

Accident Report

Fatality

Raft – Incept 22

14 October 2005

Class A





Incept 22



Diagram 1
Map of the General Area

GLOSSARY

Term	Description
Chute:	A narrow channel or drop formed by exposed rocks, usually at a gradient.
Cumecs:	A measure of the water flow over a set point at metres per second. For example, 30 cumecs means that 30 cubic metres (or 30 000 litres) of water is passing a point on the river bank every second.
Eddy out:	The guide puts the raft into an back eddy caused by the river features. This allows the raft to stop in the river in slow or non flowing water.
Left (of the boat):	The port side
National Raft Guide Grade 4/5:	National Raft Guide qualification administered by Sport Fitness Recreation Industry Training Organisation, which allows the holder to guide commercial rafts on rivers up to, and including the grade of river identified on the award card.
Over Right (or left) or (High Side):	All the crew to move to the side called. This is used to lift the upstream side to prevent water entering the raft and flipping (or wrapping) it.
Put in:	The river side launching point for the raft trip
Pour Over:	Smooth flow of water over a drop or rock
Right (of the boat):	The starboard side
River Class 1 – Easy:	Peacefully flowing flat water, meandering down.
River Class 2 – Moderate:	The river flow is quicker with disturbances from small waves, rapids, eddies and whirlpools. The main channel is always clear and obvious.
River Class 3 – Fairly Difficult:	River is now more complicated. The current is swift, the river may narrow with big waves, small drops and stoppers. The paddler may have to manoeuvre between rocks, stop in eddies and cross fast currents. The best channel is still easily recognised and remembered.
River Class 4 – Difficult:	This is challenging water. Rapids may be continuous or follow in quick succession. They can be difficult to read, inspection from the bank may be necessary to remember the route. Boulders obstruct the water flow causing pressures waves, pour overs and boat stopping stopper waves. The ability and experience of the paddler is paramount.
River Class 5 – Very Difficult:	Even after inspection from the bank, it is often difficult to recognise a route through Class V water. The gradient is greater, with tight bends and large boulders hide the river from the paddler. The water is very fast, with volume and huge force. Large pressure waves, whirlpools, siphons and big drops. Stoppers will hold a boat and/or swimmer.
River Left:	The left hand side of the river when looking downstream
River Right:	The right hand side of the river when looking downstream.
Stopper:	A reversal powerful enough to stop a raft momentarily. Also called a stopper wave.
Wrap:	This starts in the same way as a flip, but the raft fills with water and the pressure of the stream pins it against a rock.

REPORT NO.: 05 3867

VESSEL NAME: *RAFT - INCEPT 22*

Ship Type:	White Water Raft
Certified Operating Limit:	Rangitikei River
Flag:	New Zealand
MSA No.:	130776
Construction Material:	PVC
Length Overall (m):	4.6
Registered Owner:	River Valley Ventures
Safe Operational Plan:	Maritime New Zealand
Accident Investigator:	Domonic Venz

SUMMARY

At about 1400 hours, on Friday 14 October 2005 a white water raft trip commenced on the Rangitikei River. Four rafts entered the water each containing between six and seven passengers plus one Guide. The trip ran smoothly through various rapids for the following two hours.

Two of the four rafts approached a rapid known as 'Picket' (*See Figure 1*). This is one of the last major rapids, where they slowed and one of the rafts started to make its run towards the chute accessing the rapid. As this raft approached the chute it wrapped (*See Glossary*) on a rock just upstream of the main rapid. The raft rode up on the rock and five of the six passengers were thrown into the water. The Guide and one passenger stayed in the raft which then exited the wrap (*See Glossary*) and continued down the rapid where the guide beached the raft.

Of the five passengers thrown into the water four were recovered with one found to be missing. After a long search he was located trapped underwater under a rock in the main flow of the river left chute. Various attempts were made to recover the deceased, Mr Andy Warren, but were unsuccessful due to the strong current in the area. The remaining passengers were moved back to the raft base and help was flown in and the body of Mr Warren was recovered.

The report's conclusions include that the raft Guide was unable to gain the speed required to run the ideal line through Picket rapid. The raft wrapped briefly on a rock, ejecting five of the six passengers into the river. Communications were at times compromised due to the noise and some ambiguous replies.

