

CASE STUDY:

Has New Zealand Search and Rescue improved since the 1994, Pacific Storm event, in the South Pacific?

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Objective

This case study was requested to determine whether Search and Rescue capabilities in the NZ Search and Rescue Region have improved since a major search and rescue operation in 1994.

Background

In late May, 1994, 34 yachts were scheduled to take part in an annual regatta between New Zealand and Tonga. The annual event was scheduled well outside the official cyclone season, which runs from 1 November to 30 April each year. The trip was expected to take up to 14 days, for slower yachts.

The start of the official regatta was cancelled, due to bad weather in the centre of the Pacific, and many of the original 34 yachts delayed their departure or cancelled their plans. As the weather forecast improved yachts set off, either on their own, or in small groups.

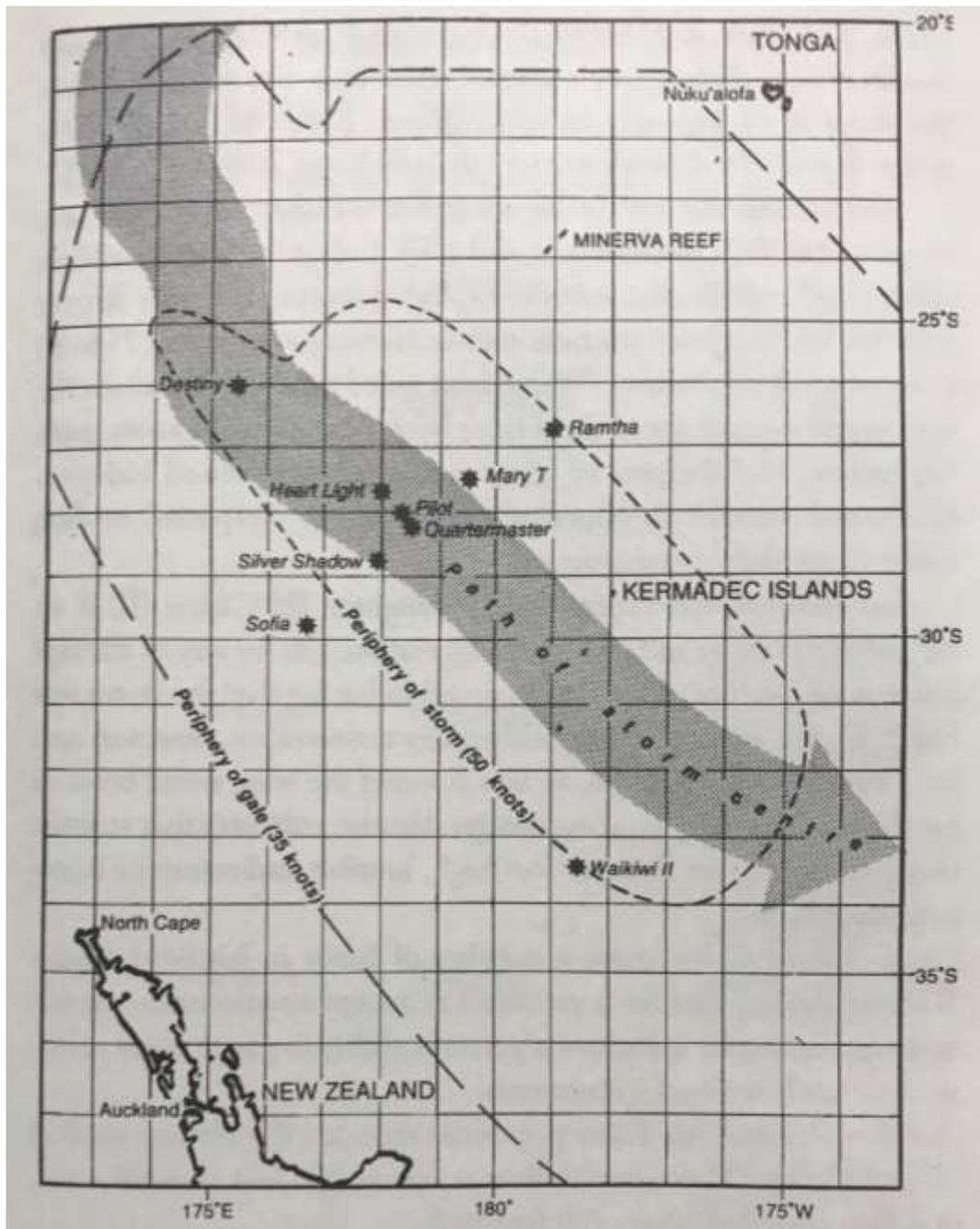
On 3 June a tropical depression began to form between Vanuatu and Fiji. Over the next 24-hours the central barometric pressure in the depression dropped from 1001 mb to 986 mb – in meteorological terms this is described as a ‘weather bomb’. Over the following days the pressure dropped to as low as 978 mb and the storm reached Beaufort Scale 12, with wind speeds over 64 knots and sea heights over 14 metres.

