from the rock with which they had collided. He then called out to the remainder of the crew, and getting a response from senior crew member 2 and the trainee crew member organised them to ascertain whether the vessel was taking on water. He then got the trainee crew member to transmit a mayday call.

Subsequent rescue

3.1.21. At about 0545, CNR received a mayday call from the *Dive! Tutukaka Rescue* on VHF channel 85. CNR organised a helicopter medical evacuation for the injured persons on board.

3.1.22. At about 0550, CNR sent an urgent vessel callout page message to Whangarei Volunteer Coastguard Incorporated (the next Coastguard NZ station south of Tutukaka and the next closest available rescue vessel to Pataua Beach). They also telephoned MOC in Wellington, which in turn advised RCCNZ.

3.1.23. At about 0552, the *Indian Summer* advised MOC that it had lost its anchor and it could not get its motor going.

3.1.24. At about 0555, Whangarei Maritime issued a "Mayday Relay" message for both the *Indian Summer* and the *Dive! Tutukaka Rescue*.

3.1.25. At about 0557, CNR sent an urgent page message to all off-duty crew and other members of Tutukaka Coastguard still ashore to attempt to find an alternative vessel to launch and go to the assistance of the *Dive! Tutukaka Rescue*.

3.1.26. At about 0558, the *Indian Summer* advised MOC that it had its sails up and was sailing towards a lighthouse. When questioned whether it was in immediate danger it initially replied yes, but when advised that the *Dive! Tutukaka Rescue* had run aground and a helicopter had been tasked to assist it said it wase not in immediate danger but had turned its EPIRB on.

3.1.27. The crew on board the *Dive! Tutukaka Rescue* who were still able to function managed to move the vessel away from the rock and treat the injured crew members. They checked the vessel for ingress of water, manoeuvred it into a suitable safe position and anchored it to await rescue.

3.1.28. At about 0620, the *Whangarei Rescue* cleared Marsden Cove and gave an estimated time to arrive at the accident scene of about 90 minutes owing to the heavy seas being encountered.

3.1.29. Meanwhile the rescue helicopter, *Helimed 1* arrived at the scene at 0633, and by about 0710 had airlifted all 5 crew off the vessel. At about 0722, MOC advised CNR that the *Indian Summer's* crew had set off the EPIRB again and it was abeam Tutukaka Lighthouse. Subsequently MOC issued a Mayday Relay for the *Indian Summer* at 0727. At about 0727 Tutukaka Coastguard advised that other Coastguard members were on board the *Lifeboat 5218*, a privately owned ex Royal National Lifeboat Institution "Arun" class 15.8 m all weather rescue vessel.

3.1.30. After *Helimed 1* had evacuated the crew from the *Dive! Tutukaka Rescue* it was requested to locate the *Indian Summer. Helimed 1* contacted the *Indian Summer* directly and was guided to the *Indian Summer* by the persons on board, by which time the *Lifeboat 5218* had left Tutukaka Harbour and was able to go to the *Indian Summer's* assistance. *Helimed 1* then left the scene and the *Lifeboat 5218* guided the *Indian Summer* into the safety of Ngunguru Harbour.

3.1.31. The *Dive! Tutukaka Rescue* was later towed back to Tutukaka by the *Lifeboat 5218*, assisted by the *Whangarei Rescue,* the Coastguard vessel from Whangarei.

3.2. Vessel information

3.2.1. The *Dive! Tutukaka Rescue* was owned by Tutukaka Coastguard and operated by it within the CNR framework.

3.2.2. The *Dive! Tutukaka Rescue* had an overall length of 9.50 m and a breadth of 3.00 m. It was constructed with an aluminium hull, and powered by 2 Yamaha 250 Hp [186.43 kW] outboard engines that gave a top speed of about 45 kt and a cruising speed of between 26 and 30 kt.

3.2.3. The *Dive! Tutukaka Rescue* was in safe ship management (SSM) with Maritime Management Services Limited. The vessel had been issued with a fitness for purpose certificate as a non-passenger ship for the Northland and Barrier inshore limits on 24 October 2008.

3.2.4. The *Dive! Tutukaka Rescue* was fitted with an integrated and networked electronics package consisting of 2 Raymarine E120 multifunction displays, GPS unit, echo sounder, radar, chart plotter, heading sensor and graphics display units. The vessel was also fitted with 2 VHF radios, and a magnetic compass.

3.2.5. The navigation package fitted to the *Dive! Tutukaka Rescue* allowed the navigator, in the left hand forward seat, to display the information they selected on their display. The equipment was set up with several different "pages" that were used to display different combinations of the navigation equipment that had been selected on. The helmsman could select their own configuration for their display, but only using the equipment that had been selected by the navigator.

3.2.6. The *Dive! Tutukaka Rescue* had been fitted, by Coastguard NZ with a Track-Plus system for monitoring the position of the vessel at any time. The self-contained unit transmitted the vessel's position along with a time stamp via the Inmarsat system which was then routed to the appropriate Coastguard NZ regional headquarters. These positions could be used to see the progress of a Coastguard NZ asset during a mission (see Figures 2 and 3). The positions downloaded from the CNR computer were the only timed positions available to the Commission after the accident.

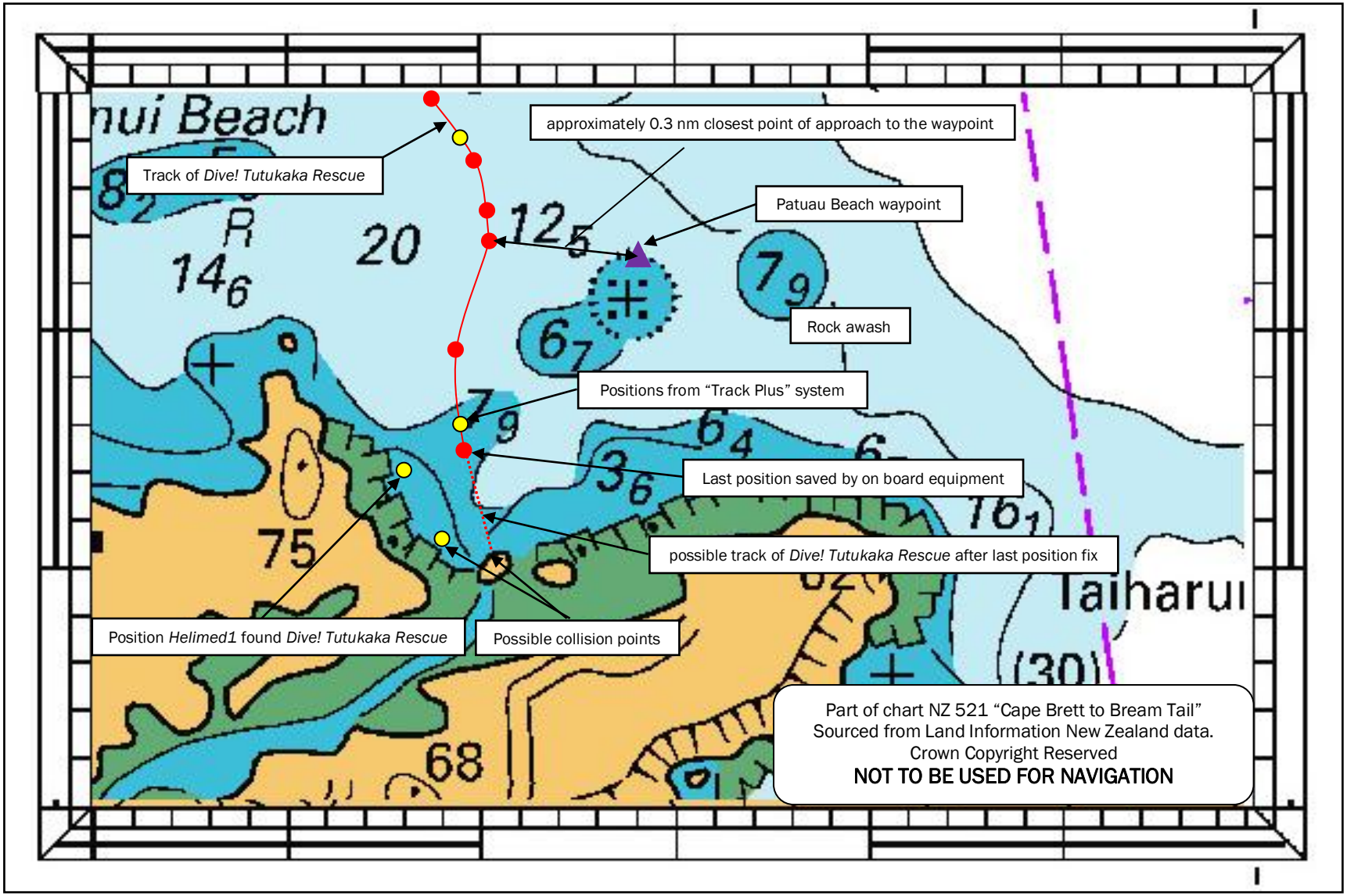


Figure 6
Taiharuru River mouth

3.3. Injuries and damage

3.3.1. The bow of the *Dive! Tutukaka Rescue* was extensively damaged by the impact with the rock. The aluminium hull was pushed back with the bow inflatable pontoon ruptured. There was a small hole above the water line that allowed the ingress of a small amount of water. Part of the rock that the vessel hit was left embedded in the remains of the inflatable pontoon (see Figure 7)

3.3.2. In the cockpit damage was sustained by equipment and fittings from the crew being violently thrown against them during the impact. Other slight damage was sustained as the crew freed the anchor and fittings.

3.3.3. The crew sustained injuries as follows:

- one suffered severe abdominal injuries, broken facial bones, the loss of an eye, the loss of 2 teeth, brain trauma and possible nerve damage to an arm
- one suffered broken facial bones, loss of all upper teeth, damage to the palate, broken nose, bone bruising, brain bruising and dislocated shoulder
- one suffered deep abdominal bruising, contusions to the head and body, lacerations and a knee sprain
- one suffered torn shoulder ligaments and a torn bicep muscle
- one suffered impact injuries and bone bruising.

Figure 7
Bow damage to the *Dive Tutukaka Rescue*

3.4. Post accident testing

3.4.1. The Commission arranged for the integrated electronics package to be tested initially "in situ" on the vessel by the manufacturer's support technician. When the equipment was turned on the GPS track information was displayed but the GPS satellite fix was blank, indicating that GPS data was not being received. The radar display and, the depth sounder display appeared to be operating normally, as was other electronic equipment. The GPS signal was fed into the navigator's master unit. When this cable was disconnected and fed into the helmsman's slave unit, GPS data was displayed on both, which indicated a fault had developed in the navigator's unit.

3.4.2. The Commission arranged for the navigator's display to be removed and in its presence tested at the manufacturer agent's workshop, but the fault could not be replicated. The display was disassembled to see if there was any damage; however, apart from one corner of the cast aluminium alloy housing, which was broken, there was no other signs of physical damage or electronic failure.

3.4.3. When the navigator's display was later reinstalled on the vessel, the fault reappeared, but then disappeared again when the unit was knocked. This would indicate that the unit had an intermittent fault that was difficult to detect. It could not be established when this fault had developed, before or after the accident, but what can be said is that the GPS was feeding data into the navigator's display unit before and up to immediately before the collision (see figures 4 and 6).

3.4.4. The navigator's display unit was examined for the operating parameters on the machine at the time. The waypoint approach alarm was set for 0.1 nm and the cross-track error alarm was set for 0.3 nm, the radar "declutter" was on and the track display sample rate was set to "auto". The "auto" track sample rate uses an algorithm based on speed and heading rate of change to vary the sample rate to optimise the storage memory in the equipment.

3.5. Personnel information

3.5.1. The skipper of The *Dive! Tutukaka Rescue* had joined the Coastguard about 4 years previously, and had completed the required Coastguard NZ training to become a certified CRV skipper on 22 December 2006. The skipper also held an inshore launch master's certificate of competency.

3.5.2. Senior crew member 1 had joined the Coastguard about 3 years previously, and had completed the required Coastguard NZ training to become a certified senior crew member on 8 August 2008.

3.5.3. Senior crew member 2 had joined the Coastguard about 3 years previously, and had completed the required Coastguard NZ training to become a certified senior crew member on 8 August 2008. He had also owned his own vessel for a number of years prior to joining the Coastguard.

3.5.4. Senior crew member 3 had joined the Coastguard about 7 years previously, and had completed the required Coastguard NZ training to become a certified CRV skipper on 28 June 2006. He had also owned his own vessel for a number of years and had extensive nautical experience in the military prior to joining the Coastguard.

3.5.5. The trainee crew member had joined the Coastguard about 2 years previously, and had completed 11 of the 14 required Coastguard NZ training modules. He also held a valid class 1 unlimited certificate of competency as a marine engineer. He had first gone to sea in 1970 and was still employed in the capacity of chief engineer of a foreign-going vessel.

3.6. Environmental conditions

3.6.1. The accident happened in the Brett coastal waters forecast area. The next forecast area to the south was Colville. MetService issued coastal waters forecasts at regular times. The coastal water's forecasts were valid within 60 nm of the New Zealand coastline and described in a general sense the weather conditions expected. However, over small parts of the forecast area, for example off a particular headland or in a sheltered bay, weather conditions could be significantly different from those forecast.

3.6.2. The coastal waters' forecast issued at 1526 New Zealand Daylight Time (NZDT) on 3 March 2009 for the Brett coastal area was:

> MARINE WEATHER BULLETIN FOR NEW ZEALAND COASTAL WATERS FORECAST ISSUED BY METEOROLOGICAL SERVICE OF NEW ZEALAND AT 1526HRS 03-MAR-2009 VALID UNTIL MIDNIGHT 04-MAR-2009
> NORTH ISLAND:
> BRETT
> *GALE WARNING IN FORCE*
> Southeast 15 knots, rising to 25 knots tonight and to 35 knots in the morning. Sea becoming very rough. Easterly swell rising to 2 metres. Fair visibility in showers developing tonight.
> OUTLOOK FOLLOWING 3 DAYS:
> Tending northeast Thursday, easing Friday afternoon 25 knots, becoming early Saturday southwest 15 knots. Very rough sea easing. Northeast swell becoming moderate Friday, easing Saturday.