The report makes a number of recommendations involving better communications on the river in the event an emergency and reviewing the Company operating procedures.

NARRATIVE

River Valley Ventures Ltd, Taihape, owns the operation and the rafts. They employ the river guides and lodge staff.

The raft is an Incept PVC white water raft of 4.6 metres in length. The raft and the overall operation were compliant with **Maritime Rule Part 80 – Marine Craft Used for Adventure Tourism**. They held a valid Safe Operating Plan Certificate of compliance issued by Maritime New Zealand.

The Guide in control of *Incept 22* held the New Zealand National Raft Guide Award as a raft guide grade 4/5 (*See Glossary*). He had worked the winter at River Valley Ventures from April 2005. Previous to this he had worked as a raft guide on rivers in Rotorua for six months and for twelve months in Queensland.

Two guides from the trip held senior grade 4/5 and one held grade 4/5. All were experienced on this and other rivers.

The passengers were a group of senior Army personnel that were on a leadership course at Waiouru Army Camp. Mr Warren, aged 44, was a Senior Sergeant with the Infantry regiment and had been with the Army since 1980. All the Army personnel, including Mr Warren, were physically fit and healthy to Army standards. All participants had to pass an Army physical test to be accepted onto the leadership course.

Some of the course participants had white water rafted before. The rafting experience level was described as varied throughout the group.

THE ACCIDENT

At 1230 hours on Friday 14 October 2005, a group from Waiouru Army Camp, arrived at River Valley Ventures for a white water raft trip down the Rangitikei River.

The group met the raft guides and they were briefed about the dangers of white water rafting and were all asked to sign an indemnity form, which they did. They were told about the clothing they were to be supplied, which included a wet suit, polar fleece jersey, wind proof vest, helmet and wet suit booties.

At about 1300 hours, the group was loaded into the River Valley bus with the rafts loaded on a trailer and preceded to the put in point (*See Glossary*) about 30 minutes away.

After the guides had unloaded the rafts and checked the gear, the group was given a comprehensive safety briefing by the Trip Leader (TL). At this time the group was issued with lifejackets and divided up into crews for the four individual rafts.

Each crew assembled at the rafts and were given another safety briefing by each guide. This included various topics such as paddle techniques and guide instructions, also capsize mitigation strategies in the event of a wrap. Instruction was given about "overs", which is when the guide instructs all crew go to the side of the raft indicated by the guide to help avert a potential wrap.

At about 1430 hours, the four rafts entered the water and started down the river. The first section of the river was flat water where the guides trained the crews in how to respond to instructions and to control the raft.

On board ***Incept 22*** the guide had six passengers. They were described as strong, solidly built men who were enthusiastic about the trip ahead.

The trip continued down through various grades of rapids with nothing untoward happening. ***Incept 22*** was generally 2nd or 3rd in line during the trip down river. As the trip approached a rapid named 'Picket' ***Incept 22*** was running 2nd. The 1st raft had eddied out to river left to assess the rapid. The guide took ***Incept 22*** to river right (*See Glossary*), up against a rock above the rapid, to also assess the rapid.

The guide of ***Incept 22*** looked at the guide from the 1st raft and between them it was decided that ***Incept 22*** would go first. The guide did a short briefing with his crew to give them an idea of what was required to transit Picket rapid.

Incept 22 was on river right and the flow of water at the top of the rapid was running right to left. This meant that ***Incept 22*** had to paddle into the flow to gain enough speed to enter the chute (*See Glossary*) at the top of the rapid. The guide yelled at the crew to paddle hard and forward so they could get enough speed to pass a rock at the top of the rapid. The guide yelled again at the crew to paddle stronger forward, but the guide could see that they did not have enough forward speed to get past the rock.

At about 1610 hours, the guide called 'over left' indicating that he wanted all the crew to move to the left side of the raft. Some did so as the left tube struck the rock, wrapped and started to ride up. As the raft was riding up the rock, five of the six passengers fell out of the raft, which by this time was almost vertical up against the upstream side of the rock. Three of the passengers were swept to the left and two to the right of the rock. The guide and one passenger stayed at the top of the raft sitting on the left tube. About thirty seconds after the wrap, the raft exited and continued past the rock. The guide grabbed a spare paddle for himself and the remaining passenger and attempted to beach the raft. He missed the 1st eddy but gained the next one and stopped at river left. The guide had seen two passengers in a pool to the left and one in a pour over (*See Glossary*) near an eddy. Another passenger was swept down and caught the raft before beaching. One passenger was unaccounted for at this point.