The ‘back of the pack’, nine yachts, with a total of 28 people aboard them, which were the last yachts to leave New Zealand, were caught up in this severe storm. All nine of the yachts ended up requesting help, either through the activation of their EBIRB, or by requesting help via marine radio.

In addition to the yachts in the New Zealand to Tonga regatta, up to 60 other yachts, of various sizes and nationalities, were caught up by the storm. Those yachts requiring assistance were also assisted by the SAR aircraft and vessels.

At its peak, the search and rescue operation, coordinated by the NZ Rescue Coordination Centre, involved aircraft from the NZ Airforce, a NZ Navy Ship, a French Naval Ship, two merchant ships and a fishing vessel. It was the largest rescue operation ever undertaken in the Pacific Ocean.

Volunteer radio operators, Jon and Maureen Cullen, maintained contact with over 60 yachts caught up in, or near, the Pacific Storm from the basement of their home in Kerikeri. The Cullen’s stayed available throughout the SAR operation and were in constant contact with RCC in Wellington.



From Farrington, 1998, pg xv

Approximate positions of *Destiny*, *Sofia*, *Silver Shadow*, *Heart Light*, *Pilot*, *Ramtha* and *Waikiwi II* when rescued. Position of *Mary T* upon issuing Pan call. Last known position of *Quartermaster*.)

By the 7th of June the toll of the storm was fully known.

- One yacht, *Quartermaster*, with three people on board was missing;
- One yacht, *Mary T*, with four people onboard initially requested help but survived the storm, and continued sailing, to Fiji
- A total of 21 people, from the other seven yachts, were rescued by five different vessels; 3 people perished.

Many of the people involved in the rescue received commendations following the event.

A New Zealand Maritime Safety Authority Report issued several recommendations which resulted in some changes to NZ Maritime Regulations.

The question the author is trying to determine is : Were lessons learned from the 1994 event, and whether a similar SAR operation today would have better or different results.

Assets Involved in the Search and/or Rescues:

NZ Land Based Agencies

- National Rescue Coordination Centre (RCC)
- KeriKeri Radio – Husband and wife team

NZ Airforce:

- P3 Orion – Kiwi 315
- P3 Orion – Kiwi 318 – 2nd aircraft sent
- Kiwi 315 went to Fiji after 15 hrs, for rest and fuel. Oil leak found. Could not be repaired. Crew elected to continue SAR ops despite the leak. (Farrington, 1998, pg 127)
- Hercules C130 (used as SAR aircraft)

Vessels:

- Tui Cakau III – 7246 ton roll-on, roll-off container ship – heading from Fiji to Auckland
- HMNZS Monowai – 3900 ton NZ Naval hydrographic survey vessel – departed Auckland 31 May on a three month excursion in the South Pacific
- French Naval Transport Ship Jacques Cartier – 770 ton – departed Brisbane 31 May, heading for Tauranga, on a goodwill visit
- San Te Maru – 360 ton – NZ based Fishing Vessel
- Normadic Duchess – 19,000 ton bulk carrier – Norwegian Registered

Yachts Requiring Assistance and/or Setting off EPIRB:

- Destiny
- Mary T
- Quartermaster
- Sofia
- Ramtha
- Heart Light
- Silver Shadow
- Pilot
- Waikiwi II

'Pacific Rescue' Timeline (NZST) (Farrington, 1998, pg ix)