3.6.3. The inshore waters' forecast issued at 1652 NZST on 3 March 2009 for the Brett inshore area was:

> Marine Weather Situation and Forecast issued at 1652hrs Tuesday 03-Mar-2009 by MetService
> GALE warning for BRETT
> Situation:
> Winds tend southeasterly today as a trough moves through the area. A high to the south moves eastwards on Wednesday and Thursday, turning the flow northeast over much of the country. On Saturday, another trough is expected to cross the area, bringing a southwest change.
> Forecast issued at 1652hrs Tuesday 03-Mar-2009
> Valid to midnight Wednesday for The Bay of Islands and inshore waters from Cape Brett to the Poor Knights Islands to Bream Head.
> Today:
> Southerly 15 knots, rising to southeast 30 knots gusting 40 knots tonight. Slight sea becoming rough tonight.
> Mostly fine, but fair visibility in a few showers developing this evening.
> Tomorrow:
> Southeast 30 knots gusting 40 knots, rising to 35 knots gusting 45 knots in the morning and tending easterly in the evening. Rough sea becoming very rough in the morning. Cloudy periods, with fair visibility in a few showers.

3.6.4. MetService also had automatic weather stations at Tutukaka Head and Mokohinau which gave the following readings for the direction and strength of the wind on 4 March 2009

Time	Tutukaka Head 35° 36'.78S 174° 32'.7E			Mokohinau 35° 54'.3S 175° 06'.9 E		
	Direction (°T)	Speed (kt)	Gust (kt)	Direction (°T)	Speed (kt)	Gust (kt)
0300	100	25	35	110	37	45
0400	110	30	36	110	37	43
0500	110	30	36	110	38	45
0600	110	33	40	110	36	44
0700	110	32	40	110	38	44

Table 1
Wind direction and speed at Tutukaka Heads and Mokohinau

3.6.5. MetService provided an after-cast of the weather at the time of the accident. The after-cast stated:

> Early on 4 March, about 0500 to 0600 hours, at Pataua Beach in Ngunguru Bay, the wind would have been from the east-southeast and rising steadily through at least 25 knots, and probably 30 knots. That part of the coast is somewhat sheltered from the east-southeast by Taiharuru Head, so the sea state at the beach was probably smaller than what the wind would suggest. However, there would have been some waves of about 1 metre breaking on the beach having been refracted around the

> head into the southern part of Ngunguru Bay combined with a low east-northeast swell (not sheltered by the headland). Sea state in open water would have been "rough" on the Beaufort scale. The swell was rising and the direction was turning to easterly or southeast, but this may not have been fully appreciated from the shelter of the headland. In open water at 6am, the swell was probably bigger than 2 metres. (I think the coastal and inshore forecasts under-forecast the swell.) Combined waves in open water would have been about 3.5 metres.

3.6.6. The duty skipper had, the afternoon before the accident, studied the weather forecasts and prognosis from MetService on the internet. He said that on arrival at the vessel he "did not use VHF channel 21 to get the latest weather information as I thought that it was obvious what the conditions were when I arrived at the vessel".

Figure 8
The *Trusts Rescue*

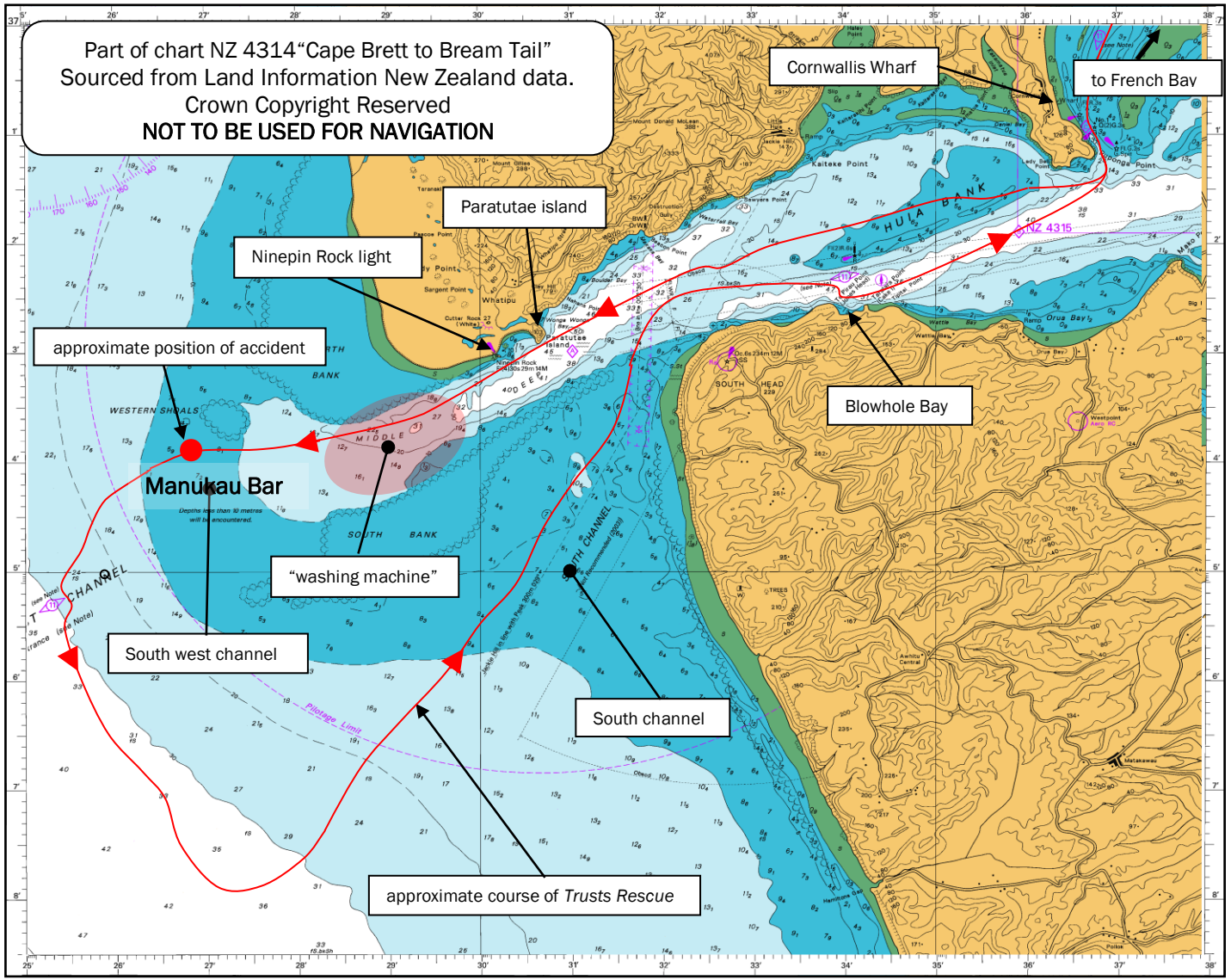


Figure 9
General area of the incident showing Manukau Bar

4. Factual information 09-207

4.1. Narrative

4.1.1. On Sunday 31 May 2009, Manukau Coastguard and the round-the-world wave-piercing trimaran *Earthrace* participated in joint promotional events during the day at Cornwallis Wharf. During the day discussions were held between the Manukau Coastguard members and the crew of the *Earthrace* on the best time to leave Cornwallis Wharf to cross Manukau Bar at the optimum stage of the tide.

4.1.2. The skipper and crew of the *Earthrace* suggested that they cross the Manukau Bar at about 2300, however, the skipper of the *Trusts Rescue* wanted to transit Manukau Bar during daylight and within the best bar crossing times of 2 hours before and after slack water.

4.1.3. Low water over the Manukau Bar was predicted for 2205 that evening so the transit across the bar was planned for about 1930 – 2000, even though it was dark at that time.

4.1.4. At about 1920, the *Trusts Rescue* left its base at French Bay with 6 Coastguard crew and an *Earthrace* volunteer on board and proceeded to Lady Bell Point where they rendezvoused with the *Earthrace* before proceeding towards the harbour entrance and Manukau Bar.

4.1.5. At about 1952, as the *Trusts Rescue* proceeded out of the harbour *Earthrace* dropped into line behind the *Trusts Rescue* at a speed of about 7 to 8 kt. The crew member allotted to communications contacted CNR to report that the vessel was about to carry out a bar crossing with the *Earthrace* following it. The helmsman of the *Trusts Rescue* said that as the *Trusts Rescue* and the *Earthrace* proceeded through Middle Deep he steadied the vessel up on the rear transit of the Ninepin Rock leading light and the saddle of Paratutae Island guided by one of the crew stationed at the rear of the cabin. He also reported that the conditions were not "too adverse" as the seas were breaking on the South Bank creating what he described as a "washing machine effect of confused water with about a one metre slop".

4.1.6. Under the influence of a strong south westerly wind, the convoy was pushed more towards the North Bank, with the *Earthrace* on the *Trusts Rescue's* starboard quarter. The *Earthrace* contacted the *Trusts Rescue* and told it that it was going to alter course to port to head further south. The *Earthrace* also requested that the *Trusts Rescue* increase speed as the *Earthrace* did not operate well at low speed. The helmsman increased the throttle setting until the *Trusts Rescue* was doing about 16 kt; nevertheless the *Earthrace* still headed in a southerly direction and increased speed passing the *Trusts Rescue* on its port side.

4.1.7. At about 2009, as the *Trusts Rescue* passed over the bar at the entrance to the South West Channel, the vessel encountered a succession of large, steep waves. The helmsman said that as there was little ambient light at the time he was unable to see the approach of the wave until the last moment. The bow was already pitched steeply upwards on the front of the wave and as the vessel crested the top of the wave it fell into the trough behind, landing on its port side. Some of the crew were thrown to the port side of the cabin.

4.1.8. A second wave was close behind the first and as the *Trusts Rescue* still had some speed on the vessel climbed the front of that wave and fell into the trough behind it, landing on its starboard side. The force was sufficient to break the casting holding the navigator's seat to the floor. The skipper broke his ankle.

Post accident actions

4.1.9. The helmsman managed to reduce the speed of the vessel and regain control. A crew member contacted CNR and reported the vessel's position, and that they were experiencing heavy seas and had an injured crew member on board.

4.1.10. At about 2020, the helmsman put the vessel's head to sea in a south westerly direction at a speed of about 6 kt. With the input of the navigator/communicator and the injured skipper a decision was made to head south towards the waypoint for entrance into the South Channel.

4.1.11. By about 2124 the *Trusts Rescue* was across the South Channel and in the entrance to Manukau Harbour. The helmsman then drove the vessel to Onehunga where they were able to pass the injured skipper into the hands of the ambulance service at the Old Mangere Bridge slip before returning to the Coastguard base at French Bay.

4.2. Vessel information

4.2.1. The *Trusts Rescue* was owned by Manukau Volunteer Coastguard Incorporated and operated by them within the CNR framework. *Trusts Rescue* was built in Auckland by Rayglass Boats. In 2007 Manukau Volunteer Coastguard Incorporated purchased the vessel from its current owner to replace the smaller vessel that they had at the time.

4.2.2. The *Trusts Rescue* had an overall length of 12.5 m and an overall breadth of 3.6 m. It was constructed to a commercial use specification from glass-reinforced plastic. The upper sides of the hull were fitted with segmented inflatable buoyancy tubes constructed from Hypalon fabric. The vessel was powered by 2 Suzuki 4-stroke 300 Hp [223.71 kW] outboard engines which gave a maximum speed of around 33 Kt and an operational speed of 24 kt.

4.2.3. The *Trusts Rescue* was in SSM with Maritime Management Services Limited. The vessel had been issued with a fitness-for-purpose certificate (see Appendix 4) as a non-passenger ship for the Manukau, Raglan and Kaipara enclosed water limits and inshore limits restricted to an area:

> commencing at the southernmost point of Raglan Harbour thence 270°, 12 miles to meet the NZ Territorial Limit, thence following the NZ Territorial Limit northwards to a point 270°, 12 miles off the northernmost point of Kaipara Harbour, thence directly to shore.

4.2.4. The *Trusts Rescue* was fitted with a Furuno Navnet VX2 integrated navigation system with 2 displays incorporating digital chart plotter, GPS and radar imagery. The vessel was also fitted with a Furuno RD30 remote display and standard navigational lighting and equipment including compass, 2 VHF radio transceivers, echo sounder and bow thruster.

4.2.5. As with all Coastguard NZ vessels the *Trusts Rescue* was fitted, with a Track-Plus system for monitoring the position of the vessel at any time. The positions downloaded from the CNR computer were used by the Commission to recreate the track of the *Trusts Rescue* after the incident (see Figure 9).

4.3. Personnel information

4.3.1. The skipper of the *Trusts Rescue* had been a member of Manukau Coastguard for about 11 years. He had been master of a Coastguard vessel for 6 or 7 years and held a Coastguard NZ certificate of competency as a senior master. He had lived close to the Manukau Harbour all his life and had used private craft on the Manukau Harbour and the Manukau Bar from an early age.

4.3.2. The helmsman of the *Trusts Rescue* had been a member of Manukau Coastguard for about 3 years and held a senior operational crew certificate. He had been a recreational fisherman on Manukau Harbour. He was the president of Manukau Coastguard

4.3.3. The navigator of the *Trusts Rescue* had been a member of Manukau Coastguard for about 5 years and held a senior operational crew certificate. He was the treasurer and operations manager for Manukau Coastguard.

4.3.4. Crew member 1 had been a member of Manukau Coastguard for about 2½ years and held a senior operational crew certificate. He had also crewed Coastguard NZ vessels in Waitemata Harbour and the Hauraki Gulf.

4.3.5. Crewmember 2 had been a member of Manukau Coastguard for about 7 months and was a trainee crew member.

4.3.6. Crewmember 3 had been a member of Manukau Coastguard for about 4 months and was a trainee crew member. He had been involved with private craft and the sea from an early age.

4.3.7. The passenger was a member of the *Earthrace* volunteer staff and had no maritime experience.

4.4. Climatic and environmental conditions

4.4.1. The Manukau Harbour entrance and Manukau Bar lie in the Raglan coastal waters' forecast area. The coastal waters' forecast issued at 0406 NZDT on 31 May 2009 for the Raglan coastal area was:

> MARINE WEATHER BULLETIN FOR NEW ZEALAND COASTAL WATERS FORECAST ISSUED BY METEOROLOGICAL SERVICE OF NEW ZEALAND AT 0406HRS 31-MAY-2009
> NORTH ISLAND
> RAGLAN
> *GALE WARNING IN FORCE*
> Southerly 15 knots, rising to 25 knots this morning and to 35 knots around midday. Sea becoming very rough. Southwest swell rising to 3 metres. Poor visibility in rain, clearing afternoon
> OUTLOOK FOLLOWING 3 DAYS: Southerly easing Monday night to 20 knots, easing Tuesday southeast 10 knots, then dying out Wednesday. Moderate southwest swell easing Tuesday.

