



**Report 96-206**

**5.5 m Fyran dory, *Hunky Dory***

**off Whatuwhiwhi, Karikari Peninsula**

**25 June 1996**

### **Abstract**

On Tuesday, 25 June 1996, at approximately 1420 hours, a rock-fishing charter group of six passengers and one guide was returning to the beach from where they had launched in the *Hunky Dory*, a 5.5m aluminium dory, when the craft was overwhelmed by seas and foundered. Five of the passengers swam for the shore. Four succeeded and raised the alarm. The fifth swimmer, after spending nine hours in the water, succumbed to exhaustion and drowned. The design, loading and corresponding freeboard of the craft combined with the sea conditions were factors contributing to the foundering. Safety issues identified included breaching some of the fundamental rules for small boat safety.

# Transport Accident Investigation Commission

## Marine Accident Report 96-206

### Vessel particulars

Type:	Fyran 5.5m dory
Class:	Not classed (under six metres)
Limits:	Not specified
Allowable passengers:	Not specified
Length:	5.5m
Construction:	Aluminium mono-hull
Power plant:	One 40 hp two-stroke, long shaft, Suzuki outboard motor
Location:	Whatuwhiwhi, Karikari Peninsula, Doubtless Bay
Date and time:	25 June 1996 at 1420 hours <sup>1</sup>
Persons on board:	Crew: 1 Passengers: 6
Injuries:	Passengers: 3 (1 fatal, 2 minor)
Nature of damage:	Minor to boat, salt water damage to motor
Inspector in charge:	T M Burfoot

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<sup>1</sup> All times in NZST (UTC + 12 hours)

# 1. Factual information

## 1.1 History of the voyage

- 1.1.1 On Monday, 24 June 1996, a group of six recreational fishermen and one guide arrived at their base camp in the town of Houhora. They planned to spend a week fishing from rocks between Houhora and Mangonui which included the Karikari Peninsula. The guide's boat, the *Hunky Dory*, an open 5.5 m aluminium dory, was to be used to reach remote locations, not accessible by road.
- 1.1.2 On Tuesday, 25 June the group travelled to a beach between Tokerau Beach and Whatuwhiwhi on the south coast of Karikari Peninsula. The weather forecast was for north to north-west winds at 15 knots becoming south-west at 20 knots in the late morning or early afternoon, rising to 30 knots in the evening. Aware of the weather forecast, the guide intended to work the south side of the Karikari Peninsula which would provide off-shore weather conditions, for the morning at least.
- 1.1.3 The guide gave each member of the group a life-jacket and instructed that it be worn while in the boat. All life-jackets were approved RFD full jacket type, with collar, reflective tape and whistle.
- 1.1.4 At approximately 0850 hours the group launched the boat. The sea conditions were calm as they proceeded to a group of off-shore rocks two nautical miles along the coast at the head of a small inlet named Brodies Creek. The trip took approximately ten minutes.
- 1.1.5 Using a tyre as a fender the guide pushed the bow of the boat against the rocks to allow the group to disembark with their fishing equipment. Over the ensuing four hours the group fished off the rocks. At approximately 1300 hours the guide noticed the wind had increased to 15 knots and backed to the west which prompted him to abandon the trip.
- 1.1.6 The guide decided to wait until high tide before returning along the shore line. This was to avoid any "wind against tide" which can cause the seas to stand up (steepen). The group boarded the *Hunky Dory* and proceeded up Brodies Creek for lunch.
- 1.1.7 At approximately 1400 hours the guide suggested to the group that they dress warmly and don their wet-weather gear as he was expecting conditions to be "a bit cold because the wind has stepped up a wee bit" around the point and the boat would probably be shipping spray.
- 1.1.8 All members of the group donned life-jackets. One fisherman, who did not wish to dress warmly despite the guide's warning, remained in shorts and T-shirt whilst the remainder dressed as suggested. Both the air and seawater temperatures were approximately 18° C.
- 1.1.9 The group left the beach at Brodies Creek at 1410 hours. To keep the boat's centre of gravity low the guide instructed the fishermen to sit on the floor of the boat, evenly spaced, with their equipment along the centreline between them. As the group left the shelter of the bay into which Brodies Creek feeds the boat was heading directly into a 20 knot west-south-west wind running parallel with the coast. The guide kept the speed of the boat at approximately eight knots (not planing), and although some spray was coming over the bow, the boat reportedly handled the seas well.