- Last week of May, 1994 – official regatta cancelled due to bad weather. Yachts leave as they see fit. Some yachts cancel.
- Friday, 3 June – the tropical depression forms between Fiji and Vanuatu
- Saturday, 4 June
 - 0841h Destiny, the 'back of the pack' yacht, furthest North, sends a Pan message alerting Keri Keri radio of extreme conditions
 - 0911h Destiny sets off EPIRB after pitchpoling in 70kt winds
 - 1030h NZ Rescue Coordination Centre activated. NZ naval ship Monowai diverted to assist Destiny
 - 1145h P3 Orion departs Whenuapai Air Base in Auckland
 - 1200h Barometric pressure drops to 986mb – storm now officially a weather bomb
 - 1220h Mary T puts out a Pan call. Monowai diverted to assist Mary T
 - 1440h Merchant ship Tui Cakau III requested to head for Destiny
 - 1548h Quartermaster sends Mayday after being knocked down, but cancels the Mayday short time later
 - 2211h Sofia sets off EPIRB
- Sunday 5 June
 - 0035h Quartermaster reports another knockdown
 - 0204h Last radio contact with Quartermaster
 - 0440h Another EPIRB detected – most likely from Quartermaster
 - 0500h Ramtha requests assistance from Monowai
 - 0745h Tui Cakau III crew rescues Destiny crew
 - 0750h Heart Light activates EPIRB
 - 0800h RNZAF Hercules reports Sofia in distress
 - 1000h Monowai crew rescues Ramtha's crew
 - 1000h French Naval vessel Jacques Cartier asked to divert to Sofia
 - 1210h Hercules crew locates Silvershadow, dis-masted
 - 1446h Life raft from Quartermaster located, nobody on board
 - 1738h Fishing vessel San Te Maru sent to rescue Heart Light crew
 - 1800h Weather system bottoms out at 978mb. Swell estimated at 10-15 metres
 - 2000h Orion locates Pilot, in distress
- Monday 6 June
 - 0020h San Te Maru locates Heart Light
 - 0810h Waikiwi II activates EPIRB
 - 0838h Monowai rescues Pilot's crew
 - 1000h San Te Maru rescues Heart Light's crew and then recovers Quartermaster's life raft
 - 1445h Merchant Vessel Nomadic Duchess diverts to rescue Waikiwi II crew
 - 1745h Monowai rescues crew from Silvershadow
 - 2009h Jacques Cartier rescues Sofia crew
 - 2104h Mary T. cancels Pan message, as weather improves, and continues sailing on own
- Tuesday 7 June
 - 0955h Orion aircraft and helicopter from Monowai begin search for missing Quartermaster crew
 - 1503h Nomadic Duchess rescues crew of Waikiwi II
- Wednesday 8 June
 - 1755h Search for missing Quartermaster crew suspended.

Vessel	4 June	5 June	6 June	7 June	8 June
<i>Destiny</i> 2 POB	0841 Pan 0911 EPIRB 1030 <i>Monowai</i> diverted 1440 <i>Tui</i> <i>Cakau III</i> diverted	0745 <i>Tui</i> <i>Kakau III</i> rescues crew			
<i>Mary T</i> 4 POB	1220 Pan <i>Monowai</i> diverted		2104 Pan cancelled Sails on unassisted		
<i>Quartermaster</i> 3 POB	1548 Mayday; then cancelled	0035 Knockdown 0204 Last radio 0440 EPIRB 1446 Liferaft spotted, empty	1000 Liferaft recovered	Orion and helicopter search for crew	1755 search suspended
<i>Sofia</i> 2 POB	2211 EPIRB	0800 Located by RNZAF Hercules 1000 <i>Jacques</i> <i>Cartier</i> diverted	2009 <i>Jacques</i> <i>Cartier</i> rescues crew		
<i>Ramtha</i> 2 POB		0500 requests assistance from <i>Monowai</i> 1000 <i>Monowai</i> rescues crew			
<i>Heart Light</i> 4 POB		0750 EPIRB 1738 <i>San Te</i> <i>Maru</i> sent to rescue	0020 <i>San Te</i> <i>Maru</i> locates yacht 1000 crew rescued		
<i>Silver Shadow</i> 4 POB		1210 Hercules locates yacht dis-masted	1745 <i>Monowai</i> rescues crew		
<i>Pilot</i> 2 POB		2000 Orion locates yacht in distress	0838 <i>Monowai</i> rescue crew		
<i>Waikiwi II</i> 5 POB			0810 EPIRB 1445 <i>Nomadic</i> <i>Duchess</i> diverted	1503 <i>Nomadic</i> <i>Duchess</i> rescues crew	

Excerpts from the New Zealand Maritime Safety Authority Report Findings (Farrington, 1998, pg 248 -255) :

Recommendations from the original report are in black ink, **compared to what is available today, which is in red.**

1. **Weather:** The ferocity of the storm could not have been predicted by Meteorological teams in New Zealand or Fiji. The yachts were caught out by a tropical depression, rather than a tropical cyclone, which formed quickly near Fiji, the depression quickly developed when it met the colder air, closer to New Zealand.