4.4.2. MetService provided an after-cast of the weather and sea conditions at the time of the incident. The after-cast summary stated:

> During the afternoon and evening of 31 May, strong to gale southeast winds were spreading over South Taranaki Bight and the ocean area to the west of the north of the North Island. This wind was increasing the sea state in the vicinity of the Manukau Bar, but not as far south as Taharoa. Meanwhile, the southwest swell wave height was increasing as waves that had been generated in the south Tasman Sea moved into the RAGLAN marine area.
> At 8pm, the wind at the Manukau Bar was about 20 knots from the south-southeast. The sea state was probably confused being comprised of [sic] rising wind waves being driven from the south, and swell waves increasing from the southwest. There had been a period of rain between about 4pm and 6pm. At 8pm the sky was clear and the meteorological visibility was very good.

4.4.3. The table below shows the times of high water at Paratutae Island based on the standard port of Onehunga on 31 May 2009 as obtained from the New Zealand Nautical Almanac (Land Information New Zealand, 2008).

Port	Date	High water	Low water	High water	Low water
Paratutae Island	31 05.2009	0319	0943	1551	2205
Onehunga	31.05.2009	0350	1003	1622	2225

Table 2
Times of high water at Paratutae Island and Onehunga

4.4.4. The tidal-current characteristics for Manukau Harbour are such that from the harbour entrance up to the mid-reaches of the main inner-harbour channels, the peak current velocities coincide with the mid-tide on both the flood and the ebb. Slack tides throughout the harbour occur within 0 to 15 minutes after the respective local low or high water, except at the near-shore entrance region off South Head, where the slack tide lags the local low water by approximately 30 minutes (Bell, Dumov, Williams, Greig, & (NIWA), 1998). Measurements showed that peak velocities of up to 1.8 m per second [3.5 kt] can occur in the entrance channel (Heath, Greig, & Shakespeare, 1977).

4.4.5. When swell and wind waves encounter a current flowing in the opposite direction they get steeper, taller and closer together. When surface waves move towards shallow water, such as a beach, they slow down, their wave height increases and the distance between waves decreases. This behaviour is called shoaling, and the waves are said to shoal. The waves may or may not build to the point where they break, depending on how large they were to begin with, and how steep the slope of the beach is. In particular, waves shoal as they pass over submerged sandbanks or reefs. This can be treacherous for vessels and ships. (World Meteorological Organization, 1998)

4.4.6. On 31 May 2009, sunset at Paratutae Island was calculated to be at 1713 with civil twilight ending at 1742. Moonrise was at 1241 and the moon was waxing gibbous[4].

[4] Between one quarter and full moon increasing in size from day to day

5. Other Coastguard occurrences

5.1. *Russell John Chisholm*

5.1.1. This occurrence was not investigated by the Commission but Coastguard NZ provided its investigation report into the occurrence.

5.1.2. The *Russell John Chisholm* was an 8 m rigid inflatable "Naiad" coastguard vessel operated by Coastguard Riverton from its base in Riverton, Southland.

5.1.3. On 31 August 2009 at about 1900, members of Coastguard Riverton assembled at the Coastguard Riverton boat shed to conduct on-water heavy-weather training. The unit's training officer had already checked on the sea conditions by observation from Howells Point (see Figure 10).

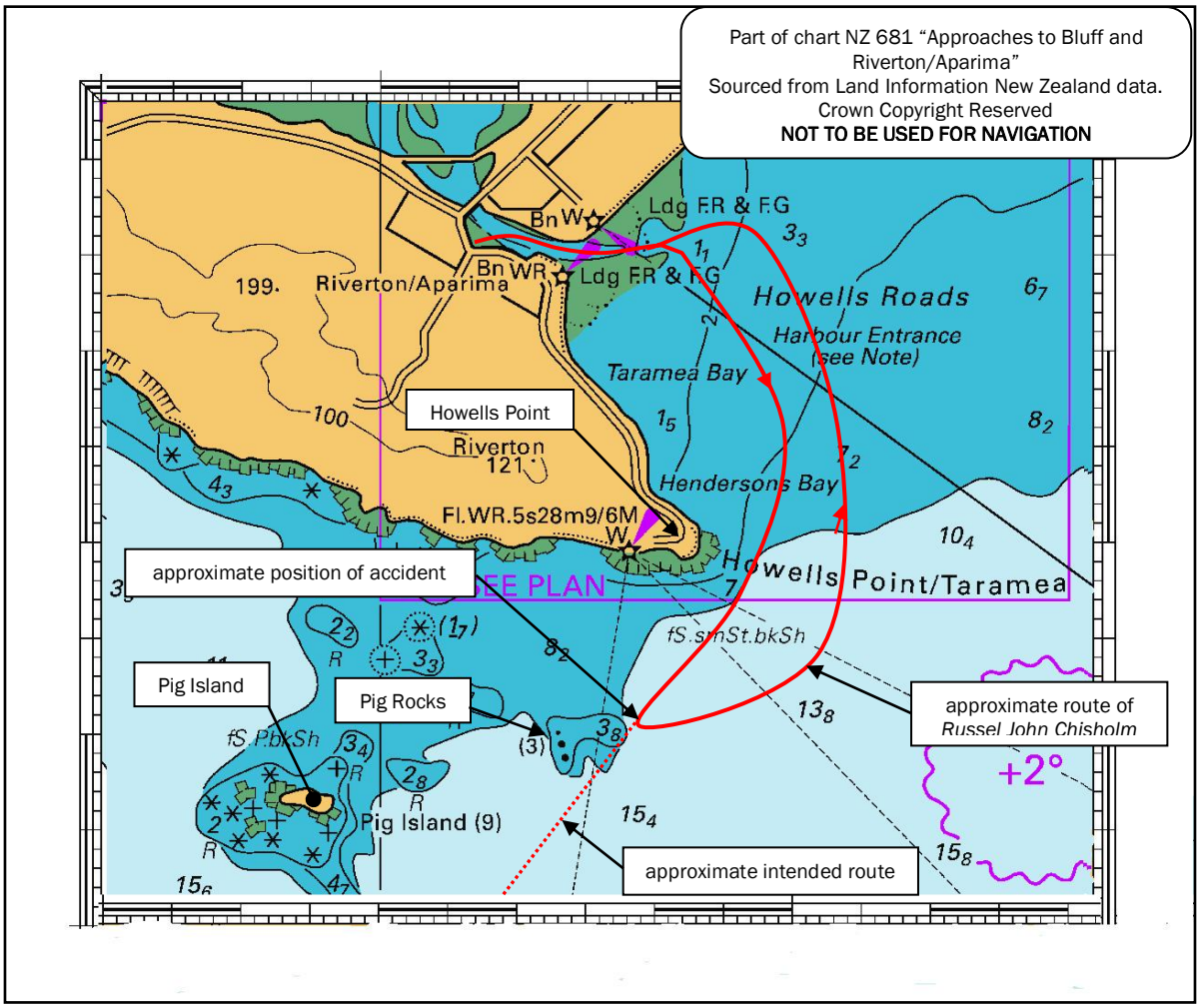


Figure 10
Approximate route of the *Russell John Chisholm*

5.1.4. At about 1905, the *Russell John Chisholm* was launched with 7 of the Coastguard Riverton crew members on board. The skipper, who was the unit's training officer, was the helmsman as the vessel travelled across the harbour and over the bar at the entrance.

5.1.5. Once clear of the bar, the crew made a radio check call on the VHF radio to their base and plotted a course to Escape Reefs that took them clear of the rougher inshore water off Howells Point.

5.1.6. As the vessel approached Pig Rocks off Pig Island the skipper reduced speed from what he estimated to be about 34 kt to about 21 kt to pass over 2 waves estimated to be about 2 m in height. After passing over these waves, a third wave was encountered that formed a second crest under the stern of the vessel. The *Russell John Chisholm*'s stern was flung upwards and the vessel fell heavily to starboard. The crew were flung upwards and fell to starboard. Three of the crew sustained moderate injuries that required hospital treatment; a sprained ankle, a facial cut requiring stitches and a broken tendon in a foot requiring pinning.

5.1.7. The uninjured crew administered first aid to the injured crew and notified their base of the accident. One of the uninjured crew then took over the helm and drove the vessel back to the base where an ambulance waited for the injured crew.

5.1.8. The climatic and sea conditions at the time were described as being about Beaufort 5 with a northerly wind of about 20 kt and 2 m waves. The sun had set at about 1815 and twilight had ended at about 1921. The waxing gibbous moon had risen at about 1338.

5.2. *Hibiscus Rescue One*

5.2.1. This occurrence was not investigated by the Commission but Coastguard NZ provided its investigation reports into the occurrence.

5.2.2. The *Hibiscus Rescue One* was an 8.5 m rigid inflatable "Rayglass Protector" coastguard vessel operated by Coastguard Hibiscus from its base in Gulf Harbour Marina

5.2.3. At about 2146 on 6 March 2010, CNR initiated an "urgent boat call-out" for Coastguard Hibiscus. The call-out was to attend a vessel taking on water on the eastern side of Tiri Tiri Matangi Island with 4 persons on board.

5.2.4. Several of the crew from Coastguard Hibiscus responded to the call-out and one of them contacted the CNR operations centre en route to the *Hibiscus Rescue One* to obtain the details of the incident.

5.2.5. At about 2149, the first crew member arrived at the *Hibiscus Rescue One* and commenced preparing the vessel for departure. At about 2151, 3 other crew members arrived at the vessel. One of these 3 was allocated the navigation station (navigator) and started preparing the chart plotter, radar and GPS.

5.2.6. At about 2155, a fifth crew member arrived at the vessel, and as soon as they were on board the *Hibiscus Rescue One* departed its berth with the skipper at the helm and the crew member in the navigation position still initialising the navigation equipment. As the *Hibiscus Rescue One* left the berth the navigator was entering the GPS co-ordinates for the incident vessel and while she was doing this the radar and chart screens were not displayed on her screen. The skipper at the same time was adjusting the helmsman's display screen to obtain a radar image.

5.2.7. At about 2159, as the vessel was transiting the marina (see Figure 11), one of the other crew members used the ultra-high-frequency (UHF) radio transceiver to pass a crew list to CNR. She then attempted to log a trip report via UHF but was unsuccessful so she called CNR on the VHF radio from outside the cabin and was advised to stand by. At this time the skipper was able to obtain a radar image on the helmsman's screen.

5.2.8. At about 2201, the *Hibiscus Rescue One* cleared Gulf Harbour Marina breakwaters. The navigator had just completed entering the GPS co-ordinates of the incident vessel and advised the skipper she had done so. Her radar screen was showing land to port, but no radar echoes ahead. She advised the skipper to "move to starboard a bit". The skipper responded by adjusting the throttle and accelerated the vessel to a speed estimated to be in excess of 26 kt.

5.2.9. At about 2202, a shuddering and skidding was experienced on board the vessel as it grounded on rocks at Rakauananga Point. The vessel spun approximately 180°, and the engines were thrown upwards on their pivots and cut out. The skipper was thrown from the helm station.

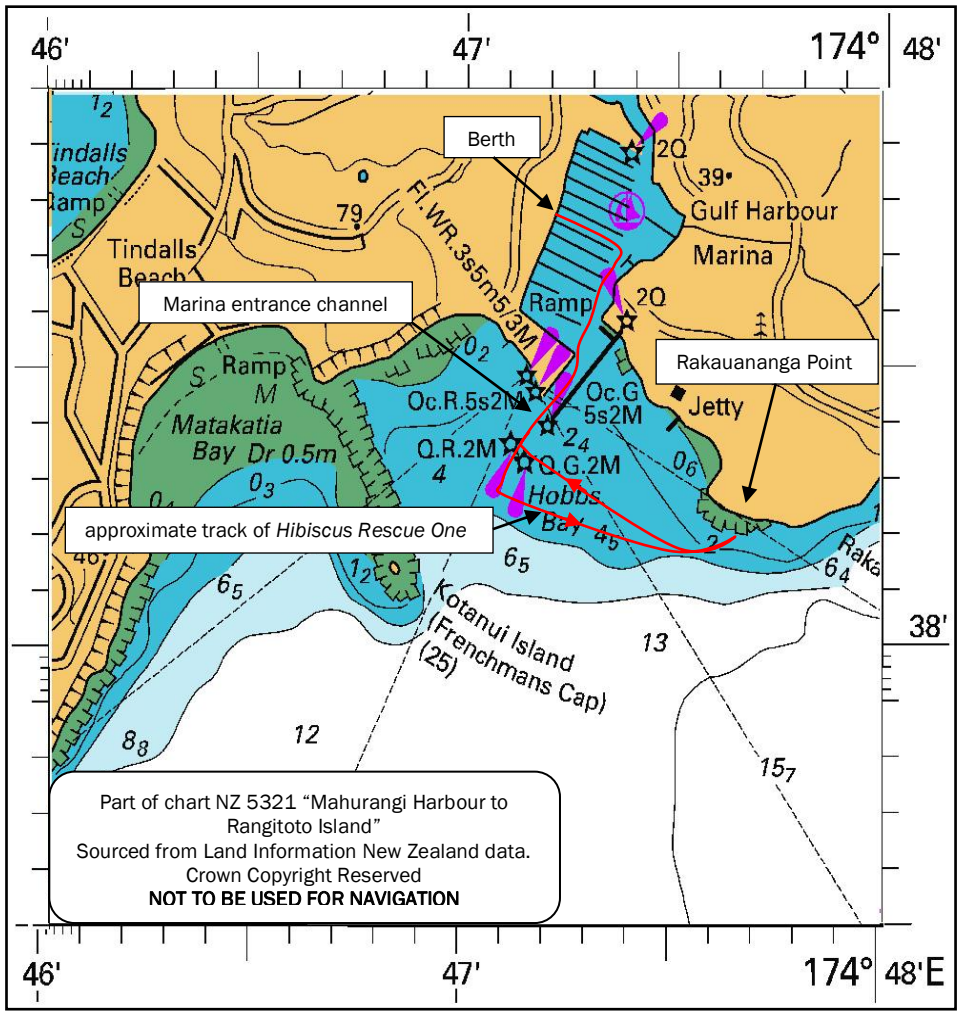


Figure 11
Track of the *Hibiscus Rescue One*

5.2.10. The crew on board checked each other for injuries and the skipper called CNR on UHF radio. The skipper advised CNR that the vessel was aground on rocks and that there were no injuries but it would require assistance. CNR paged the *Hibiscus Rescue Two* and the *North Shore Rescue* to respond.

