

Class B Accident Report

Kayak

Capsize & Double Fatality

Waipaoa River on 26 September 2004

KEEPING YOUR SEA SAFE FOR LIFE



Maritime Safety

MARITIME SAFETY AUTHORITY OF NEW ZEALAND
Kia Maanu Kia Ora



REPORT No.: - 04 1127

UNNAMED KAYAK – CAPSIZE & DOUBLE FATALITY

Three people were setting a net from a single person kayak in the estuary inside the mouth of the Waipaoa River, 10 kilometres south of Gisborne. The net jammed while being run out and the combination of tide and overloading capsized the kayak.

The kayak, which was borrowed, flooded due to the missing hatch covers and was swept toward the river mouth. Two men were also swept downstream and drowned while a young man managed to reach shore.



Details of Vessel, Owner & Management, Classification, Navigational Equipment, Manning & Crew:

Name of Vessel:	<i>Unnamed</i>
Vessel Type:	Kayak, single person, 'sit-on-top' type. Model: Pacific Kayaks Scupper-Pro
Construction Material:	Roto-moulded polyethylene
Length Overall (m):	4.5
Maximum Breadth (m):	0.65
Moulded Depth	0.23
Propulsion:	Paddles
Accident Investigator:	Jim Lott

NARRATIVE

On 26 September 2004 at about 1550 hours NZ Standard Time, the Skipper and his two crew members drove from Gisborne south to the Waipaoa River. They were accompanied by the partners of the two men and their children. They also took a 4.5 metre kayak lashed to the roof of their van and a 60 metre fish net.

Forward and aft of the cockpit, the kayak had two hatches opening into the void space inside the hull, which had no separate watertight compartments. The hatches had moulded covers that were designed to be strapped down tightly over the openings. The covers were attached by a further strap to the hull at the time of manufacture in order to ensure they were not lost. The hatch covers were not with the kayak when it was borrowed. A rubber strip fitted to the hatch coamings provided a seal that prevented water ingress if the hatches were secured in place.

At about 1610 hours the group arrived at the tidal estuary inside the river mouth and bar. The Skipper and each of the crew paddled the kayak on the estuary in turn. They were approximately one kilometre from the rivermouth. There was no wind and the water was calm.

The two men smoked some cannabis.

At about 1640 hours, the Skipper loaded the net that was contained in a sack onto the kayak. There was one double paddle and one single paddle. He loaded no other equipment or safety gear.

At each end of the net was an end-rope. Attached to one end-rope were some steel weights weighing in total about ten kilograms. These weights, whose purpose was to anchor the outer end of the net, were to be set last.

While his partner tended the end-rope on shore, the Skipper paddled out on the estuary to set the net. His attempt to feed out the net while paddling at the same time was unsuccessful and he returned to shore.

The two crew members then joined the Skipper on the kayak. They sat facing forward over each of the hatch openings with their legs hanging overboard in the water. Their added weight caused the freeboard of the kayak to reduce to about 4 cm. The sack containing the net was held by the after crewmember. With the other two men paddling, it was his task to feed the net from the sack over the port quarter of the kayak, ensuring it did not snag on the rudder or its fittings. The Skipper in the cockpit used a double paddle while his companion forward had a single paddle.

They successfully set the net as they paddled about 70 metres out from shore. As the last of the net entered the water and the end-rope began to run out it caught briefly on the rudder. As the second crewmember freed the rope, the steel weights fell into the hatch opening where he was sitting. Before he had the chance to lift the weights out, the end-rope became tight due to the ebbing tide, which had reached a speed of about 1 knot and was carrying the kayak towards the river mouth. The kayak was

headed partially across the river and the pull from the net end-rope was therefore partially across the kayak.

The combination of the severe lack of freeboard (the height of the hull remaining above water) and the force from the end-rope, pulled the kayak down by the stern while the crew tried to balance it. However, it quickly capsized striking the 11 year old crew member on the head during the process.

As the kayak capsized, water flooded into both uncovered hatch openings. The kayak quickly foundered. The polyethylene material used to mould the kayak is very slightly buoyant. The rudder and other metal fittings in combination with the buoyant polyethylene resulted in the kayak retaining slight positive buoyancy as it was carried down stream. A small amount of air may have been trapped in the ends of the hull. The kayak would have provided no effective support for its occupants.

While the Skipper assisted his friend who was a poor swimmer, the 11 year old started to swim. He was urged to head for shore by his two companions. The semi-submerged kayak drifted away.