- 1.1.10 The guide was navigating by visual reference, keeping the boat about three cables off the shore line and any off-shore rocks. After approximately 10 minutes the boat entered an area of turbulence, where the seas were standing up. The waves were approximately one metre high, steep sided and had a length just under that of the *Hunky Dory*. The boat began to take water, a little over the bow, and a more substantial amount over the low sill in the transom where the outboard was fitted.
- 1.1.11 The guide considered turning around and running with the sea but decided against it as this would expose the boat's side to the steep waves and risk it capsizing. After a few minutes the sea flattened out slightly. By this time water had filled the bilge area under the floorboards, so two of the fishermen each lifted a floorboard near the stern and one of them, using a 20 litre bucket, began to bail.
- 1.1.12 Just after the group started bailing the boat met with three larger waves, at which time water poured in over the transom and submerged the air intake for the motor causing it to stop. Realising that the boat was going to founder the guide instructed each member of the group to "grab" a round fender for additional buoyancy and to step out of the boat. As the boat submerged it rolled over, but remained afloat just under the water surface. As the guide stepped out of the boat he grabbed the Emergency Position Indicating Radio Beacon (EPIRB) and switched it on. This was at approximately 1425 hours. The flare pack, which was not secured to the boat, floated away before it could be secured.
- 1.1.13 The seven occupants gathered around the semi-submerged boat and assessed the situation. They were drifting parallel with the coast approximately 400 m from the shore line off which there were several outlying exposed rocks. At approximately 1515 hours the boat had drifted within 50 m of one of the outlying rocks and two of the fishermen, who were strong swimmers, decided to try and swim for shore to get help. Their plan was to swim in stages from rock to rock until they reached the shore. They set off together using two fenders between them for additional flotation.
- 1.1.14 At approximately 1645 hours the boat had drifted within 75 m of a rocky outcrop. At this time the group noticed a lifejacket on the rocks, indicating that the first pair had made it to the shore. This prompted two more of the group, who were also strong swimmers, to try and make it ashore, so with two more fenders between them they set off, leaving the guide and two fishermen with the boat. One of the remaining fishermen told the guide that he could not make it ashore and preferred to stay with the boat.
- 1.1.15 Approximately five minutes after the second pair had left, the fisherman dressed in shorts and T-shirt decided he would follow the others and "try his luck". The guide tried to dissuade him from leaving the boat pointing out that he was inappropriately dressed, that it would be dark soon, they still had the EPIRB and that the others had probably raised the alarm. The fisherman, who could not swim, did not heed the guide's advice and, taking the last fender, set off in pursuit of the other two swimmers. Shortly after the fisherman left, the guide observed a low-flying aeroplane appear from the west heading towards them, but before it reached them, it banked to the left and headed north over Karikari Peninsula.
- 1.1.16 The guide continued to observe the fisherman following the other two who continued paddling across wind directly to the shore line. After he had covered approximately 25 m the fisherman appeared to "run out of puff". The guide saw him turn more down wind and head north-east converging slightly with the shore line.

- 1.1.17 The guide noticed that the fisherman was lying across the top of the fender which made his rate of drift faster than that of the submerged boat. The guide became concerned that if the fisherman did not reach the shore it would be difficult for searchers to detect him, in the water, in the dark. The guide untied the EPIRB and set it adrift calculating that it would drift at the same rate as the fisherman enabling searchers to locate him by homing in on the beacon. Approximately 20 minutes later the guide lost sight of the fishermen due to the increasing seas and the onset of darkness.
- 1.1.18 Meanwhile, the first two fishermen to leave the boat had reached the shore. Despite exhaustion and their progress being hindered by cuts and bruising to their feet caused by the rocks and gorse, they made their way in the dark up the gorse covered hill. While their recollection of time was not good, they recalled seeing a small aeroplane pass overhead as they reached the top. They found a track which they followed in the wrong direction for some distance because of disorientation in the dark before realising that “the wind was at their backs”. They turned and retraced their steps, eventually finding a house whose occupants contacted the local fire station and rendered assistance to the two survivors. This was at approximately 1925 hours.