5.2.11. The crew members, after assessing the situation, decided to attempt to self-rescue the vessel, and by 2218 the crew members had managed to refloat the vessel. They then took the vessel back to Gulf Harbour Marina where the vessel was taken out of the water.

5.2.12. There were no injuries to the crew. The vessel sustained damage to the engine skegs, the engine cowlings and the engine hydraulics, and scraping to the underside of the vessel's hull.

5.2.13. The crew members on-board reported that it had been a dark night made worse by the back-scatter of light from the marina and a bright light at the marina entrance. Although dark the weather was not reported as being exceptionally bad. The crew reported that the wind combined with the tide at the time of the accident combined to push the vessel to the north. The waning gibbous moon rose at about 2203, about the same time as the *Hibiscus Rescue One* ran aground.

6. Organisational and management information

6.1. General

Notification of an incident

6.1.1. There were several ways that a person in difficulty on the water could signal their need for assistance:

- they could use a VHF radio on channel 16, the international safety and calling channel, to issue a distress (mayday) call if they were in grave and imminent danger; or issue an urgency (Pan Pan) call if they had an urgent message to transmit concerning the safety of a ship, aircraft or person. This transmission would be received by a coast radio station operated by the MOC which would then advise either the RCCNZ or the Police as appropriate
- they could, if within range, use a mobile telephone and call the emergency number 111 and be connected with a Police communications centre
- they could, if they were not in serious difficulty, use one of the dedicated Coastguard VHF channels to request assistance and the Coastguard would respond
    - If the circumstances initially reported appeared to require either a category 1[5] or 2[6] response the Coastguard would at the same time advise either the Police or RCCNZ.
    - If, on arrival at an incident, it was apparent that a category 1 or 2 response was required the skipper of the Coastguard vessel would contact the Coastguard base which would advise the relevant authority.

  Once advised, the relevant authority would take over management of the response
- they could activate an EPIRB indicating that they were in grave and imminent danger the data from which would be received at RCCNZ.

Search and rescue in New Zealand

6.1.2. The responsibility for New Zealand SAR policy lay with the Government. Services were managed and coordinated by several core departments and state agencies, namely Police, Maritime New Zealand, the Civil Aviation Authority, the New Zealand Defence Force, and the Ministry of Transport. Other agencies, such as the Ministry of Civil Defence and Emergency Management, were responsible for wider and complementary policies regarding rescue activities.

6.1.3. In 2003, Cabinet established the NZSAR Council to give strategic governance for all SAR in New Zealand. The Council was supported by a secretariat, which provided strategic co-ordination for SAR in New Zealand through support services, policy advice and the implementation of NZSAR Council decisions.

6.1.4. An NZSAR secretariat convened the NZSAR Consultative Committee, which was a national forum for all NZSAR stakeholders, including voluntary groups such as Coastguard NZ.

6.1.5. The responsibility for the co-ordination of SAROPs rested with one of 2 co-ordinating authorities depending on the type of emergency concerned: either Police or RCCNZ. (NZSAR Secretariat, 2011).

6.1.6. For any SAROP there was only one authority responsible for the management and co-ordination of the operation. The Police were the authority for category 1 SAROP's and RCCNZ was the authority for category 2 SAROP's.

[5] category 1 – a SAROP where Police is the lead agency
[6] category 2 – a SAROP where RCCNZ is the lead agency

6.1.7. A category 1 SAROP was co-ordinated at a local level; including land operations, subterranean operations, river, lake and inland waterway operations and close-to-shore marine operations. A category 2 SAROP was co-ordinated at the national level, including operations associated with missing aircraft or aircraft in distress and off-shore marine operations within the New Zealand Search and Rescue Region.

6.1.8. The SAR co-ordinator was responsible for co-ordinating multiple organisations that could provide people, aircraft, vessels and other resources in response to a SAR event. Coastguard NZ was one such SAR resource (see Figure 12).

6.1.9. Coastguard NZ had entered into a joint service-level agreement with RCCNZ, the Police and the Secretary for Transport (for and on behalf of the NZSAR Council).

6.1.10. The purpose of the agreement was to provide an arrangement under which the co-ordinating authorities sought, and Coastguard NZ provided, SAR services in response to, and in support of, SAROPs. Under the agreement the Coastguard NZ developed and maintained a SAR capability for New Zealand in return for funding for those activities. SAR services included providing communications with third parties. When a Coastguard vessel was tasked by either the Police or RCCNZ, Coastguard NZ was paid an agreed hourly rate to cover the cost of operations.

6.1.11. A SAROP was defined in the agreement as "an operation undertaken by a co-ordinating authority to locate and retrieve persons missing or in distress. The intention of the operation was to save lives, prevent or minimise injuries and remove persons from situations of peril by locating the persons, providing for initial medical care or other needs and then delivering them to a place of safety".

6.1.12. The response service referred to in the agreement and to be provided by the Coastguard to the co-ordinating authorities was to include:

> 1 .1. The provision of marine search and rescue services in a timely manner by trained personnel using appropriate equipment on request by the Coordinating Authorities in support of SAROPs. During tasked SAROP activities Coastguard NZ is required to:
> 1.1.1. Use marine Channel 16 in accordance with the agreed protocol
> 1.1.2. Make available to the Coordinating Authorities any and all tracking data from equipment fitted to or carried on Coastguard vessels and aircraft involved in the SAROP. Where possible the data is to be made available in real time to enable the Coordinating Authorities to monitor and assist in the search processes;
> 1 .2. The provision of specialist Coastguard NZ advice to the Coordinating Authorities or other SAR providing agencies on request;
> 1 .3. The provision of appropriately trained Incident Management Team Member(s) at the Incident Control Point or other location as agreed with the Coordinating Authority;

Coastguard NZ

6.1.13. The majority of Coastguard NZ units were formed independently by groups of local residents usually after maritime tragedies in their areas. The first recorded instance in New Zealand of an official lifeboat was the one stationed at Timaru in 1864. The first permanent rescue service was established at Sumner in 1898 (Coastguard NZ., 2009).

6.1.14. The New Zealand Coastguard Federation was established in 1976 and in 1990 Royal Patronage was granted. In 2004 Coastguard NZ affiliated units around New Zealand agreed to regionalisation, with each unit falling under the responsibility of one of 4 regions and in 2005 the word federation was dropped, with the national body being known as Royal New Zealand Coastguard Incorporated (Coastguard NZ., 2009).

6.1.15. Coastguard NZ and the affiliated units were run as charitable trusts with about 85 % of the funding coming from donations and local community support. From 2008 the New Zealand

Government, through the service-level agreement, provided financial assistance for the provision of rescue services to distress calls through the Police or the RCCNZ. This Government financial assistance funded about 15% of the total calls made by Coastguard NZ each year (Coastguard NZ., 2009).

6.1.16. The remainder of the operations carried out by Coastguard NZ were in effect self-tasked. Many of the operations consisted of more minor problems such as delivering fuel to persons who had run out and providing towage services to those who had broken down and could not return to their berths without assistance. Some of Coastguard NZ's operations consisted of preventative operations or reflex tasking, where Coastguard NZ would render assistance to persons in difficulties where the difficulties had the potential to escalate into more serious situations.

6.1.17. Coastguard NZ was divided into 4 geographic regions, Northern, Eastern, Central and Southern. A total of 66 local units operated within these regions of which all were individual incorporated societies (see Figure 12).

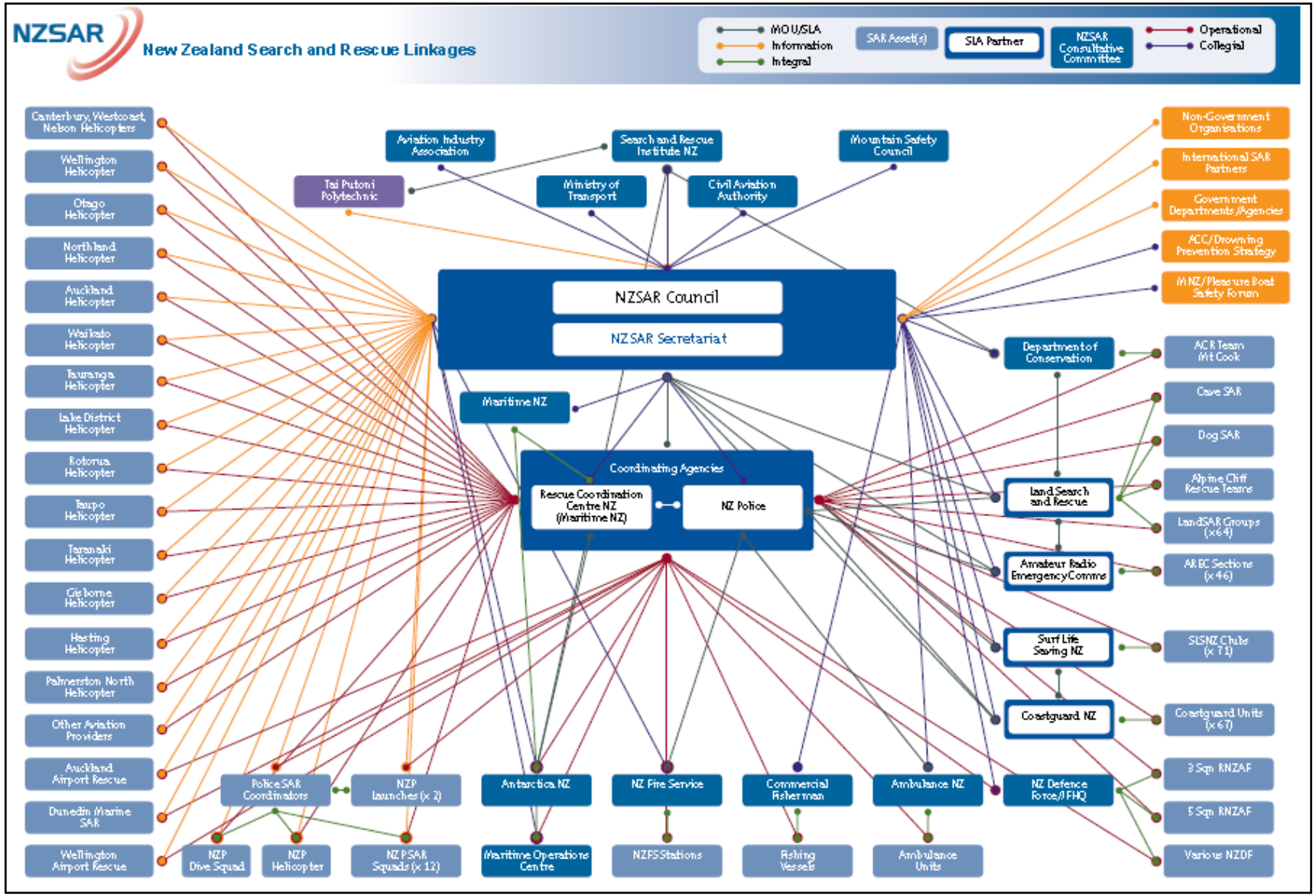
6.1.18. All the coastguard units were affiliated to a Coastguard region and through these regions to Coastguard NZ. Through that affiliation they were bound by the policies and procedures of both the regions and the national organisation. The policies and standards set by the national organisation were considered to be the basic minimum and could be enhanced by either a region or an operational unit by mutual agreement.

6.1.19. Coastguard NZ national safe operational policy stated that:

> a Coastguard unit agrees to operate a Dedicated Rescue Vessel (DRV) described according to the special conditions (limits and manning) set by the Royal New Zealand Coastguard Federation. The Safety Officer and Management of a unit may increase the standards set by the Federation by extending the special conditions, if doing so is in the best interests of effective operation. If local conditions are set, the vessel is not to be operated at standards below these conditions. **Under no circumstances shall the DRV be operated at standards lesser than the special conditions set by the Federation**. …

6.1.20. Coastguard NZ's policy and objectives as stated in its dedicated rescue vesel safety system manual generic template were:

> It is this volunteer Coastguard unit's policy that in the conduct of its maritime operations it will protect the safety of passengers, crew and the environment. …
>
> The purpose of this volunteer Coastguard unit (in addition to any specific objectives contained in its constitution) and its management is to ensure safety at sea, prevention of injury or loss of life, and avoidance of damage to the environment, in particular the marine environment, and to property.