The guide communicated with the next raft as it went through the rapid. This raft headed down river to look for the missing passenger. The 3rd raft came through the rapid successfully and eddied out (*See*

Glossary) river left below the rapid. The TL then eddied out on river left (*See Glossary*) above the rapid. He beached the raft and ran down to assist in finding the missing passenger. The TL then miscommunicated with the other guides as he thought erroneously that the missing passenger had been accounted for so decided to raft down the rapid instead of keeping his raft in the optimum position for rescue.

All the guides were communicating using sign language and it was confirmed to the TL that there was one passenger, Mr Warren, still missing. The TL instructed one of the guides and some passengers to carry a raft back up the river through the bush and put it in the river well above the wrap rock.

At 1620 hours, the TL notified the River Valley base by radio that Mr Warren was missing. The guides searched the area, but could find no sign of him. At about 1635 hours, one of the guides was standing on a high rock on river left of the wrap rock; he looked down and saw Mr Warren trapped underwater under a large rock.

Various attempts were made to recover Mr Warren but were unsuccessful due to the strong current in the area and lack of manpower and equipment.

At 1715 hours, it was decided to raft the remaining passengers out to the River Valley base. They arrived there at 1745 hours.

Five of the passengers from the group stayed with the TL and assisted with retrieval of Mr Warren after receiving extra manpower and rescue equipment flown in by helicopter at about 1740 hours.

At 1830 hours, Mr Warren was recovered from the river. At 1845 hours the Police instructed that Mr Warren's body be flown to the Taihape mortuary.

By 1905 hours, all staff were back at River Valley Lodge.