#### **Search and rescue (see Figure 1)**

- 1.1.19 The guide activated the EPIRB at approximately 1425 hours. The signal was detected by civilian aircraft and subsequently by satellite via the local user terminal (LUT) at the New Zealand (National) Rescue Co-ordination Centre (NRCC) at 1620 hours. The LUT gave an approximate position for the EPIRB in the Rangaunu Bay area, north of the Karikari Peninsula.
- 1.1.20 An aeroplane, fitted with aural search equipment, was deployed from the Kaitaia Aero-Club to search the Rangaunu Bay area for the source of the EPIRB signal. The pilot reported back to the NRCC that the signal was fading in and out, but appeared to be coming from one of two vessels anchored in Maitai Bay on the north-east coast of the Karikari Peninsula. The pilot was unable to spend sufficient time in the area to confirm this due to the onset of darkness.
- 1.1.21 At 1745 hours the Marine Duty Officer (MDO) contacted Far North Radio and advised them that an EPIRB had been detected in the Rangaunu Bay area. Far North Radio confirmed that there were no local distress signals or overdue craft in the area. Far North Radio began contacting each of the known craft in the area by VHF radio asking them to report their positions and check their EPIRBs (the guide had not informed anyone of their planned trip).
- 1.1.22 At 1854 another satellite pass gave the EPIRB’s position to be south of Karikari Peninsula in the middle of Doubtless Bay, approximately 3.5 miles from its true position. Far North Radio broadcast this new position and some of the rescue craft headed toward the area to commence a search. Searching vessels reported the weather conditions as south-west winds at 25 to 30 knots with rough seas off-shore. There was a two to three metre swell from the north-east running past Knuckle Point on the eastern tip of Cape Karikari.
- 1.1.23 One of the vessels anchored in Maitai Bay had experienced bad weather earlier that day and its skipper thought it possible that the EPIRB located inside his vessel’s life-raft may have been activated inadvertently. To discount this possibility the vessel was asked to head out of the bay to see if the EPIRB’s satellite derived position altered on the next pass.