Source: NZSAR Secretariat

Figure 12
Diagram of New Zealand SAR Linkages

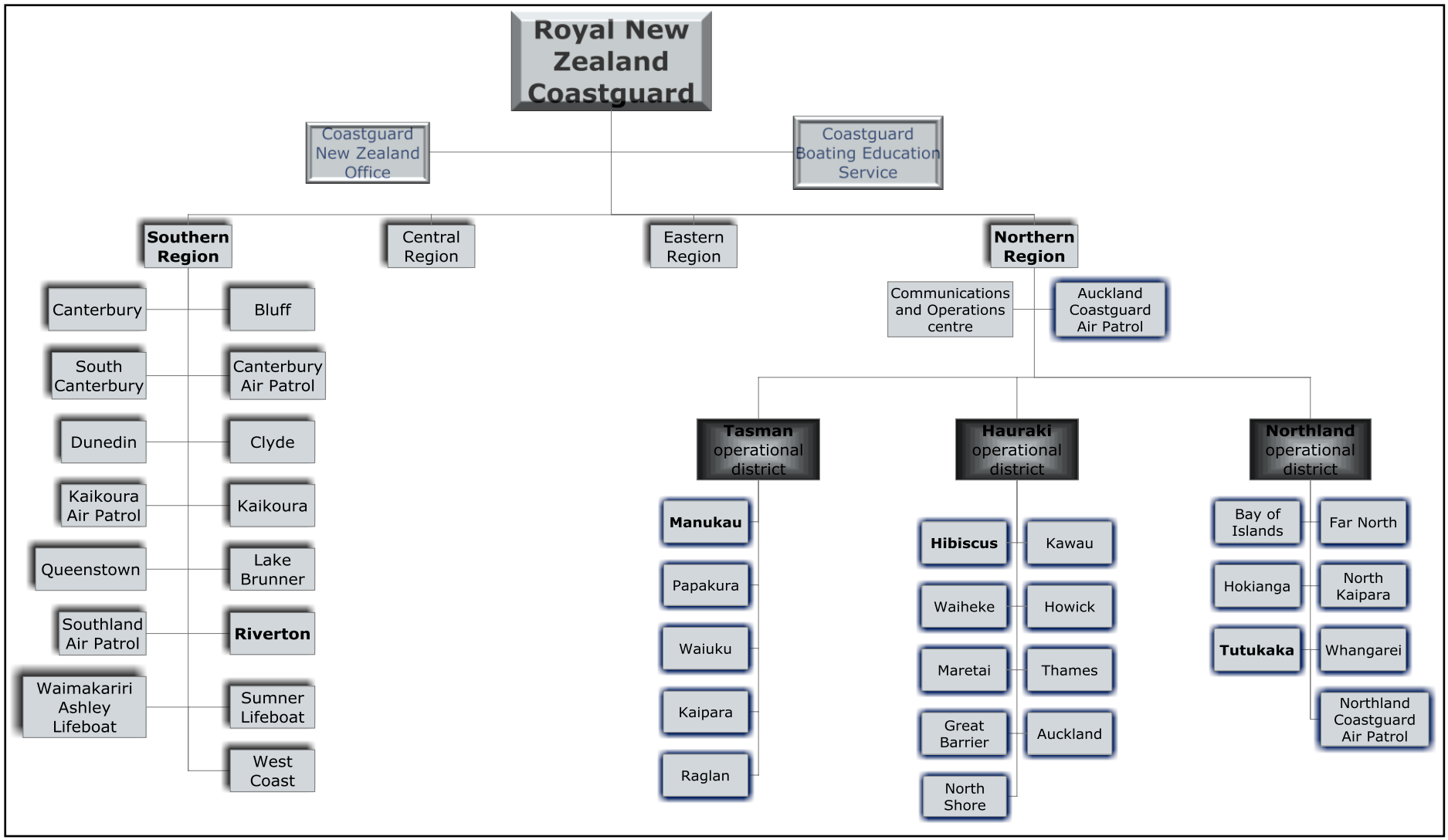


Figure 13
Organisational chart of Coastguard NZ with emphasis on the Northern and Southern Regions

6.1.21. The CNR SAR units standard operating procedures reflected the national policy as shown below:

> **0.2 Safety**
>
> 0.2.1 Overriding all procedures outlined herein is the paramount concern for the safety of all personnel involved in Coastguard operations.
>
> 0.2.2 In this light, never be afraid to stand yourself or your vessel down if, in your opinion, the situation is beyond the capabilities of your vessel / equipment, your experience, or your crew are likely to be exposed to undue risk.
>
> 0.2.3 CRVs are frequently out in weather and situations which would keep 'normal' prudent boaties at home - it is not unsafe so much as cold and uncomfortable. Until your experience grows, pace yourself according to your abilities and those of your crew.
>
> **0.3 Skipper's Discretion**
>
> 0.3.1 It is acknowledged that these procedures cannot cover every situation, and that all actions taken on the water by their nature remain at the discretion of the CRV Skipper. Every effort to conform to these procedures should be made and any known breaches shall be reported to the CNR Operations Manager as soon as possible.

6.1.22. The Commission asked Coastguard NZ to provide information on the number of operations that they carried out in a yearly period. This information was provided by Coastguard NZ in a tabular form for both the years ending in 2009 and 2010 as shown below:

Statistics	July 2009 to June 2010	July 2008 to June 2009
Total number of Coastguard rescue operations	3 722	3 410
Number of category 1 rescue operations	547	577
Number of category 2 rescue operations	20	34
Number of hours spent on Coastguard rescue operations[7]	30 024	26 078
Number of hours spent on category 1 and 2 operations	7 335	8 667
Number of hours spent on training	89 141	72 884
Number of people assisted on Coastguard rescue operations	6 560	5 493
Number of lives saved on category 1 and 2 operations	31	45
Number of lives rescued on category 1 and 2 operations	402	424
Number of lives assisted on category 1 and 2 operations	133	141

(Royal New Zealand Coasguard Incorporated, 2010)

Table 3
Coastguard operations per year

6.1.23. The Northern Region was divided into 3 operational areas, Tasman, Northland and Hauraki, and operated 24 units including a communications centre and 2 Coastguard air patrols. In the year ended 30 June 2010 Northern Region received 2066 calls for assistance. Tutukaka Coastguard was one of the 6 units operating in the Northland District. Manukau Coastguard was one of the 5 units in the Tasman operational district. Coastguard Hibiscus was one of the 9 units in the Hauraki operational district.

6.1.24. The Southern region consisted of 15 operational units of which Coastguard Riverton was one. In the year ended 30 June 2010 the Southern Region received 310 calls for assistance.

[7] Excludes hours spent on category 1 and 2 SAROPS

6.2. 09-204 *Dive! Tutukaka Rescue*

6.2.1. The Northland Operations Committee set operational goals within its area which were derived from the goals established by CNR. The goals were as follows:

- to provide Coastguard emergency response to 90% of the popular recreational boating areas within the area of operation, with a rescue vessel on scene within 60 minutes of activation 24/365 in up to force 7 weather conditions.
- to provide marine safety information and support services in safe marine activities
- to provide VHF radio coverage to 95% of the area of operation, giving all vessels with appropriate installations clear radio communications to Coastguard.

Force 7 weather conditions were described by Land Information New Zealand as being:

Force	Descriptive term	Open Sea Criterion	Mean Wind Speed (knots)	Sea State	Average wave height	Probable maximum wave height
7	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	28 – 33	Very rough	4 m	5.5 m

(Land Information New Zealand, 2010)

Table 4
Description of Beaufort force 7 weather conditions

6.2.2. Tutukaka Coastguard was run by a committee comprising of the chairman, vice chairman, treasurer and secretary, with 2 other officers with specific appointments and 2 co-opted members. About 50% of the committee members were active crew members as well. Two members of Tutukaka Coastguard represented the unit on the Northland Operations Committee at meetings held every 2 months. Two further members of the Northland Operations Committee represented the Northland Operations Committee at CNR board meetings held at monthly intervals.

6.2.3. The active members of Tutukaka Coastguard were split into 3 crews each comprising a skipper and at least 4 crew members. The crews operated on a 10-days-on duty 20-days-off-duty cycle per month; however, all crews received the pager alerts and any crew could respond to a pager alert at their discretion. This gave some safeguard that sufficient crew to man a vessel responded to an alert if one of the rostered crew were indisposed or out of coverage.

6.3. 09-207 *Trusts Rescue*

6.3.1. Manukau Coastguard was run by a committee comprising of the president, secretary and treasurer, with 2 other officers with specific appointments and 2 other committee members, one of whom was the Manukau representative on the Tasman Operations Committee and one who was a board member. All of the committee members were active crew members.

6.3.2. The active members of Manukau Coastguard were split into 4 crews, each comprising a skipper and at least 5 crew members. The crews operated on a 7-days-on-duty, 21-days-off-duty cycle, however all crew members who had their pagers switched on received the pager alerts and any crew could respond to a pager alert at their discretion. Manukau Coastguard expected the duty crew to attend all call outs that occurred during evenings, nights and weekends during their duty period.

6.3.3. Manukau Coastguard had a standard operating procedure[8] for operating the *Trusts Rescue* when it was likely that the vessel would cross the Manukau Bar. These procedures stated:

[8] Manukau Volunteer Coastguard Standard Operating Procedures, 2009 edition

4.8 Bar work

The CRV will carry exposure (survival) suits on every job or patrol in case of a requirement to cross the bar. A personal VHF, EPIRB and strobe is to be held by everyone on board.

It is the discretion of the skipper to select crew members for jobs known to be over the bar. This may mean that DUTY CREW members may be stood down. The DUTY MASTER will decide the make-up of crew dependant [sic] on jobs and conditions.

If the DUTY CREW are going to be crossing the bar, but have not left the base, a crew member who feels unsure about crossing may ask to be stood down.

If a job over the bar is initiated when there are CIVILIAN(S) on board, it is at the MASTER's discretion whether to off load them before commencing the job. *Cornwallis Wharf* or *Paratutae Is.* can be used as off loading points in this scenario.

When crossing the bar the CRV will contact Coastguard Radio when exiting and entering the harbour. The call will include POB and the Channel being used (South West or South Channel).

When the CRV is operating outside the harbour, both the Papakura and Waiuku Coastguard Units should be notified.

Ultimately it is the MASTER's decision to cross the Bar or not.

6.3.4. Manukau Coastguard in its standard operating procedures had a procedure for non-incident usage of the CRV which stated:

> When the CRV is being used, but not attending a callout, the DUTY CREW will be notified and given the first right of refusal to attend, this does not mean the member can continually turn down the training.

6.3.5. There was no reference in the Manukau Coastguard standard operating procedures detailing what constituted non-incident use; however, during the interview with the skipper of the *Trusts Rescue* he said that: "although there's not a lot of pleasure call outs I have been doing a bit of wanting parts out to trawlers… I've had a guy that lost his eyesight on a seismic survey vessel and it was too far for the chopper, do some LandSAR work, drop them off and pick them up afterwards… I have been involved in the ARC, taking some of their staff to different places, drop them off, pick them up later".

7. Training

7.1. General

7.1.1. The basic training requirements for crew operating CRV's were set down by Coastguard NZ to ensure consistency throughout the regions. This training was supplemented by additional requirements where found necessary by regional or individual Coastguard units.

7.1.2. Training was based on practical training and courses interspersed with 13 theoretical modules and a requirement for a certain number of hours to be served on board a CRV (see Appendix 2).

7.1.3. Before a Coastguard senior crew member could become a skipper they would be assessed by the local training officer on vessel handling, situational assessment, decision-making and crew management. The applicant would then have to sit an open-book written examination and be practically assessed by a district assessor as being suitable and if successful be assessed practically by a regional assessor before being awarded a Coastguard NZ certificate of competency.

7.1.4. Maritime NZ, under section 35.10 of Maritime Rule Part 35, Training and Examination; had approved the Coastguard NZ training framework and allowed Coastguard to issue certificates of competency as skipper of a designated CRV.

7.1.5. Some of the required courses to progress through the Coastguard NZ system were provided by the Coastguard Boating Education Service. Three of the courses, Boat Master, Day Skipper and VHF, were to New Zealand Qualifications Authority unit standards and although none of the courses and certificates gained was recognised commercially in New Zealand or abroad, they were recognised in Europe as suitable for private charters.

7.2. 09-204 *Dive! Tutukaka Rescue*

7.2.1. Tutukaka Coastguard arranged for a CNR-accredited tutor to teach one of the modules on the first Tuesday of every month, and the practical training held by skippers of each crew would cover that module during that month, if practicable. However, as crew members were volunteers they might not have been able to attend each module owing to other commitments in that case they would have to wait 13 months before a specific module became available again.

7.2.2. Coastguard NZ had developed a Search and Rescue Boat Book which was a manual to be used on board for both operations and training. The first part of the manual covered key aspects of SAROPs (see Appendix 1). This manual had been received by Tutukaka Coastguard shortly before the accident and was due to have been introduced into the training regime on 11 March 2009.

7.2.3. Tutukaka Coastguard had taken delivery of the *Dive! Tutukaka Rescue* in October 2008, approximately 5 months prior to the accident. The first 3 months that Tutukaka Coastguard had the vessel it engaged in weekly training sessions to familiarise the crews with the new vessel and equipment.

7.3. 09-207 *Trusts Rescue*

7.3.1. Manukau Coastguard conducted regular training sessions on Thursday evenings throughout the year. Some of these sessions would be practical training and conducted on the water predominantly during the summer months, with the theoretical sessions favoured during the winter months. Night training and adverse weather training were carried out during the year at less regular intervals including weekends.

7.3.2. Because of the density of Coastguard NZ units in the Auckland area, members of those units often attended combined training sessions facilitated by CNR, rather than CNR tutors travelling to each Coastguard unit.

7.3.3. Manukau Coastguard did not have a written policy or operating procedure on training for crossing the Manukau Bar. However, there was an expectation that more senior members would train and mentor the junior members in “bar operations”.

8. Analysis

8.1. Introduction to the issues

8.1.1. The 4 accidents studied during this inquiry represented only 0.11% of all Coastguard NZ call-outs based on the average from July 2008 to June 2010, and to put any issues into perspective, that represents a high proportion of successful missions. These 4 accidents did however result in serious injury to some Coastguard crew members and some serious damage to the vessels and equipment.

8.1.2. Coastguard NZ was New Zealand's primary inshore maritime SAR service and as such provided an important service to the public by undertaking a number of activities ranging from replenishing empty fuel tanks (during the day and in good weather) to responding to genuine distress calls at night in poor weather at unfamiliar locations.

8.1.3. The pressure to conduct the higher end of these missions safely and quickly in various environmental conditions makes the Coastguard operations inherently dangerous, and it is some of those inherent factors that are contributing to the accidents involving Coastguard NZ vessels.

8.1.4. This report is not intended to overly burden Coastguard NZ with undue requirements or to handicap this vital function in any way; rather the purpose of this report is to identify strategies that will help ensure that the goals of the organisation are consistent with the available equipment and the capability of the operating crew; thus helping to ensure the craft that they must handle and the people in them arrive back safely, regardless of the outcome of each mission.

8.1.5. While each of these 4 accidents appears at a casual glance to be unique there are some common factors.

- each occurred at night;
- 3 occurred when the skipper was at the helm rather than a dedicated helmsperson;
- 3 occurred during inclement weather;
- in all cases inadequate planning occurred before each vessel departed its base;
- in all cases there was a lack of adequate CRM;
- in 3 cases the standard of navigation was not what should be expected from dedicated emergency response vessels.

8.1.6. The report examines these issues and whether Coastguard NZ's operational goals were compatible with its capabilities. With the Coastguard Northern Region, its operational goals were to provide an emergency response to 90% of the popular recreational boating areas, with a rescue vessel on scene within 60 minutes of activation, 24 hours per day and 365 days per year in up to force 7 weather conditions.