Weather forecasting has advanced tremendously since 1994. The advances mean that severe weather events can be predicted much earlier than in the past. An increased number of satellites, and more availability of super computers, has been estimated to increase the predicting of major weather events by one day, each decade. This, in theory, should give us four more days warning today, than we had in 1994.

2. **Avoiding the Storm:** The rapid developments of the storm meant the slow moving yachts were unable to move out of the storm's path.

Even if a tropical storm is detected or predicted earlier, this might not give slow moving yachts time to avoid a storm during a 15-day sail between New Zealand and Tonga.

3. **EBIRBs and Radios:** These helped accurately identify the position of many of the yachts. The onboard HF and VHF radios allowed both practical and emotional support to many of the vessels. Handheld VHF radios allowed for communication between the stricken yachts, and nearby rescue vessels, even when the ship's aerial was broken away.

There was confusion over how many EBIRBs were activated, because they were mainly transmitting on 121.5 MHz, in a relatively small area. During the storm, RCC requested that individual yachts shut down their EBIRB for a short time so that a more accurate count could be ascertained. My research only could find one 406MHz beacon activated – which is unsurprising because they were only introduced in the early 1990's.

GPS equipped 406MHz beacons (EPIRB/ ELT / PLB) are able to more quickly, and accurately, determine the location of a beacon which is activated, and also transmits an individual HEX-ID, which uniquely identifies the beacon which has been activated. On 1 February 2009, the 121.5MHz detection capabilities of the Cospas-Sarsat satellites was turned off.

If the beacon has been registered, the HEX-ID will allow a rescue coordination centre to reveal information about the beacon, the person/vessel/aircraft it is attached to, and emergency contact information.

EBIRBs, which are carried on marine vessels, are required to automatically detach from a vessel, and be activated, if the vessel sinks or rolls.

Locating vessels of opportunity was done through marine radio calls, and in at least one case, an aircraft sighting a vessel close enough to effect a rescue.

Today, many vessels, of all sizes, have an Automatic Identification System (AIS) onboard. AIS signals can help locate vessels of opportunity, or help pin point the location of a vessel in distress. AIS is not a requirement in New Zealand waters.

4. **Category 1 Offshore Yachting Requirements:** At the time of this regatta, only NZ registered yachts were required to meet the Category 1, offshore yachting requirements, of the New Zealand Yachting Federation.

These requirements included being “completely self-sufficient for extended periods of time, capable of withstanding heavy storms, and prepared to meet serious emergencies without the expectation of outside assistance”.

Meeting these requirements required a yacht to be thoroughly inspected by two independent auditors, who looked at everything from safety gear required to the competency of the crew.

Only four of the nine yachts in the regatta were NZ registered. The other five yachts were not required to go through a Category 1 inspection. However, these yachts were mainly found to be well prepared for the race. One foreign yacht, “Pilot” did not have a life raft, EBIRB or HF radio.

The Category 1 – Offshore Yachting rules have been updated several times since 1994. The rules only apply to NZ registered yachts, meaning that any foreign yacht does not need to meet NZ safety standards.

Current category 1 safety certificates are required by *all New Zealand-registered yachts leaving New Zealand* on ocean passages. These yachts must be registered on the Maritime New Zealand register of ships. Category 1 requires a percentage of the crew to hold current advanced sea survival certificates and offshore medic qualifications.

In 2013 a US registered schooner went missing in the Tasman Sea. An independent report found that, had the ship been registered in NZ, “it is possible, even probable that she would not have passed the YNZ inspection; from the table above the key deficiencies are the lack of HF (SSB) radio, radar reflector and distress flares”.

5. **Sea anchors/drogues:** A recommendation was made to consider requiring all Category 1 yachts to carry an appropriately sized sea anchor.

This is a current requirement of the Yachting NZ, Safety Regulations of Sailing 2017–2020.

6. **Life Rafts:** Having the correct size raft, for the number of the people onboard, is essential. Having too few people in a raft can cause stabilisation and ballast problems, as well as injuring or killing people if the raft is thrown around in big seas. *Quartermaster*, the yacht from which all crew were lost, had an eight person raft, but only three POB. There was evidence found that at least some of the crew were in their life raft at some point. This suggests that they were in the life raft but subsequently washed out and drowned.