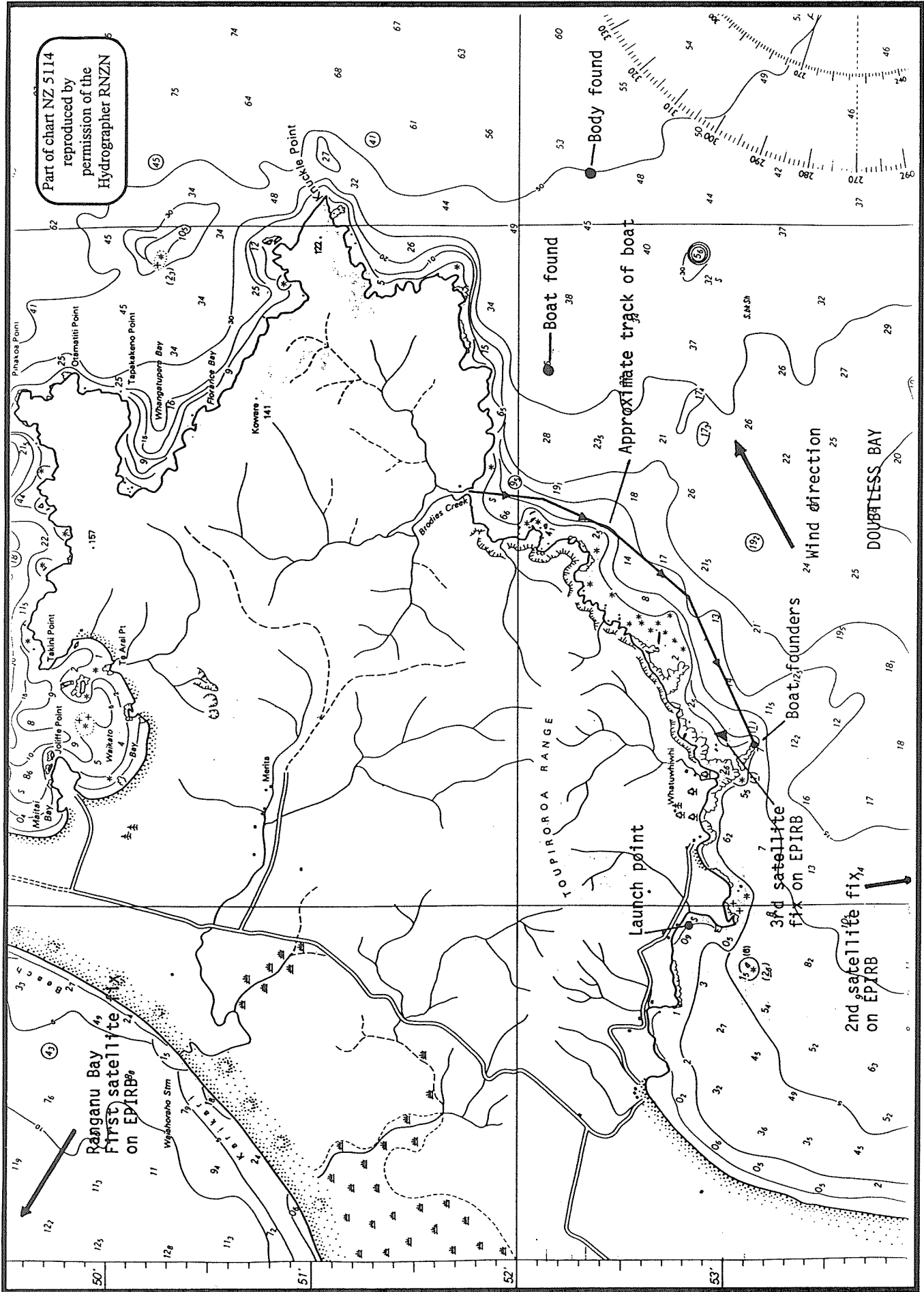


Figure 1  
Part of Chart NZ5114, showing positions during Search and Rescue operation

- 1.1.24 At 1925 hours Fire Service staff relayed the information from the two survivors to the Police who initiated and co-ordinated a Class II search<sup>2</sup> using Far North Radio and eleven vessels that were in the area. At approximately 2100 hours two vessels arrived in the area where the *Hunky Dory* was reported to have foundered. One of the vessels searched down-wind while the other searched the coastline leading into Brodies Creek. The other vessels formed a search pattern leading into the area.
- 1.1.25 At 2040 hours another satellite pass indicated the EPIRB was near the point where the *Hunky Dory* foundered, approximately 2.2 nautical miles from its true position.
- 1.1.26 At 2147 hours the *Hunky Dory* was found with the guide and one fisherman still clinging to the hull. The pair were cold and exhausted but otherwise uninjured. The guide informed the searchers that two others had set out for the shore and that another was last seen drifting down wind of them accompanied by the EPIRB.
- 1.1.27 This information was relayed to Far North Radio and the other searching vessels. A land search located the second pair of fishermen, who had made it ashore and were making their way through the bush toward civilisation.
- 1.1.28 At 2232 hours the remaining fisherman was located by the reflective tape on his life-jacket catching in a searching vessel's search-light beam. His life-jacket was not secured tightly and had slipped up his body causing him to float with his face in the water. He was pulled on board in an unconscious state and the crew administered CPR immediately. Although the fisherman's body was still warm he did not respond to the CPR treatment and was pronounced deceased on the vessel's arrival at the main wharf in Mangonui.

## **1.2 Vessel and crew information**

- 1.2.1 The *Hunky Dory* was a 5.5 m Fyran aluminium dory powered by a single 40 hp Suzuki outboard motor. The boat was open for the entire length except for a small doorless gear locker located right forward. The boat was transversely framed from the keel to the gunwale throughout using aluminium box section. Four longitudinal frames attached to the top of the transverse frames supported a series of cross-members which supported loose plywood floor boards, forming a bilge space under the floor. A single seat was fitted at the stern for the operator.
- 1.2.2 The sides of the boat were double skinned and had polystyrene board inserted between the frames for extra buoyancy in case of flooding. Additional polystyrene blocks were located and secured under the floorboards.
- 1.2.3 The guide did not intend the boat to be used as a fishing platform, but merely as a means of transportation for short trips to remote areas inaccessible by other means. Anti-skid chequer plate on top of the gear locker, hand rails and a tyre fender were fitted at the bow to facilitate easier climbing over the bow onto rocks. Five roller shaped fenders were carried which were used as rollers when it was necessary to run the boat up on to a remote beach.
- 1.2.4 The boat's transom was cut away to accommodate the outboard motor. No outboard well was constructed to compensate for the resulting loss of freeboard in this area. (See Figure 2.)
- 1.2.5 Safety equipment carried included a power-boat flare pack in a sealed container, an EPIRB, one 20 litre and two 5 litre bailers. The guide often carried a portable VHF radio on fishing excursions; however, he had found them susceptible to water damage in the past and omitted to carry one on this occasion. He carried a cellular telephone.