8.1.7. The conclusion is that for the most part the Coastguard NZ operation can achieve its goals but some improvements in training, equipment and strategy must be made if it is to continue conducting the more dangerous operations safely at night and/or in bad weather. Further, a better realisation is needed that some call-outs will simply be beyond the capability of available resources.

8.1.8. The Commission has also looked at how Coastguard NZ operation works in with the Police and RCCNZ for category 1 and 2 SAR tasks. These issues are discussed in more detail below.

8.2. Inherent pressures in rescue work

8.2.1. Much of the Coastguard NZ work is conducted in a "routine" environment, a typical example being on patrol in an area of high recreational vessel density in normal weather conditions on a weekend, responding to a range of events such as engine breakdowns, fuel starvation and people in other minor difficulties. This type of operation does not engender the sense of urgency normally associated with genuine distress calls for life-threatening situations and it usually occurs in daytime and in reasonable weather conditions. The converse of this type of operation is the call-out situation, where the crews are paged to respond to events often at night.

8.2.2. There are inherent risks associated with a call-out situation: pressure to take or complete a mission, the weather, night navigation with associated spatial disorientation owing to lack of visual cues, possible unfamiliarity with the location of the rescue, and the inability to appreciate and read the sea conditions at night fully. These risks are not unlike those identified by the United States National Transportation Safety Board in a special report on emergency medical services operations [aviation] (National Transport Safety Board, 2006)

8.2.3. The National Transportation Safety Board identified the need for a risk evaluation by, say, the skipper of the rescue craft and one other person to assess the situation without being influenced by the sense of urgency that can accompany the initial call requesting the services.

8.2.4. The service-level agreement that existed between NZSAR and Coastguard NZ allowed for Coastguard NZ to not respond if there were any safety concerns for the responding vessel or crew. The situation was complicated by the fact that Coastguard NZ could self-task its craft to respond to non-urgency calls picked up via coastguard radio channels. In some cases, where an urgency or distress situation arose, these calls would be better directed to either the Police or MOC monitoring the distress frequencies but the person in need of assistance might not know the meaning of an "Urgency" or "Distress" situation and might not know who to call on the appropriate radio distress frequency. If these calls were received by the Coastguard, the decision to escalate the callout to a Class 1 or Class 2 SAROP would rest with the Coastguard radio operator.

8.2.5. The Coastguard radio operator could be sitting in a dedicated control centre, such as in the Northern Region, or could be one of the persons who could be required to crew the Coastguard vessel, in the case of the smaller and more remote Coastguard areas. Either way, the person taking the call would need a good understanding of what the local conditions were and the capability of the Coastguard unit they were tasking.

8.2.6. In 3 of the cases examined there was evidence that the person in charge of tasking the Coastguard unit was influenced by a desire to task a unit beyond what was actually required. In the case of the *Dive! Tutukaka Rescue*, CNR had been monitoring the MOC discussion with the *Indian Summer* and twice telephoned MOC offering to task the Tutukaka unit, eventually giving an estimated time to arrival at the *Indian Summer* of 45 minutes, at night, in poor actual and forecast weather conditions and with limited knowledge at that stage of the capability of the responding crew. It is not clear what action the crew of the Coastguard vessel intended to take had they successfully located the *Indian Summer*, or whether they had thought that far ahead, but that should have been decided at the pre-planning or reassessment stages, neither of which took place. It is feasible that the risk to the Coastguard vessel and its crew would have been greater than the risk to the *Indian Summer* and its crew.

8.2.7. In the case of the *Hibiscus Rescue One*, there were already 2 other Coastguard units either in attendance or on their way to assist the vessel in need of assistance before the crew of the *Hibiscus Rescue One* was paged, so the time taken for the crew to respond was not as critical. In any event the crew had ample time to prepare the vessel for the task and plan the trip before departing for the scene.

8.2.8. In the case of the *Trusts Rescue*, the skipper (in this case) was convinced against his better judgement to cross the Manukau Bar in the dark, and to cross the bar via the South West Channel rather than his preferred South Channel, to suit the preferences of the *Earthrace*. It is questionable whether the Coastguard unit was an appropriate resource to provide what in effect was a pilotage service, and it is unclear why the crossing had to be made in the dark and not via

the preferred South Channel, where the wave conditions were generally more suitable for smaller craft.

8.2.9. A call for assistance could come via Coastguard radio, the Police or MOC. In the Coastguard Northern Region's case, its goal was to respond to 90% of the popular recreational boating areas, with a rescue vessel on scene within 60 minutes of activation, 24 hours per day and 365 days per year in up to force 7 weather conditions. This could place undue pressure on dispatchers and skippers alike to respond without fully considering the risk to the operation.

8.2.10. Research shows that humans can suffer from hazardous attitudes from which hazardous thoughts develop and affect the standard of their decision-making. These attitudes depend upon an individual's characteristics and the type of environment in which they are operating. Factors that can influence decision-making are commercial pressure, peer pressure and the corporate environment in which the decisions are made (Largo, 1993). The skipper of the *Dive! Tutukaka Rescue* believed that an urgent boat response was required although that was not the message he had received via his pager. His demonstrated behaviour on the night was symptomatic of an overly strong desire to accept the task then to act too quickly, a desire it would seem was shared by the CNR dispatcher.

8.2.11. The Coastguard NZ would benefit from reviewing its procedures for tasking urgent call-outs in marginal conditions, whether self-tasking or by request from the Police or the RCCNZ. The review should achieve at least 2 outcomes, the first being that those involved in making the decision should have access to all of the information necessary to make a prudent call, and the second, acknowledging that although the skipper of the vessel should have the final say about whether to proceed with a mission, a thorough discussion about this should take place beforehand. This decision-making process should involve other people, including someone not affected by the sense of urgency.

8.2.12. Examples of information that should be available to those responsible for tasking vessels include the weather conditions, the type and size of the vessel being tasked and the experience of those who are going to crew it. The suitability or match of the vessel to the task is something discussed later in this report.

8.3. Night operations/navigation

8.3.1. Navigating small vessels at night has some special challenges that can only be overcome by choosing the right style of navigation for the circumstances and total user familiarity with the chosen equipment, including knowing its limitations.

8.3.2. A second point to consider is that when operating small vessels at night in heavy seas, the helmsman will not be able to see and "read" the waves ahead as well as during daylight, so large or unusual waves might be upon a vessel before the helmsmen has time to react.

8.3.3. Daytime navigation (in clear weather) has the advantage that the crew can look out of the window and identify geographical and navigational features to help maintain awareness of where they are. In good visibility this navigation by eye, together with reference to a chart, can be all that is required. At night the visual cues available to the crew could however, be reduced to single points of light source or, in their absence, total darkness.

8.3.4. Small vessel operators often rely on electronic navigation suites to help maintain spatial awareness, and Coastguard NZ was no different. All 4 of the Coastguard vessels discussed in this report were fitted with such equipment, and in each case the equipment was being used as the prime navigation tool, which could have been appropriate if the users had been totally familiar with its operation and particularly with its limitations.

8.3.5. One advantage of radar is that it will detect above-water objects around the vessel, so it gives the crew an actual picture of their position in relation to those objects. In a small vessel in rough seas, however, the radar will also detect the surrounding waves, and any objects close by can be obliterated within what is called sea clutter, making the radar redundant for navigation close to land or other objects. This was a problem the crew of the *Dive! Tutukaka Rescue* encountered both on their way out of Tutukaka Harbour and approaching the shoreline where their vessel struck the rock.

8.3.6. Radars only give a picture of what is above the water, so the crew need to have a good awareness of their position in relation to underwater dangers as well. The skipper of the *Hibiscus Rescue One* was only using radar and an estimation of where he thought his vessel was amidst the backscatter of lights from the marina and the dark of what lay beyond; consequently he lost awareness of where his vessel was in relation to the submerged rocks and ran his craft aground, at speed.

8.3.7. GPS-referenced chart plotters are a good aid to navigation, but the system does have a inherent level of inaccuracy, which makes them unsuitable as the sole means of navigation when operating close to the shore and other structures. GPS-referenced chart plotters were being used as the prime navigation tool in all 4 of these cases, although in the case of the *Hibiscus Rescue One* the system was initiated only shortly before the vessel grounded. The directional problems the *Dive! Tutukaka Rescue* experienced on the way to assist the *Indian Summer* suggests that the crew were not well practised at navigating by GPS alone, and the fact that they were prepared to navigate by GPS alone when so close to a rock-strewn shoreline, at speed, indicates that they had a false expectation of its accuracy and were not fully conversant with the limitations of their equipment.

8.3.8. Similarly, the *Trusts Rescue* was allowed to set to the north of the South West Channel when crossing the Manukau Bar, to the point where the vessel it was leading became uncomfortable with its position and of its own accord adjusted its course south and overtook the Coastguard vessel. Being set northwards towards the North Bank and Western Shoals could well have been a factor in encountering the steep and short-period waves that contributed to the accident.

8.3.9. The problem of not being able to see the wave pattern when navigating at night was a factor in 2 of these accidents, arguably the principal cause of the accidents involving the Riverton and Manukau Coastguard vessels.

8.3.10. Operating small non-displacement vessels in rough sea conditions, particularly in steep wind-driven waves as opposed to long swell waves, requires some skill and the ability to read the waves and adjust the vessels course and speed to negotiate them safely. Generally, the smaller the vessel in relation to the size of the waves, the bigger the risk, but that risk can be more easily managed during daylight. Reducing speed at night, with the option of putting bow to wind and sea and riding out the weather are common strategies used to mitigate the risk, but with the Coastguard vessels responding to a distress or urgency situation these options while available would not sit well with the goal of effecting a rescue, and the inherent pressures that go with achieving that goal.

8.3.11. That is not to say that small-non-displacement vessels cannot be used at night in rough sea conditions. It just means that when they are, particular caution on the part of the operator is required and that the response time should not be calculated at the vessels' normal cruise speeds. If a more suitable vessel is available, consideration should be given to using that vessel instead.

8.4. Vessel suitability and extracurricular activities

8.4.1. Continuing the discussion on small non-displacement vessels in rough seas, and using the *Dive! Tutukaka Rescue* as an example, the Commission questions whether this type of craft is best suited for night operations in heavy seas. At 9.5 m long and operating in what was estimated to be combined 3.5 m waves at night, the vessel would have required some careful operation to avoid mishap, let alone perform a rescue of another craft as well.

8.4.2. The *Dive! Tutukaka Rescue* appeared to be the style of craft favoured by Coastguard NZ for almost its entire fleet, albeit with some variations in size and brand. At the time of these accidents Coastguard NZ did not have a process for evaluating the fleet requirements on a national or area basis; rather vessels were purchased based on what the individual Coastguard units thought best suited their needs. Using this approach Coastguard NZ had missed the opportunity to standardise the vessels and the onboard equipment (which would help with standardising training) and had also missed the opportunity to optimise the structure of the fleet to best meet its objectives. For example, in the Hauraki area of the Northern Region there were 9 Coastguard units. An evaluation of the locations and types of vessels operated by each unit might identify that one or more of the units that were more likely to be operating in the

outer Hauraki Gulf might be better to use a larger, slower displacement-type vessel more suited to heavy-weather night-time operations. Such an evaluation would logically take into account the other SAR resources with which the units would need to integrate, Police Maritime Units for example. The evaluation then could ideally happen at the SAR Council level, with input from other SAR stakeholders, ensuring a whole-of-government approach is taken to equipping the Coastguard rather than decisions being made at Coastguard unit level. This approach would possibly save costs through economies of scale for purchasing. As this inquiry progressed, changes within Coastguard NZ were starting to address this issue.

8.4.3. Incidental to 3 of these accidents, but directly related to the accident involving the *Trusts Rescue*, is the issue of extracurricular activities in which Coastguard vessels engaged from time to time, and whether these were consistent with the purposes of the vessel as stated on the fitness-for-purpose certificates. The question of why the *Trusts Rescue* was being used for what was effectively a pilotage service warrants some discussion, and even if such a pilotage service was required at all.

8.4.4. The Manukau Bar is not an ideal place to be for any vessel at night; in fact larger commercial vessels are prohibited from crossing it at night and other users are cautioned not to do so. The *Trusts Rescue* could have feasibly been tasked to cross the bar at night to render assistance, but this was not the case on the day of the accident. The *Earthrace* was clearly able, and better suited it would seem, to cross the bar of its own accord, evidenced by its navigator taking their own corrective action to regain centre channel and increase speed to enable them to manoeuvre better.

8.4.5. Even if the trip had been being used as a training exercise, there should have been no passengers on board, but there was one. The *Trusts Rescue* had been surveyed and classed as a non-passenger vessel, so according to Maritime Rules it should not have been carrying passengers. If Coastguard NZ vessels are intended to carry passengers, a decision needs to be made on whether they are to be surveyed and equipped as such, which then gives rise to the issue of skipper qualifications (see Appendix 3). Under the current Maritime Rules skippers of passenger vessels are required to hold formal maritime documents, which the Coastguard NZ certificates of competency issued under Maritime Rule Part 35 did not meet.

8.4.6. In discussions with the various persons involved with Manukau Coastguard, it became apparent that the Coastguard vessels were used for commercial activities, including ferrying of passengers. There was also a mismatch between Manukau Coastguard's believed area of operation (out to 50 nm off the coast) and where the vessels were permitted to go (12 nm off the coast).

8.4.7. The Commission has not probed the detail of these issues, but if they are symptomatic of the situation with other Coastguard NZ units then they will need to be addressed at managerial and regulatory levels.

8.5. Planning

8.5.1. In its Search and Rescue Boat Book Coastguard NZ stated that "Operational accidents and incidents often stem not from equipment failure or deficiencies in people's skill and experience in using equipment, but more often from the operational plan (or lack of) that was employed by the crew". The boat book then referred to the crew stopping to assess and plan before going to the immediate area of an incident. (see Appendix 1). This was a good instruction that if followed would undoubtedly have increased the chances of a successful mission, but what could not be found in any of Coastguard NZ's training material was the fundamental need to plan before even launching the vessel; the need to plan to get there and back.

8.5.2. Planning for any mission should be undertaken before the vessel leaves its berth. All available information should be gathered and any factor that could affect the outcome of the mission should be considered before a decision is made to proceed; the mission includes the trip to reach the location where the task is to be performed. As previously mentioned, more than one person should be involved in influencing that decision, preferably as many of the crew as possible.