For several minutes, the men were able to stay afloat and the partner of one of the men tried to swim to their assistance. She reached a position about ten metres from the men but then returned to shore after seeing her four children, who were under eight years old, starting to head into the water after her. She then ran towards two fishermen who were further along the beach to ask for help. Both the Skipper and crewmember were clearly in difficulty and were lost from sight from shore, from time to time.

At this time, the other man's partner entered the water. Shortly after, the two fishermen also tried unsuccessfully to reach the men. The Skipper was seen at one stage holding his head above water.

By a combination of swimming and floating on his back, the young man managed to reach shore where he was assisted by one of the fishermen. He was extremely cold and was taken by ambulance to hospital. While in hospital he became unconscious for a short time but made a full recovery overnight. The core body temperature of hypothermic persons will often continue to drop following rescue. This effect is referred to as 'afterdrop'. It can lead to unconsciousness and is sometimes fatal.

There was no further sighting of the two men, but the kayak was still visible for a time.

At 1744 hours, the fishermen returned to shore and phoned 111.

At about 1748 hours, a search was initiated.

At 1753 hours, Coastguard was informed.

At 1830 hours, a helicopter joined the search.

The search at sea and on shore for the two men continued until about 2040 hours using Coastguard vessels and personnel, Police, Fire Service, rescue helicopter and thermal imaging equipment. During the search, the kayak and a single paddle used by the men were recovered from the beach within a kilometre of the river mouth. The search included the beach and foreshore several kilometres from the river.

On 27 September police divers recovered the net from the seabed of the estuary.

The search for the missing men continued until their bodies were recovered from the beach on 3 October and 6 October.



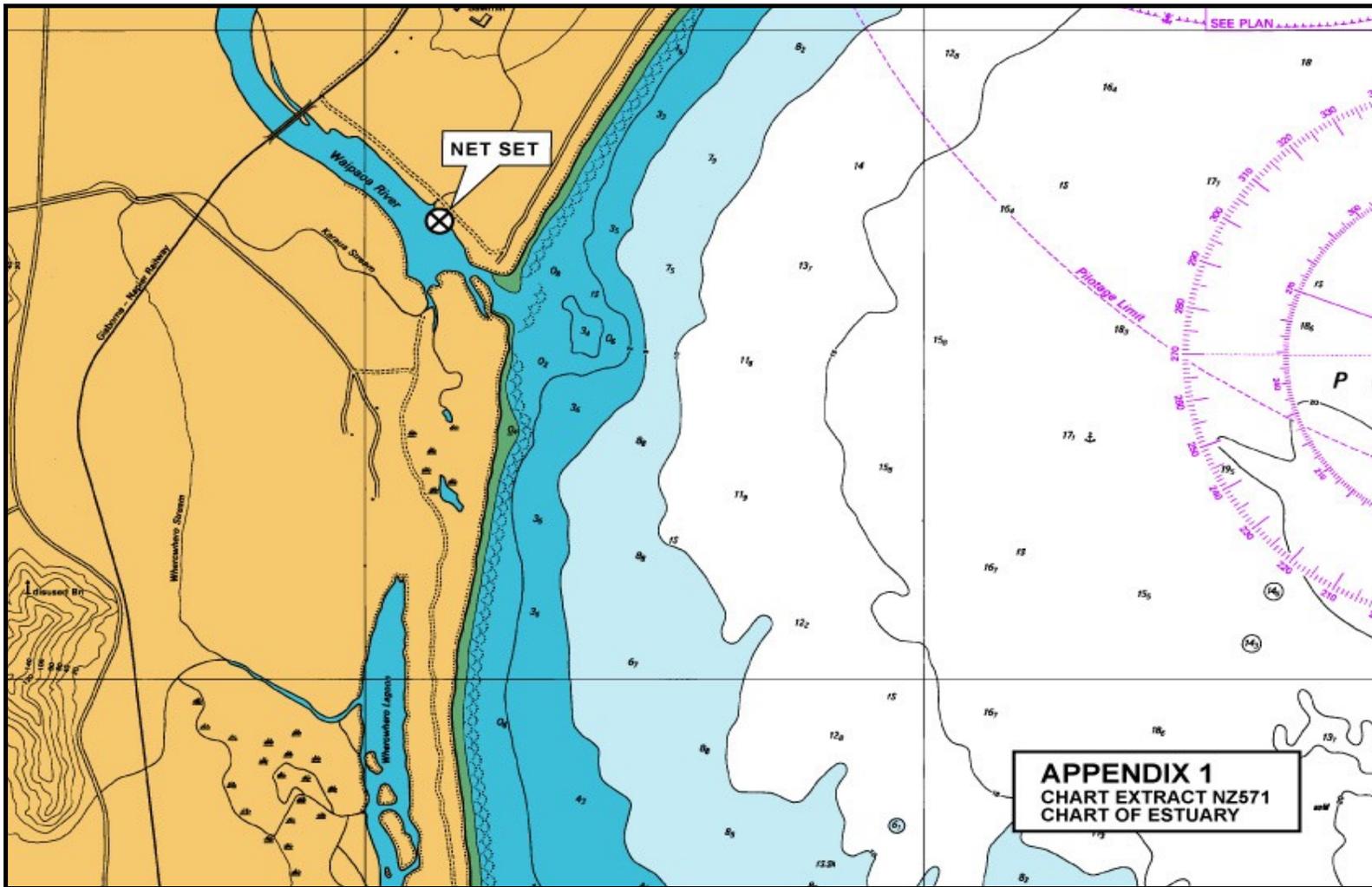
PHOTO 2 – KAYAK SHOWING DESIGNED FREEBOARD