The Yachting NZ, Safety Regulations of Sailing 2017–2020, rule 17.11 states “liferaft(s) capable of carrying the entire crew”. There is no stipulation that, for instance, a six-person life raft can’t be carried for a three person crew.

Having the life raft appropriately secured to the deck is also essential. Four of the vessels lost their life raft when their yacht rolled in heavy seas.

The Yachting NZ, Safety Regulations of Sailing 2017–2020 has requirements for attachment of the life raft

7. **Crewing:** A recommendation was made that skippers ensure they have enough, competent crew, to handle the vessel in large storms. More people on a yacht, or many yachts loosely travelling together, often offer a false sense of security.

The Yachting NZ, Safety Regulations of Sailing 2017–2020 states minimum requirements for crew competency.

Additional comparisons - 1994 SAR Operations vs. Improvements or Changes Today

Rescue Coordination Centre (RCC)

In 1994, RCC was operated under the Civil Aviation Authority, from its Headquarters in Lower Hutt. A single Search and Rescue Officer (SARO) was on call, handling Category II SAR response from a portable briefcase. Once a SAR was underway the SARO would determine if activation of the rescue centre was required.

Once activated for an event like the 1994 storm, the SARO contacted the NZ Police, NZ Airforce, NZ Navy and Maritime NZ, who all sent liaison officers to the Rescue Coordination Centre. The gathered team would handle the SAR operation for the duration of the event.

In 2004, a new Joint Rescue Coordination Centre, operated by Maritime New Zealand, was opened. RCCNZ is staffed 24/7 all year by a minimum of two qualified Search Mission Coordinators. The full time staffing has resulted in a quicker reaction time to Category II SAR events.

NZ Airforce Aircraft / Crew

The RNZAF was challenged by this operation occurring on a holiday weekend. One P3 Orion was able to be sent almost immediately, but it was a challenge to find a 2nd crew for the 2nd Orion. In the end, thanks to the dedication of personnel, both the 2nd Orion, and a C130 Hercules, was made available for the search.

Today, the RNZAF has an Orion available for Search and Rescue, with a two-hour standby period, if there is an aircraft available. On occasions there is not a SAR aircraft available due to other mission requirements, or maintenance issues.

Some of the P3 Orion and C130 Hercules, used in 1994 are still in operation today. The P3 Orion fleet recently completed a major upgrade project. First awarded in late 2016, the project included upgrades and modifications to mission systems and aircraft components, as well as inflight and ground-based simulation for training, spares and maintenance support.
(Gain, 2019)

The RNZAF has announced the upgrade of the P3 Orion fleet, with a Boeing P8 Poseidon, beginning in 2023 (RNZ, 2018). It has also announced that C130J will replace the current C130 fleet, but no date for this has been announced (1 News, 2019).

Technology

Many of the problems encountered in 1994 were due to a lack of, or inferior, technology. Locating vessels in distress, or vessels of opportunity, was much more difficult due to the technology available at the time.

The technology available in 2019 has vastly improved some SAR capabilities. GPS capability, EBIRBs, vessel and aircraft tracking, satellite phones and electronic searchings aids have all been developed or improved.

However, locating a single person, in the water, will always be a challenge for fixed-wing aircraft, flying at speed and minimum altitudes. Radar, FLIR and other technology work well at finding upright, or overturned vessels, but struggle to find a person in the water due to the target being roughly the size of a basketball.

Rescue of Survivors at Sea

The biggest challenge, once yachts in distress were located, was rescuing the people on board the yachts. All of the vessels of opportunity reported similar problems in this regard. In the end, all of the vessels of opportunity managed to rescue the survivors off their disabled yachts. But, the job was not easy...

From the Captain of the HMNZS Monowai (Robbins, 1999): “It was readily apparent that there was absolutely no possibility of bringing Monowai alongside Ramtha in such conditions. The traditional rescue method is for the ship to bring herself alongside the yacht upwind with cargo nets, ladders etc rigged on the lee side. The yacht’s crew would then climb nimbly up the nets to safety.”



HMNZS MONOWAI approaches the disabled catamaran Ramtha in 60 knot winds and 10m seas.