8.5.3. Once the decision has been made, the plan should be formed. Every one of the crew should know what the plan is and the vessel prepared as much as practicable before departure. Tasks will be easier to perform on a stable platform alongside the wharf than on a small vessel in a rough sea and in the dark. An open-ended plan can always be amended when nearing the accident site using the Coastguard's "stop assess and plan" when more or new information about the task becomes known.

8.5.4. When the skipper of the *Dive! Tutukaka Rescue* arrived at the vessel, other volunteers were already there preparing the vessel. Once the skipper obtained details of the task from CNR he made his own plan and gave a cursory briefing to the crew members available before the vessel departed the berth. Some of the crew members at that stage were unaware of where they were going. The trip plan was made on the way, and the result of this was evident in the erratic track taken by the vessel en route. Had the trip been programmed into the navigation system before departure, the navigator falling ill would not have been such an issue, and the skipper need not have taken the helm.

8.5.5. Similarly with the accident involving the *Hibiscus Rescue One*, the skipper was in a hurry to depart the berth, the navigator was still initiating the navigation system as the vessel departed the marina entrance, the only plan apparently in his mind being to get to the scene as quickly as possible. Only 9 minutes elapsed from the time the crew were paged at their homes to the time the vessel left the wharf.

8.6. Crew training

8.6.1. Teamwork, when all the crew on board the vessel work together towards a common goal is known in the maritime industry as crew resource management (CRM). CRM is the use and co-ordination of all the skills and resources available to the crew to achieve the established goal of optimum safety and efficiency (Largo, 1993).

8.6.2. The use of CRM helps eliminate the potential for one-person errors and aids the flow of information between members of the crew, and between the crew and the outside world. Part of the flow of information between members of the crew is challenge and response and the use of closed-loop communications to ensure that orders and information are correctly heard and understood.

8.6.3. When challenge and response is encouraged, the other members of the crew can reasonably challenge an order or information to ensure that it is correct and that the most suitable option available has been chosen. For a crew member to challenge a deviation from the plan, they first must know what the plan is.

8.6.4. When used effectively, CRM ensures that all the crew share a common view of the intended passage, maintain situational awareness, anticipate dangerous situations, acquire all relevant information and act upon it in a timely manner, avoid an error chain being formed, and avoid preoccupation with minor problems.

8.6.5. Coastguard NZ had included the basis of CRM in the crew management section of the Advanced Skippers course, which any member of the Coastguard who held a Coastguard NZ certificate of command could attend. However, for CRM to be most effective, all of the crew must be aware of the principles of CRM and the part they are required to play in the effective management of a mission. CRM training should feature at the beginning of all Coastguard NZ training so that anyone entering the training programme learns the principles from the beginning.

8.6.6. The *Dive! Tutukaka Rescue* scenario is an interesting case in point. The skipper started the trip in an overseeing role, with other crew members undertaking the key tasks of steering and navigating. He was though, in an ideal position to stand back and oversee the situation. When the navigator fell ill, he elected to take the helm himself, a task that required a large part of his concentration, particularly at night and in the rough sea conditions. Had the rest of the crew shared exactly his mental model of what was going to happen next, this might not have been such a problem. His crew were still gathering information and commenting, essentially feeding him information, but he would have had some difficulty processing all that information and maintaining a clear picture of what was happening around him. That is to say, he was losing situational awareness.

8.6.7. Research has shown that an individual's limited capabilities of information processing can be easily overloaded and can result in load shedding, channelled attention or regression to ingrained but inappropriate skills. The capacity to process information can be further reduced by stress, fatigue and lack of currency. Any conscious task (including daydreaming and worrying) can occupy attention and block out other information. Unusual or difficult mental tasks can cause a narrowing of the visual field. However well learned skill routines take up less mental capacity than routines that are less polished. Tasks requiring intense vigilance will suffer after approximately 20 minutes. Task stress can lead to a focusing of attention, causing us to filter out aspects of our surroundings of which we would otherwise be aware (Hobbs, 2001).

8.6.8. The entire crew had become focused on sighting the *Indian Summer* to the detriment of someone monitoring their own vessel's position in relation to the shoreline. They had just heard the *Indian Summer* say that its crew had the Coastguard vessel in sight, so when someone on the Coastguard vessel said they saw a light, there was an immediate assumption by the skipper that it must be the *Indian Summer*, so he accelerated his craft and turned towards it, towards the rocks. That was the time the Coastguard NZ training of stop, assess and plan should have been followed.

8.6.9. There was a last-minute challenge from one of the crew that he thought the light might be on the shore, but it was too late.

8.6.10. The case involving the *Hibiscus Rescue One* was not as complex. A plan was never made and the vessel was not fully prepared before departing the berth. The skipper appeared to succumb to pressure to respond quickly, although it was not established by this inquiry whether that pressure came from the dispatcher, from the skipper himself or a combination of both. Had an environment of good CRM existed within the crew it is highly possible that someone would have challenged the skipper to stop, assess and plan before departing the berth.

8.6.11. The navigator eventually "caught up" with the skipper as the vessel departed the marina, having just had time to program the navigation system, and immediately challenged him on the position and heading of the vessel. The skipper's response was to increase speed. Had he been receptive to advice and challenge from his crew, he should have at least slowed down and altered course to starboard until the team was able to establish its position with certainty before continuing.

9. Findings

The following findings are not listed in any order of priority:

9.1. The *Dive! Tutukaka Rescue* collided with a rock at a moderate speed because the crew became focused on the task of searching for the vessel they had been sent to assist, and lost awareness of where their vessel was in relation to the rock-strewn shoreline.

9.2. Factors contributing to the crew of the *Dive! Tutukaka Rescue* losing situational awareness included, poor preplanning, not reassessing the plan on arriving in the area of the incident, the absence of effective CRM and the crew over-relying on the electronic navigation equipment when navigating close inshore.

9.3. The *Hibiscus Rescue One* ran aground at high speed because crew quickly lost awareness of where their vessel was in relation to submerged rocks when they lost their visual cues as their vessel left the sanctuary of the well-lit marina.

9.4. Factors contributing to the *Hibiscus Rescue One* running aground included unnecessary haste, an almost total lack of preplanning, and the absence of effective CRM.

9.5. *Trusts Rescue* was travelling too fast for night-time navigation over the Manukau Bar and the helmsman was unable to see the series of large, steep waves in time to slow the *Trusts Rescue* to an appropriate speed before encountering the waves.

9.6. Factors contributing to the accident involving the *Trusts Rescue* included the vessel's unsuitability for guiding another craft that had superior and different sea-keeping characteristics, the decision to make the crossing at night, the decision to use the South West Channel and the standard of navigation that allowed the vessel to set northwards towards shallower water.

9.7. The crew of the *Russell John Chisholm* were injured because the craft was travelling too fast at night for the sea conditions that could reasonably be expected for the area in which it was operating.

9.8. Coastguard NZ's system for tasking its rescue vessels did not always ensure that the people responsible for tasking or accepting tasks were in possession of sufficient information to make prudent decisions, and did not ensure that people unaffected by the sense of urgency inherent in rescue call-outs were involved in that process.

9.9. Small vessel maritime operations at night present additional challenges for vessel handling and navigation for which the Coastguard NZ training system had not fully prepared the crews involved in these 4 accidents.

9.10. The rigid inflatable vessels favoured by Coastguard NZ for its rescue vessels might not have been the most suitable for the heavy-weather (up to force 7) night operations with which the Coastguard was tasked from time to time, and would have meant the crews were placed at too big a risk for their level of training and expertise.

9.11. For the Manukau Coastguard unit there was a disparity between the operating limits for the vessel, the designation of the vessel as a non-passenger vessel, the type of extracurricular work in which the vessel was engaging and the qualifications required of the skippers, which if indicative of the situation with other Coastguard NZ units will require changes to bring the operation in line with Maritime Rules.

9.12. Coastguard NZ did not have a process requiring its crews to plan a response and assess the risk when first tasked, the first requirement for crews to plan being on arrival at the area of the incident; consequently, lack of planning contributed to 3 of the 4 accidents discussed in this report.

9.13. Coastguard NZ recognised the need for training in CRM for its skippers, but because this training was not extended to all crew, the concept could never have worked effectively. The absence of effective CRM contributed to all 4 of these incidents.

9.14. The standard of night navigation techniques among the crews in 3 of the 4 accidents discussed in this report indicates that there are shortcomings in the navigation training skills programme for Coastguard NZ crews.

10. Recommendations

General

10.1. The Commission may issue, or give notice of recommendations to any person or organisation that it considers the most appropriate to address the identified safety issues, depending on whether those safety issues are applicable to a single operator only or to the wider transport sector. In this case, recommendations have been issued to The Secretary for Transport, Maritime New Zealand and The Royal New Zealand Coastguard Incorporated and with notice of these recommendations given to the other 2 entities as appropriate.

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

Recommendations

The following recommendations are not listed in any order of priority:

Recommendation 1

It is a safety issue that the system for tasking a Coastguard rescue vessel does not always ensure that the people responsible for tasking or operating the vessel are in possession of sufficient information to make a prudent decision on whether the task should be undertaken. Further, a person independent of the crew should always involved in the decision process.

It is recommended that the Chief Executive of The Royal New Zealand Coastguard Inc. develops a nationwide standard that supports measured decisions based on the maximum available information when tasking coastguard vessels. (012/11)

Recommendation 2

It is a safety issue that there are shortcomings in the standard of navigation training applied by Coastguard crews particularly for navigation at night and in poor weather conditions.

It is recommended that the Chief Executive of The Royal New Zealand Coastguard Inc. ensures that all Coastguard crews achieve a high standard of navigation skills for all Coastguard crews commensurate with the worst case scenario of conducting rescues at night and in bad weather. (013/11)

Recommendation 3

It is a safety issue that the Coastguard did not have a process requiring its crews to undertake pre-departure planning when tasked to an incident thus increasing the risk of an accident occurring en-route to the incident area.

It is recommended that the Chief Executive of The Royal New Zealand Coastguard Inc ensures all Coastguard crews conduct an appropriate pre-departure plan , that includes a risk assessment, and that the plan is reassessed at appropriate times as the rescue scenario unfolds. (014/11)

Recommendation 4

It is a safety issue that the Coastguard did not extend the training in the concept of crew resource management to all members of the crew so that the crews could work cohesively as a team to maintain situational awareness, monitor the plan, anticipate dangerous situations, acquire timely information and avoid pre-occupation with minor problems.

It is recommended that the Chief Executive of The Royal New Zealand Coastguard Inc incorporates in its training regime for all crew from the very early stages the concept and use of crew resource management as a means of achieving its goal of optimum safety and efficiency in the operation of its vessels. (015/11)

Recommendation 5

It is a safety issue that there appears to be a disparity between the operating limits and designation of the Coastguard vessels and the types of extra curricular work the vessels are engaged in and the qualification requirements of the skippers of Coastguard vessels.

It is recommended that the Director of Maritime New Zealand considers some means of aligning the qualifications of Coastguard certificated skippers with the qualifications structure of Maritime New Zealand to ensure that the Coastguard certification better serves the needs of its skippers with respect to operating limits, designation of vessels and anticipated work to be undertaken. (016/11)

Recommendation 6

Better search and rescue efficiencies and a safer coastguard operation could be achieved if the design and type of vessels assigned to individual coastguard units are compatible with the conditions they are more likely to operate in and easily integrate with other search and rescue resources available locally and nationally.

It is recommended that the Chief Executive of The Royal New Zealand Coastguard Inc review the coastguard fleet with a view to achieving standardization of design, suitability for likely operating conditions and the best fit with other search and rescue resources both locally and nationally. (017/11)

10.3. On 13 May 2011 The Royal New Zealand Coastguard Inc. responded to the recommendations as follows:

Recommendation 1

Accepted

Coastguard to develop and implement a nationwide standard that supports measured decisions based on the maximum available information when tasking coastguard assets. As the environment we operate in is dynamic we see the investment in the decision making skills of those in charge as, if not more, valuable than a system or process and will continue to pursue this as our primary outcome.

Training component is being addressed within the CRM for CRV Masters and the Duty Officer or nominated Ground Person as part of the current Training Development Project to be completed for implementation from July 2011.

Recommendation 2

Accepted

Coastguard volunteer (CoC) training will include high standard of navigation skills commensurate with worst case scenario of conducting weather at night and in bad weather.

This is being addressed as part of the mandatory competency level for Operational Crew as well as an advanced navigation skill set for Senior Crew, through a new course being designed as part of the current Training Development Project to be completed for implementation from July 2011.

Recommendation 3

Accepted

All Units have requirements as part of the Safe Ship Management System (MNZ) for standard operating procedures for pre-departure planning. Coastguard will develop and implement a National standard for pre-departure planning that includes a risk assessment process and reinforces the SAPP requirements laid out in the Coastguard Boat Book,

The application of pre-departure planning will be regularly reviewed as part of the Unit Capability Reports completed by Regional Operations Managers. It will also and incorporated into the CRM

for CRV Masters as part of the current Training Development Project to be completed for implementation from July 2011.

Recommendation 4

Accepted

Coastguard will develop and implement training from the recruit stage to develop a culture that increases individual's appreciation of the personal and team responsibility. This will improve the cohesiveness of the team to maintain situational awareness, monitor the plan, anticipate dangerous situations, acquire timely information and avoid pre-occupation with minor problems.

This will be addressed as part of CRM for all crew members as part of the current Training Development Project to be completed for implementation from July 2011. This will also be applied retrospectively to existing crew.

Recommendation 5

Accepted

Current Coastguard training requirements exceed those required for a number of the MNZ Commercial qualifications so alignment is overdue and would be strongly supported by Coastguard.

Recommendation 6

Accepted

Coastguard is responsible for the Coastguard Rescue Vessel fleet and is currently identifying funding to undertake the Vessel Standardisation Project" as identified in the 2020 Vision document:

Rescue Vessel fleet built to agreed plans and process

Classes of vessels agreed and replacement aligned with 'fit for purpose" identified through "evaluation".

Standard fit out to agreed National standard

Coastguard is also progressing a Coastal Evaluation Tool for use with current and future resourcing.

10.4. On 17 May 2011 the Director of Maritime New Zealand responded to the safety recommendation as follows:

MNZ has recently completed a review of the domestic commercial qualifications and the associated operational limits. That review has involved extensive consultation with the maritime industry to ensure that MNZ's approach to licensing seafarers manages risks and supports a modern maritime sector while ensuring the safety of vessels, their crew and passengers and cargo.