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<sup>2</sup> A search and rescue operation controlled by the Police and assisted by other organisations.



**Figure 2**  
**The *Hunky Dory*, note the low transom**



- 1.2.6 The guide obtained a Commercial Launch Master Certificate in 1984. Since then he had operated a number of small craft on fishing charters. He was well known as an expert in recreational fishing and often promoted small boat safety in conjunction with his fishing charter business. He had been using the *Hunky Dory* on fishing charters for approximately three years.
- 1.2.7 The fishermen were all experienced recreational fishermen, most with some knowledge of small boats gained from owning their own. Four of the fishermen had been on numerous fishing charters with the guide in the past, three of them featuring in videos promoting the guide's business. The deceased had answered a fishing magazine advertisement for the trip, and had obtained two of the guide's promotional videos which depicted groups of fishermen being transported in a recent model Fyran Pro-fisher 19 runabout with twin outboard motors.
- 1.2.8 The weight of each individual was above average. The total weight of the occupants, their personal belongings and fuel on board was estimated to have been 660 kg (excluding the outboard motor).

### **1.3 Survey information**

- 1.3.1 As the boat was under six metres it was not required to be surveyed under the Maritime Transport Act 1994, nor was the guide required to hold a qualification.
- 1.3.2 Northland Regional Council By-laws for the area in which the guide was operating required that any person operating a boat for hire or reward must hold a licence issued by the Council. The procedure for obtaining such a licence included the following requirements:
- Skipper to hold a qualification appropriate for the intended operation
  - The boat to be inspected by an officer of the Council to determine its suitability for the intended operation
  - A maximum number of permitted passengers to be specified
  - A minimum amount of safety equipment to be carried including approved life-jackets, flares and bailers
  - An alternative means of propulsion be provided (oars would have sufficed in this case)
- 1.3.3 A condition of the licence would have been effective communication with the local marine radio station e.g. submission of a trip plan. A VHF radio would not have been a requirement, but would have been recommended by the Council.
- 1.3.4 The guide did not hold the appropriate licence to operate in the area.

## **2. Analysis**

- 2.1 On the return trip the guide was navigating by visual reference keeping the boat an even distance from the numerous off-shore rocks that were visible along the shore line. Approximately one nautical mile from their destination a shallow reef extended three to four cables off the shore line which would have been causing the south-west sea to "stand up" in that area. It is likely that the *Hunky Dory* entered this area of turbulence. If the guide had been consulting a chart during the return trip, or if he was more familiar with the characteristics of the reef, he would probably have given it a wider berth.