White Water Section Map - River Valley Ventures

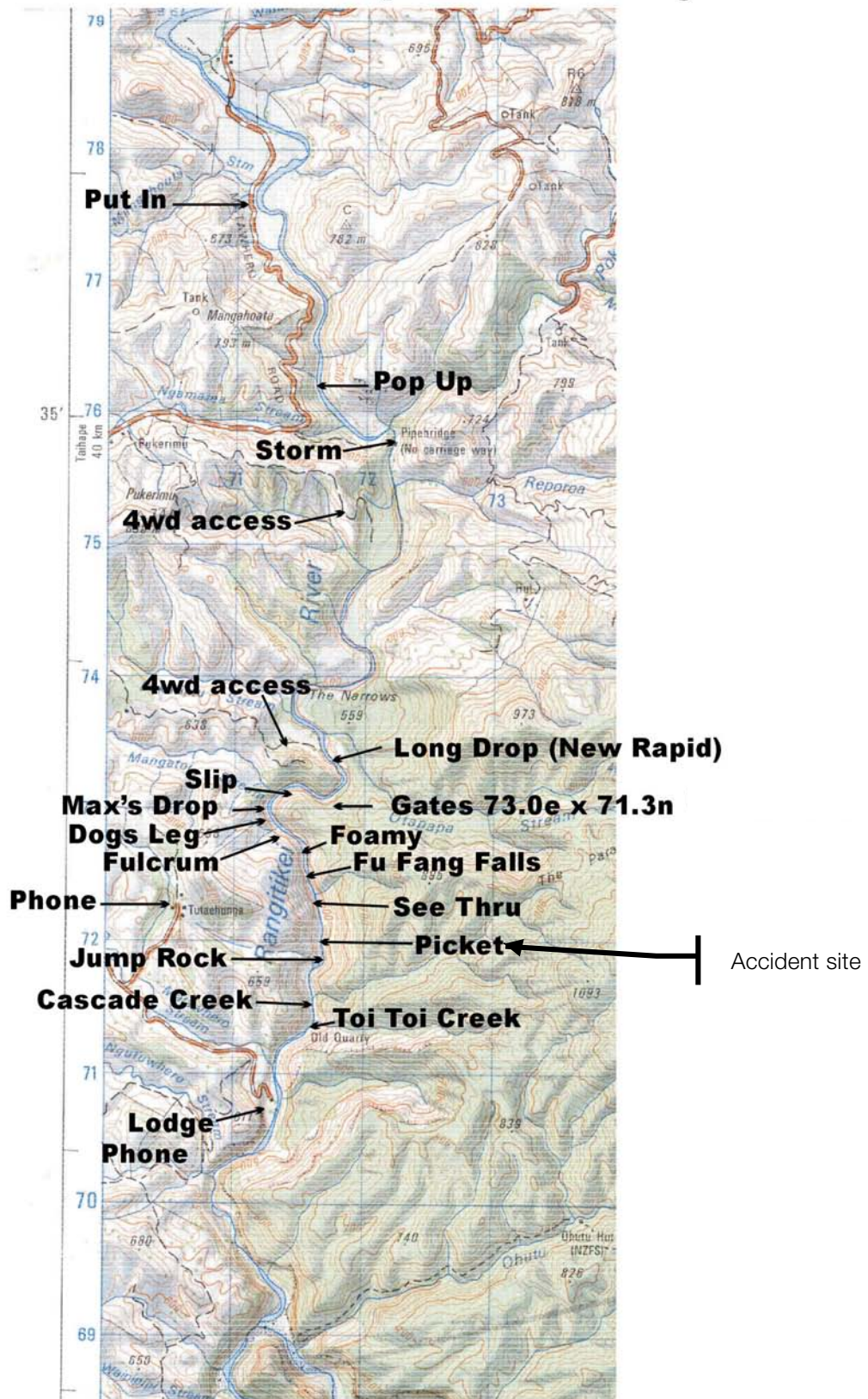


Figure 1
White Water Section Map – River Valley Ventures

COMMENT & ANALYSIS

Evidence

Maritime New Zealand commenced an investigation immediately upon notification. A Maritime New Zealand Accident Investigator and a Rafting Safety Auditor from Maritime New Zealand arrived on scene on 17 October 2005. All the guides and River Valley Ventures Management were interviewed. Documentation was gathered from the River Valley Ventures base as well as from NZ Army and the Taihape Police. River flow evidence was obtained from the Horizon Regional Council Environmental Information Team.

Analysis

Manning

All rafts were correctly manned and operated in accordance with **Maritime Rule Part 80 – Marine Craft Used for Adventure Tourism**.

Training

Of the four guides involved in this trip, two were senior raft guides grade 4/5 (*See Glossary*). One of them had been the Rafting Manager at River Valley Ventures the previous season. The other two guides held river guide grade 4/5.

They were all well trained in the operation of these rafts, and were extremely familiar with the section of the river that the trip was run on.

They were well versed in, and were operating within company policy as set out in the Safe Operational Plan (SOP). This had been audited within the last six months by Maritime New Zealand.

Audit findings included identification of corrective actions and comments in regard to operational considerations for the grade 4/5 section and the grade 1/2 section of the Rangitikei river

Corrective actions identified for grade 4/5 section:

1. Outline paddle/safety briefing details
2. Apply to Maritime New Zealand for acceptance of use letter for Extrasport and Americas Cup rafting lifejackets
3. Emergency response steps/flow chart to be developed for off river support staff
4. Establish SOP review and amendment policy

if applicable,

5. Document management strategies for river swimming and cliff jumping activities
6. Training rationale to be developed for guide training activities

Comments in regard to operational considerations for grade 4/5 section:

1. Location of back boards to be detailed in SOP
2. Separate hazard master list
3. SOP to reflect actual practice for radio use and details for line of sight radios to be considered
4. Use of a safety kayaker to be considered for high river levels and guide experience
5. River level details (visuals) to be documented
6. Helmet checking for fit to be added to helmet use policy

7. Formal analysis policy in regard to accident, incident, mishap recording and reporting to be amended to reflect actual practice of operation

River Flow

Stage height (mm) and river flow (m³/s) at Rangitikei River at Pukeokahu From 14-Oct-2005 12:00:00 to 14-Oct-2005 18:00:00. The stage height datum (where height is 0 mm) is not the river bed but an assumed datum.