PHOTO 3 – SHOWING REDUCED FREEBOARD DUE TO OVERLOAD



PHOTO 4 – WAIPAOA ESTUARY LOOKING TOWARD THE RIVER MOUTH



APPENDIX 1 – CHART OF ESTUARY

FINDINGS

1. The 4.5 metre 'sit-on-top' kayak was designed for use by one person only. This model has a good safety record provided it is used as intended by the manufacturer within appropriate limits. It is a popular high-performance model fitted with a rudder and adjustable foot-rests. There were no manufacturing faults found. The system of securing removable hatches over openings into the hull was satisfactory. The kayak was fitted with a safety line around the gunwale to provide a hand-hold in case of capsize. Portions of this safety line were missing in some areas.
2. The kayak had imbedded in the moulding a clearly legible safety label. The label advised a number of safety precautions, including:
 - Wear a personal flotation device
 - Obtain instruction in the kayak's use and the need for rescue training
 - Use it within the operator's ability
 - Do not use alcohol or drugs before operating the kayak

The provision of safety advice that is permanently moulded into the vessel is a commendable safety feature.

3. The following faults were found with the condition of the kayak when it was inspected following the accident.
 - Both removable hatches were missing. They were not fitted at the time the kayak was used to set the net.
 - The seals around the hatch openings were perished and partly detached from the coamings.
 - The moulded tubes (scupper-holes) that link the cockpit/seat to the hull and support the weight of the paddler were filled with blocks of polystyrene foam. (The polystyrene was left in place for the subsequent trials). This prevented any water in the cockpit from draining out.
4. While rod or line-fishing from a kayak is popular and poses no significant risk in calm conditions, a kayak is not a suitable craft for setting or retrieving a net. Any attempt to do so is dangerous.
5. More than one person on a single-person kayak creates significant risk. In calm conditions it may be acceptable for a child to accompany an adult, but two adults on a single kayak is dangerous practice in all circumstances. Two-person kayaks are available.

6. The paddler of a kayak is seated low in the vessel to keep their weight as low as possible. In this type of kayak the cockpit/seat is moulded low into the hull. Any additional person has to sit higher up on the deck thereby raising the centre of gravity and leading to reduced stability.
7. When any vessel is overloaded, the additional weight pushes the vessel lower in the water leading to a loss of freeboard. Sufficient freeboard is critical to stability. Reduction of freeboard below that calculated by the designer removes the ability of the vessel to return to the upright when the vessel heels. In this accident the additional weight of two persons reduced the freeboard to a point where it was almost non-existent.
8. The occupants became separated from the kayak. In almost all cases it is safer for persons to stay with any capsized boat unless it sinks. This kayak did not sink due to the minimal buoyancy provided by the inherently buoyant polyethylene used in its construction, and possibly small pockets of trapped air. In this condition the kayak provided no support for those in the water.

The stability of this kayak was tested in very similar circumstances as part of the investigation. It was clearly demonstrated that with three persons on board they had no ability whatsoever to avoid a capsize when the kayak heeled due to the sideways pull from a rope as the vessel moved on a slight current. If the kayak with three persons on board heeled even slightly, it would inevitably capsize.