Coastguard has advised MNZ that it is supportive of the proposed Qualifications and Operational Limits framework. Currently the skipper of a coastguard rescue vessel may hold either an ILM or LLO certificate of competency. Coastguard also advised that they require their coastguard rescue vessel crew to undertake training beyond that required by MNZ to recognise the conditions in which they operate.

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Appendix 1: Coastguard Search and Rescue Boat Book, pages 1 and 2

RESCUE

The CRV and its crew will enter situations that may involve a high degree of risk if proper planning and procedures are not followed.

It has long been recognised in SAR operations that operational accidents and incidents often stem not from equipment failure or deficiencies in people's skill and experience in using equipment, but more often from the operational plan (or lack off) that was employed by the CRV crew.

SAP – STOP ASSESS PLAN

SAR crews need to observe the scene carefully and notice all the details then formulate and agree to a plan **before** getting involved.

The idea of assessing the situation before formulating any plan of action is something that has always been taught to Coastguard crews. SAP is merely a more structured form of what should already be standard practice.

What is emphasised in SAP is that **all the crew**, not just the Skipper, are involved in both the assessment and planing stage.

SAP is a structured habit, a basic tool used in any situation with potential risk even scenes that appear routine should still be assessed.

Using SAP, a SAR crew can:

- Identify all the hazards at a scene
- Receive input from all crew members
- Formulate a plan that best fits the situation
- Assign tasks /roles for each crew member

SAP can be as short as a few seconds for routine situations such as taking a vessel in tow and could take considerably longer for more complex/hazardous situations.

Phase 1 – STOP

Once you have entered the immediate area of an incident you are within range of any dangers that may be present and involved in the scene

This is why it is critical to stop outside the immediate area of the incident for an initial assessment. It is the small or partially hidden factors that can quickly turn an operation into a disaster.

In many situations, the vessel should come to a complete stop (all way off). In some situations, it may be necessary to maintain steerageway, to slowly circle a scene or even pace a vessel underway in order to keep a constant position. ***This all counts as stopping***

Pre-Arrival Planning
The situation that a SAR crew expect may well be different from the situation that they arrive to, and so will the solutions to the problems.

Pre-arrival planning can lead to problems when SAR crews go in with a plan that does not fit the situation. When the SAR crew arrives on scene they should always take a fresh, unbiased view of the situation.

Phase 2 – ASSESS

The most important step, assessment must be just that – assessment **not planning**.

Here the entire crew observe the scene carefully and comment on what they can see. Details can make a profound difference.

"I see lines in the water off the stern"

"Looks like she's listing to port and down at the bow"

"There's fuel or oil on the water"

If the scene is complicated, it may be necessary to have a few seconds of silence while people observe; this gives the crew time to focus on their task of observation.

Phase 3 – PLAN

The planning stage is where **all crew** are involved in coming up with the most effective plan. Everyone gives input but the Skipper has the final say. Once a plan is decided the Skipper assigns tasks and gets verification from the crew that they all understand the plan and their individual roles. Sometimes situations can change and turn a good plan into a bad one. If the Skipper can foresee certain circumstances then a backup plan can be discussed.

Appendix 2: Coastguard training scheme

COASTGUARD CRV CREW QUALIFICATIONS			
Phase of learning	**Pre-requisites**	**Modules**	**Qualification gained at end of this phase**
Induction			
Induction Phase: On satisfactory completion of these modules will graduate with a Trainee Certificate	Unit Induction Unit H & S Policy	Personal Safety NZ SAR System	Trainee Certificate (CNZ)
Trainee Crew			
Training Phase: On satisfactory completion of these modules will graduate with an Operational Certificate	**First Aid Certificate** (Approved Course) **Day Skipper** (CBES) **VHF Certificate** (CBES) **Local Area Familiarisation** Unit **Basic Boat Handling** (Unit) **Safe Ship Man. Manual** (Unit) *20 Logged CRV Actual Hours*	Legal Considerations SAR Comms Towing Observation Techniques Victim Recovery Man Overboard	Operational Certificate (CNZ)
Operational Crew			
Operational Phase: On satisfactory completion of these modules will graduate with a Senior Certificate	**Boatmaster** (CBES) **Radar** (CBES) **Inboard Maintenance** (CBES) **Outboard Maintenance** (CBES) **GPS** (CBES) *75 Logged CRV Actual Hours*	Search Techniques Emergency Repairs Working with Aircraft Boat Handling & Heavy Weather On- scene Command	Senior Certificate (CNZ)
Senior Crew			
Senior Phase: On satisfactory completion of these modules will graduate with a Master's Certificate	**Satisfies local Unit criteria** **Seatime Hours** *(750 qualifying hours)* **Minimum Experience logged** **Practical Master's Course** *(1 day)*	CoC Practical Assessment Theory Assessment	Master's Certificate (CNZ)
Master			
Master's Phase: On satisfactory completion of these modules will graduate with a Senior Master's Certificate	**Satisfies local Unit criteria** **Seatime Hours** (1,500 qualifying hours) **Minimum Experience logged** **Advanced Skipper's course** (2 day)	CoC Practical Assessment Theory Assessment	**Senior Master's Certificate (CNZ)** The Master strand of CIMSAR is now completed awarding the **Certificate in Coastguard Marine SAR – Rescue Vessel Crew** (Bay of Plenty Polytechnic)
Senior Master			
Training Master's Phase: On completion of this module will graduate with a Training Master's Certificate	**Practical Instructor Training Course** (2 day)		**Training Master Certificate**
Local Unit Training Elements Remain : - All practical training relating to theory modules / Local Area Familiarity / Basic Boat Handling / Safe Ship Management. **Practical aspects of SAR modules are covered in the relevant '*Deck Hours*' at respective levels.**			

Appendix 3: Relevant rules from Maritime Rule 31B

31B.9 Inshore Area

(1) Except as provided by rule 31B.6(1)(b), passenger vessels operating within the inshore area must carry —

(a) seafarers holding the minimum required qualifications specified in Table 2 and in the accompanying flow-chart; and

(b) at least the minimum crew specified in Table 2.

(2) If the master of a vessel operating within the inshore limits set out in Appendix 1 of Part 20 holds an LLO, the master must ensure that the vessel remains within the nominated parts of the inshore area endorsed on the master's certificate.

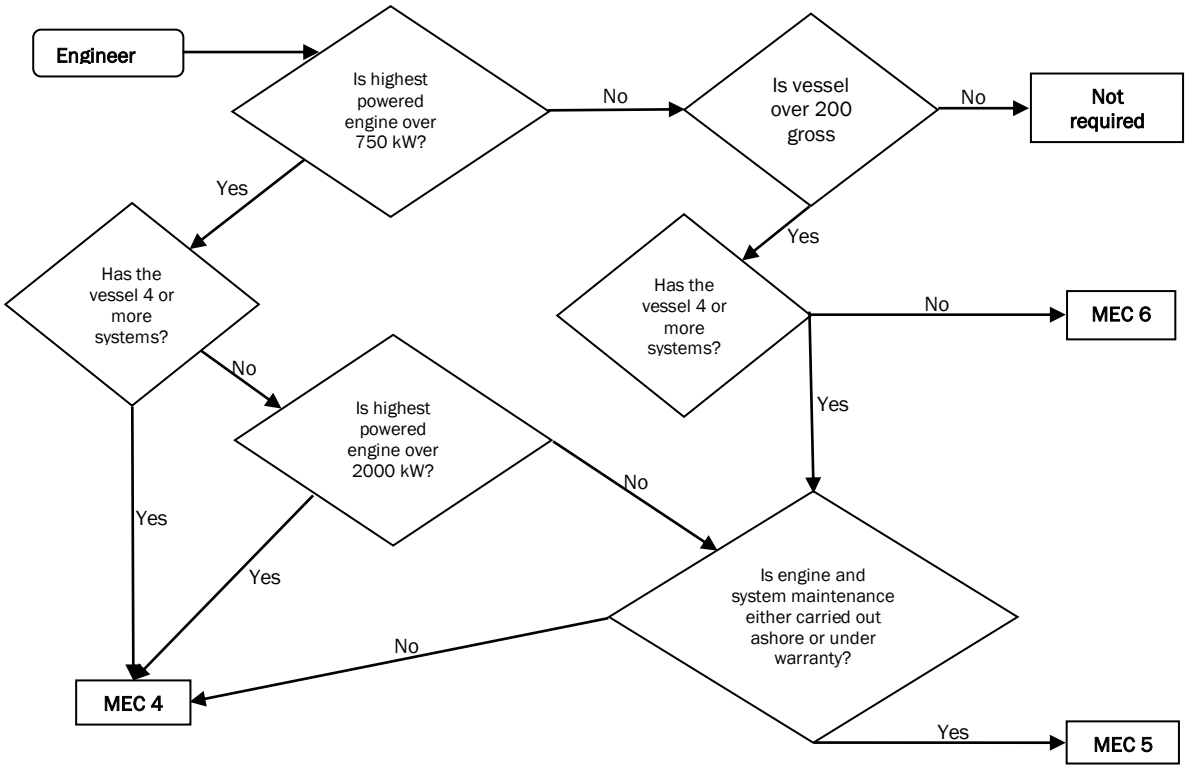
(3) If the master of a vessel operating within any defined section of the coastal area not beyond the 12 mile territorial sea of New Zealand, which has been assigned to that vessel by a surveyor in accordance with Part 20, holds —

(a) an NZOW or an ILM, the master must ensure that the vessel remains within 30 miles of a safe haven that is specified in the vessel's Safe Ship Management Certificate or Safe Operating Plan; and

(b) an LLO, the master must ensure that the vessel remains within —
(i) an area of operation endorsed on the master's certificate; and
(ii) 15 miles of a safe haven nominated under rule 32.9(1)(g)(ii)(bb); and
(iii) 4 miles of the coast.

Table 2

Passengers on board	Minimum Required Qualifications	Minimum Crew
20 – 49	Master - LLO up to 20 m in length overall and ILM if 20 m or more; Engineer – in accordance with flow chart and may be the master	2
Less than 20		1



Appendix 4: *Trusts Rescue* fitness for purpose certificate

NEW ZEALAND SHIP
FITNESS FOR PURPOSE CERTIFICATE

Issued by Maritime Management Services Limited under the provisions of rule 21.13(2)a or 21.13(19)a of Part 21 of the Maritime Rules

Ship Name	TRUST RESCUE	**Port of Registry**	
Primary Port	02	**Overall Length**	12.50 METRES
MSA Number	133339	**Gross Tonnage**	
Ship Type	NON PASSENGER - DRV	**kW (Total)**	
Owner	MANUKAU VOLUNTEER COASTGUARD INC		
Address	PRIVATE BOX 174, TITIRANGI		

The above ship must not proceed beyond the following operating limits:

ENCLOSED WATER LIMITS:	MANUKAU, RAGLAN, KAIPARA
INSHORE LIMITS:	Restricted Inshore area commencing at the southernmost point of Raglan Harbour, thence 270°, 12 miles to meet the NZ Territorial Limit, thence following the NZ Territorial Limit northwards to a point 270°, 12 miles off the northernmost point of Kaipara Harbour, thence directly to shore.
COASTAL LIMITS:	NIL
OFFSHORE LIMITS:	NIL

The above ship must not carry more than the following number of passengers:

ENCLOSED WATER LIMITS:	NIL
INSHORE LIMITS:	NIL
COASTAL LIMITS:	NIL
OFFSHORE LIMITS:	NIL

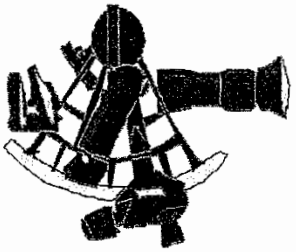
Other limitations on operations:

Life jackets to be worn at all times.

Lifesaving appliances are provided for a total number of **12** persons.

THIS IS TO CERTIFY THAT the above ship complies with the rules and requirements of the Maritime Transport Act 1994 and is fit for the purpose described above. The ship complies with the applicable maritime rules and marine protection rules.

This ship ***does not*** require a Load Line Certificate - Minimum freeboard : **mm**



MARITIME MANAGEMENT SERVICES LIMITED

DATE OF ISSUE: 14 August 2008

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

10-201	Bulk carrier TPC Wellington, double fatality resulting from enclosed space entry, Port Marsden, Northland, 3 May 2010
09-201	Collision: private jet-boat/private watercraft, Kawarau River, Queenstown, 5 January 2009
08-209	Loss of the rigid inflatable boat Mugwop, off the entrance to Lyttelton Harbour, 28 October 2008
11-201	Interim Factual report - Passenger vessel Volendam, lifeboat fatality, port of Lyttelton, New Zealand, 8 January 2011
08-205	Fishing vessel, *San Cuvier*, dragged anchor and grounded, Tarakeha Point, Bay of Plenty, 27 July 2008
08-206	Passenger ferry Monte Stello, collisions with wharfs, Picton and Wellington, 8 and 9 August 2008
09-205	Stern trawler Pantas No.1, fatality while working cargo, No.5 berth, Island Harbour, Bluff, 22 April 2009
09-203	Jet boat, DRJS-11 grounding and subsequent rollover Dart River, near Glenorchy, 20 February 2009
08-203	Passenger Ferry Monte Stello, Loss of Power, Tory Channel, 2 May 2008
08-207	Commercial Jet Boat Kawarau Jet No. 6, Roll-Over, confulence of the Kawarau and Shotover Rivers, 25 September 2008
08-204	6-metre workboat Shikari, collision with moored vessel, Waikawa Bay, Queen Charlotte Sound, 20 June 2008
08-202	Coastal bulk carrier Anatoki and bulk carrier Lodestar Forest, collision, Tauranga Harbour roads, 28 April 2008
07-202	Fishing vessel Walara-K, flooding and sinking, 195 nautical miles off Cape Egmont, 7 March 2007
07-207	Bulk carrier, Taharoa Express, Cargo shift and severe list 42 nautical miles southwest of Cape Egmont, 22 June 2007
08-201	Fishing charter vessel, *Pursuit*, grounding, Murimotu Island, North Cape (Otou), 13 April 2008

Price $44.00

ISSN 1173-5597 (Print)
ISSN 1179-9072 (Online)