Rescue of Destiny crew, by Tui Cakau III (Farrington, 1998, pg 93): The yacht rolled and crashed against the ship, once again the sound of the splintering fiberglass echoed through the cabin. The two vessels collided time and time again, throwing Paula across the deck and jostling Dana in his bunk below. He pulled his injured body up on deck, the pain that shot through his limbs was overshadowed by his fear and determination to save his life. Then he saw Paula. She was hanging precariously on a gangway net wrapped around the ship’s life raft, holding on by her hands, her feet dangling in space as the ship rose upward in the swell, taking Paula with it.

Rescue of the Waikiwi II crew, by the Nomadic Duchess (Farrington, 1998, pg 209): “The ship’s crew shouted and yelled in a foreign language, adding to the confusion as ropes and lines rained down her side”. Without further warning the two vessels collided, smashing and grating against each other. It was difficult keeping a foothold on the yacht. This was worse than anything the yacht crew had endured previously. They were so close to being saved, and yet it seemed impossible that this enormous ship could offer anything other than destruction as it crashed and bumped against the little yacht.

Rescue of the Heart Light crew. by fishing vessel San Te Maru (Farrington, 1998, pg 222): The fishing vessel drifted down onto the yacht, smashing into Heart Light’s stainless steel dingy davits. The impact of the collision knocked the yacht’s crew off their feet. When they recovered their footing they waited for a chance to jump across to the fishing vessel. It was a time of great danger. Stephanie jumped toward the cargo net dangling down the fishing boat’s side at precisely the moment the yacht fell down a wave and the fishing boat rose up, and away from the yacht. Stephanie snatched at the cargo net with her fingertips and hung in space for a second before two strong pair of hands grabbed her and pulled her to safety.

Unfortunately, the actual rescue of people from small vessels, onto large craft, is generally no better today than it was in 1994. Large ocean-going vessels, such as bulk carriers and cargo ships, often do not have the ability to deploy, and retrieve, rescue craft from their ships. Even in circumstances when a ship is able to deploy a rescue craft, managing to get the rescue craft alongside another vessel can be dangerous to the rescuers, and those they are trying to rescue.

From Stuff (2016): Sailing from Western Samoa to Auckland, the container ship spent 14 hours battling through high seas to reach the *Platino*, its captain said by satellite phone from the ship. Captain Shashi Prakash and his 22 Indian and Filipino crew had to change their rescue plans because of persistent 3m swells and high winds."It was difficult to pick up the survivors from the small craft ... our first attempt wasn't successful... we had to use pyrotechnics to send a rope."With the rope line shot over to the *Platino*, the 20m yacht was hauled in against the 9725 tonne 145 metre container ship. The three survivors scaled a rope ladder finally reaching safety aboard the *Southern Lily*.



Rescue of the yacht *Platino* by the container ship *Southern Lily* in June 2016.

Summary

If a similar incident to the 1994 regatta occurred today, the New Zealand registered yachts in the regatta would be better prepared, thanks to updated rules and requirements for offshore yachts. Unfortunately, these same rules do not apply to foreign flagged vessels. So, it is uncertain that these foreign vessels would be better prepared than they would have been in 1994.

Improvements

The New Zealand Search and Rescue sector has seen many improvements in the 25-years since the Pacific Rescue. Many of these improvements are the direct result of new or improved technology, including GPS equipped 406MHz emergency beacons, improved radio and satellite communications and improved weather forecasting.

The opening of a dedicated 24/7/365 Joint Rescue Coordination Centre, has led to faster, and better, rescue coordination services for Category II SAR missions. With a minimum of two Search Mission Coordinators on duty at any given time, JRCCNZ is able to provide a more dedicated service than what was available in 1994.

The Maritime Operations Centre (MOC) now operates 24/7/365 and is able to communicate with vessels throughout the NZ Search and Rescue region using a combination of VHF, HF and Satellite phone communications. It should be noted that many local marine radio stations, including Kerikeri radio, still operate today.

While many of the same RNZAF aircraft that were being flown in 1994 are still operating today, the P3 Orion's have gone through a major upgrade, giving them more advanced SAR capabilities.

Rescues by Vessels of Opportunity

The area where there has been little improvement is the actual rescue of sailors from small vessels which have people requiring rescue.

Large vessels which are unable to deploy and retrieve rescue craft face the same challenges they did in 1994, today. Anytime a large ship and a small yacht rendezvous in large seas there will be challenges in transferring the sailors from the yacht to the ship, particularly if the sailor/s are injured.

References

In additions to the references below, an interview was conducted with Rodney Bracefield and Christine Wilson, from the Joint Rescue Coordination Centre New Zealand, on 18 September 2019.

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