- 2.2 As the trip progressed water accumulated under the floorboards of the boat causing it to settle deeper in the water, reducing its freeboard and accelerating the rate of flooding. The bilge space under the floorboards held a significant volume of water. Not until the water began to lap over the floorboards did the occupants start bailing. In order to achieve this they had to first remove some of the floorboards. Considering the sea conditions and the freeboard of the boat the situation was probably irretrievable at this time. The delay in starting to bail probably contributed to the foundering. The guide's decision not to turn the boat around was appropriate.
- 2.3 With any boat, the design and operating concept should be to prevent water entering the boat at a rate faster than that at which it can be removed. The freeboard of a boat such as the *Hunky Dory* is determined by its lowest point. The cut away section of the *Hunky Dory*'s transom, with no compensating "outboard well", rendered the boat susceptible to flooding by the stern under adverse conditions. The polystyrene flotation did not contribute to the buoyancy of the boat until it became submerged. The polystyrene blocks under the floor frames were probably responsible for the vessel capsizing as it foundered. Once a small boat capsizes it seldom offers any significant support or protection for its occupants.
- 2.4 The guide was aware of the weather forecast for the day, had studied the charts and chose an area that would be sheltered in the morning. As predicted the wind changed to the south-west around midday and began to increase in strength. Due to the effect the local topography may have had on the wind, the change in weather may not have been apparent to the guide immediately; however, when he did notice the wind increasing in strength, this should have indicated to him that the forecast change in weather was taking place. It would have been prudent for the group to have returned before the weather deteriorated.
- 2.5 The guide's decision for the group to lunch at Brodies Creek before returning allowed an additional hour for the wind speed and significant wave height to increase. These factors would have outweighed the benefit of avoiding any wind against the negligible tide that ran in the area. Significant wave height is the product of three factors, wind speed, wind duration and fetch<sup>3</sup>. An increase in any one or more of these factors will result in an increase in wave height. The fetch in the area in which the group was fishing was approximately four miles when the wind was from the south-west.
- 2.6 It was the guide's responsibility to operate the *Hunky Dory* having due regard to its design limitations and the anticipated weather conditions. Considering the design of the *Hunky Dory*'s transom, the absence of any superstructure forward for deflecting water and the total weight of the boat's fuel, equipment, occupants and their personal belongings, the loading of the boat was marginal for the conditions experienced off-shore, and totally inappropriate for the conditions encountered on the return voyage over the reef, particularly when bailing was the only method available to its occupants for removing water from the boat. This was not a shortcoming of the boat's size, but rather its suitability for the trip.
- 2.7 The EPIRB carried on board the *Hunky Dory* was a valuable aid for detection in an emergency. The accuracy to which the position of the EPIRB can be determined is reliant on the strength of the signal and the type of detection equipment used by search-craft.
- 2.8 The signal from an EPIRB floating in the water will often be subject to fading as the beacon falls into the troughs between waves. This is evidenced by the aircraft pilot's analysis of the signal and the sequence of positions provided by satellites passing over the accident area on the day. The satellite did however consistently provide a position for searchers to concentrate their search within three nautical miles of the beacon's true position.

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<sup>3</sup> The distance up-wind from the point of observation over which the wind blows constantly and uninterruptedly over the sea.

- 2.9 Small boats, persons and flotsam can be difficult to detect in broken water, more so in fading light. Once searchers arrive in their area it is essential for survivors to have some means at their disposal to attract the searchers' attention. The concept of a "grab bag" containing flares, EPIRB, portable radio and other emergency equipment is often used by boat owners to ensure retention of such equipment in the event of a rushed evacuation of the boat. If such a system had been used by the guide it is likely the set of flares on board *Hunky Dory* would have been available to attract the attention of searchers and resulted in earlier rescue.
- 2.10 Approximately 90% of all EPIRB transmissions detected in the New Zealand NRCC's area of responsibility result from inadvertent activation. When an EPIRB is detected, some time is taken to establish, through the maritime distress and safety radio network, what known craft are in the area and if any are reported overdue or in distress.
- 2.11 If the skipper of a craft having put to sea without a radio and without informing anyone of the intended trip then gets into difficulties, his/her peril is not recognised during this important first action in the search and rescue (SAR) operation. The guide did not carry a VHF radio, so he was unable to make a distress call. As he did not provide a trip plan, nor "log in" with the local marine radio station, no one knew of his boat's existence in the area. As the flares were lost, the group had limited means to attract the searchers' attention.
- 2.12 One of the fundamental rules in the event of a capsize is to stay with the boat if it is still afloat. With the benefit of hindsight the decision for the first two fishermen to swim ashore and raise the alarm was a good one, which almost saved the life of the deceased and probably helped prevent further loss of life. With the knowledge that the first two fishermen had reached the shore it would have been prudent for the remaining survivors to stay with the boat and EPIRB, where they could support each other until help arrived.
- 2.13 If the deceased had stayed with the boat he may have survived. Although the sea and air temperatures were warm, he had used the fender to raise his upper body clear of the water where the wind chill factor and time would have contributed to him becoming hypothermic. He was lightly clad and could not swim. It was likely that the onset of hypothermia and exhaustion caused him to become disoriented and lose the fender. When he was recovered from the water, his body was still warm, indicating that he had only recently lost consciousness. Had his life jacket been secured correctly, it would have supported his head above water, possibly for long enough to avoid his being drowned.
- 2.14 The list of books, magazines, and notices promulgated by the Marine Department (and now the Maritime Safety Authority), Coastguards and boating organisations, promoting marine safety in small boats, is extensive. The guide, experienced as he was with small boats and small boat safety, chose not to heed some of the fundamental small boat safety issues discussed in these publications which are outlined above.