9. Capsizes from time to time are a normal part of operating kayaks. Paddlers need to be sufficiently practised to cope with such an event. The ability to survive a capsize in this 'sit-on-top' type of kayak and climb back on board relies on the watertight integrity of the hull. The absence of the fitted hatches made this kayak absolutely unsafe for any use. If the hatches had been in place and the seals intact, then the kayak would have provided a source of buoyancy that the men could have held on to while awaiting rescue, which may well have been successful. When the kayak filled with water throughout and thereby lost its ability to support the men, this chance of survival was eliminated.

If kayaks had fitted buoyancy, such as foam or sealed enclosed spaces in the ends of the hull, they would provide a source of flotation for users even if the hatches were left off or lost. 'Sit-inside' style kayaks are fitted with a spray skirt to prevent water entering the cockpit. While many 'sit-inside' type kayaks have watertight bulkheads that provide a sealed buoyancy area, safety would be enhanced if all kayaks, both 'sit-on' and 'sit-inside' styles were fitted with buoyancy, or at least separate enclosed buoyancy areas.

It must be recognised that fitting buoyancy presents challenges that are not simple to overcome. However, any boat of any type that remains floating level with some reserve buoyancy will always be much safer than one that retains only minimal buoyancy, or sinks.

10. No lifejackets were taken by the group to the beach. The requirement for lifejackets to be carried on every boat has been in place since March 2003. The Navigation Safety Rule (**Maritime Rule 91**) and any applicable navigation safety bylaws require every vessel to have on board a correct sized Personal Flotation Device (PFD), commonly called a lifejacket, for each person. In all circumstances of increased risk, a PFD must be worn and securely fastened. In this case, there was increased risk from each of the following:

- the excessive number of people on the kayak
- the absence of PFD's
- absence of hatches
- the low water temperature
- one man was a poor swimmer
- lack of training
- the use of marijuana

11. In addition to the legal requirement for lifejackets, the Maritime Transport Act 1994 (section 19) states that the Skipper of every vessel is responsible for the safety of those on the vessel and for compliance with all applicable maritime rules and regulations.

Section 65 of the Act makes it an offence to maintain or operate a vessel in a way that causes any unnecessary danger or risk to another person or property.

12. The weather was cool but there was no wind and the sea was calm. High water in the area was at about 1510 hours, but the ebb in the river estuary may have started somewhat earlier. The increasing strength of the ebb would have made swimming increasingly difficult.

13. The water temperature in the estuary was about 10° centigrade. Aside from the initial shock from sudden immersion, loss of strength occurs very quickly in water at this temperature. Within 30 minutes the low temperature can lead to unconsciousness. The men were wearing clothing that provided little protection from the cold water and would inhibit the ability to swim.

14. The Skipper was a professional fisherman and a strong swimmer. His companion was a poor swimmer.

15. A PFD provides not only buoyant support and thermal protection it also eliminates the need for a person to tread water to stay afloat. Remaining motionless in the water can double the time before hypothermia takes effect. A wide variety of PFDs are readily available and a basic PFD can be purchased for under \$20.
16. The post mortem examination found that the cause of death was drowning. It was also found that for both men, the level of cannabis indicated that they were “likely to be affected by the drug at the time of death” in the opinion of the pathologist. Very small amounts of alcohol were also found to be present. There is no indication that the men had been drinking alcohol immediately prior to visiting the estuary and the level of alcohol was approximately 25% of the legal limit to drive a car. The pathologist noted that cannabis tends to accentuate the effects of alcohol.
17. The partners of the two men made an attempt to assist them that in the opinion of the Investigator was very courageous. Given the water temperature, the strength of the tide and the needs of the distressed children on shore, there was nothing further any of them could have done to effect a rescue.
18. Both men were Maori. Early indication from the analysis of data about the ethnic background of those involved in fatal boating accidents suggests that Maori persons are over-represented in this area.

SAFETY RECOMMENDATIONS

1. It is recommended that the possibility of fitting of buoyancy in all kayaks be brought to the attention of kayak manufacturers utilising the database held at the MSA. Some types of foam break down and absorb water over time. However, some manufacturers have fitted foam successfully and have enhanced the safety of their product considerably by doing so. Other manufacturers have built kayaks that have separate enclosed void spaces to provide buoyancy. The MSA recognises that this is a challenge for the manufacturers. Approximately 10,000 new kayaks enter service in New Zealand every year.
2. It is recommended that the MSA continue to work with kayak groups, the Marine Industry Association, kayak manufacturers and retailers to enhance public awareness of the importance of wearing personal flotation devices and the need to use this type of craft within its safety parameters.
3. It is recommended that this report be sent to Toi Maori drawing their attention to the number of Maori persons involved in fatal boating accidents in order to explore ways for all boating safety agencies to address this issue.