### **3. Findings**

- 3.1 The Maritime Transport Act 1994 did not require the *Hunky Dory* to be under survey, nor did it require the guide to hold a formal qualification.
- 3.2 The guide had sufficient experience to conduct the fishing charter and was qualified as a Commercial Launch Master.
- 3.3 If the guide had possessed the appropriate licence to operate as required under the Northland Regional Council By-laws, effective communication with the local coast radio station would have been required, which may have resulted in earlier rescue.

- 3.4 The *Hunky Dory* was overwhelmed by the sea and foundered.
- 3.5 The design of the *Hunky Dory*'s transom rendered the boat susceptible to flooding by the stern.
- 3.6 The *Hunky Dory* was not an appropriate boat to withstand the sea conditions encountered on the accident trip.
- 3.7 The weather forecast was accurate for the area on the day of the accident.
- 3.8 The guide understood the weather forecast for the day of the accident.
- 3.9 It would have been prudent for the guide to have abandoned the trip before the weather conditions deteriorated, or to not have embarked on the trip that day.
- 3.10 It would have been prudent for the guide to have carried a VHF radio on the trip.
- 3.11 The guide's omission to submit a trip plan and "log in" and the loss of the boat's flares were factors contributing to the delay in rescue.
- 3.12 It would have been prudent once they were aware that the first two survivors had succeeded in reaching the shore for the remaining five occupants to stay with the boat; in such case the deceased may well have survived.
- 3.13 Had the *Hunky Dory* been fitted with a bilge pump, removal of water from the boat could have commenced earlier, which may have prevented the foundering.
- 3.14 The *Hunky Dory* did not have the safety equivalence of the boat used in the guide's promotional video.

11 December 1996

M F Dunphy  
Chief Commissioner

## Glossary of Marine Abbreviations and Terms

AC	alternating current
aft	rear of the vessel
beam	width of a vessel
bilge	space for the collection of surplus liquid
bridge	structure from where a vessel is navigated and directed
bulkhead	nautical term for wall
bus	an arrangement of copper conductors (Bus bars) within a switchboard, from which the circuits are supplied
cable	0.1 of a nautical mile
chart datum	zero height referred to on a marine chart
command	take over-all responsibility for the vessel
conduct	in control of the vessel
conning	another term for “has conduct” or “in control”
DC	direct current
deckhead	nautical term for roof
dog	cleat or device for securing water-tight openings
draft	depth of the vessel in the water
EPIRB	Emergency Position Indicating Radio Beacon
even keel	draft forward equals the draft aft
freeboard	distance from the waterline to the deck edge
free surface	effect where liquids are free to flow within its compartment
freshet	term used to describe an increase of water level in the river due to rain in the mountains
focsle	forecastle (raised structure on the bow of a vessel)
GM	metacentric height (measure of a vessel’s statical stability)
GoM	fluid metacentric height (taking account the effect of free surface)
GPS	Global Positioning System
GS	general service
heel	angle of tilt caused by external forces
hove-to	when a vessel is slowed or stopped and lying at an angle to the sea which affords the safest and most comfortable ride
Hz	Hertz (cycles)
IMO	International Maritime Organisation
kW	kilowatt
list	angle of tilt caused by internal distribution of weights
m	metres
MSA	Maritime Safety Authority
NRCC	National Rescue Co-ordination Centre

point	measure of direction (one point = 11¼ degrees of arc)
press	force a tank to overflow by using a pump
SAR	Search and Rescue
SOLAS	Safety Of Life At Sea convention
sounding	measure of the depth of a liquid
SSB	single-side-band radio
statical stability	measure of a vessel's stability in still water
supernumerary	non-fare-paying passenger
telegraph	device used to relay engine commands from bridge to engine room
ullage	distance from the top of a tank to the surface of the liquid in the tank
V	volts
VHF	very high frequency
windlass	winch used to raise a vessels anchor