Date and Time	Stage Height (mm)	Flow (m ³ /s)
14/10/2005 12:00	1193	41.324
14/10/2005 12:15	1187	40.831
14/10/2005 12:30	1186	40.749
14/10/2005 12:45	1184	40.586
14/10/2005 13:00	1181	40.342
14/10/2005 13:15	1180	40.261
14/10/2005 13:30	1179	40.180
14/10/2005 13:45	1177	40.018
14/10/2005 14:00	1175	39.856
14/10/2005 14:15	1174	39.774
14/10/2005 14:30	1172	39.611
14/10/2005 14:45	1170	39.449
14/10/2005 15:00	1171	39.530
14/10/2005 15:15	1170	39.449
14/10/2005 15:30	1168	39.286
14/10/2005 15:45	1166	39.124
14/10/2005 16:00	1162	38.802
14/10/2005 16:15	1161	38.721
14/10/2005 16:30	1160	38.641
14/10/2005 16:45	1159	38.561
14/10/2005 17:00	1157	38.401
14/10/2005 17:15	1156	38.321
14/10/2005 17:30	1154	38.162
14/10/2005 17:45	1153	38.082
14/10/2005 18:00	1151	37.923

Figure 2

The above information is displayed in real time on the Horizon Regional Council website. This information was accessed by River valley Venture before the trip commenced and was within operation of river flow limits. The upper limit of operation is 50 cumecs and the lower limit is 7 cumecs.

The Guide estimated the grade of Picket rapid to be between Grade 3 and 4 (See *Glossary*) at the time of the accident.

This was the first time that River Valley Ventures had had a raft wrap on this particular rock.

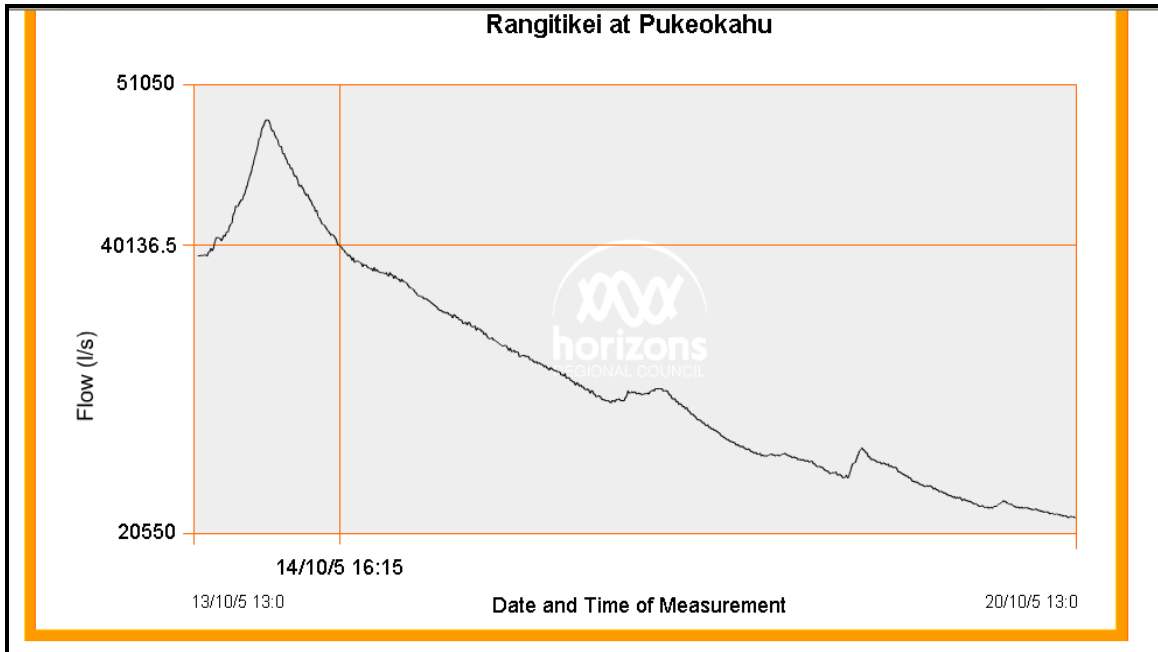
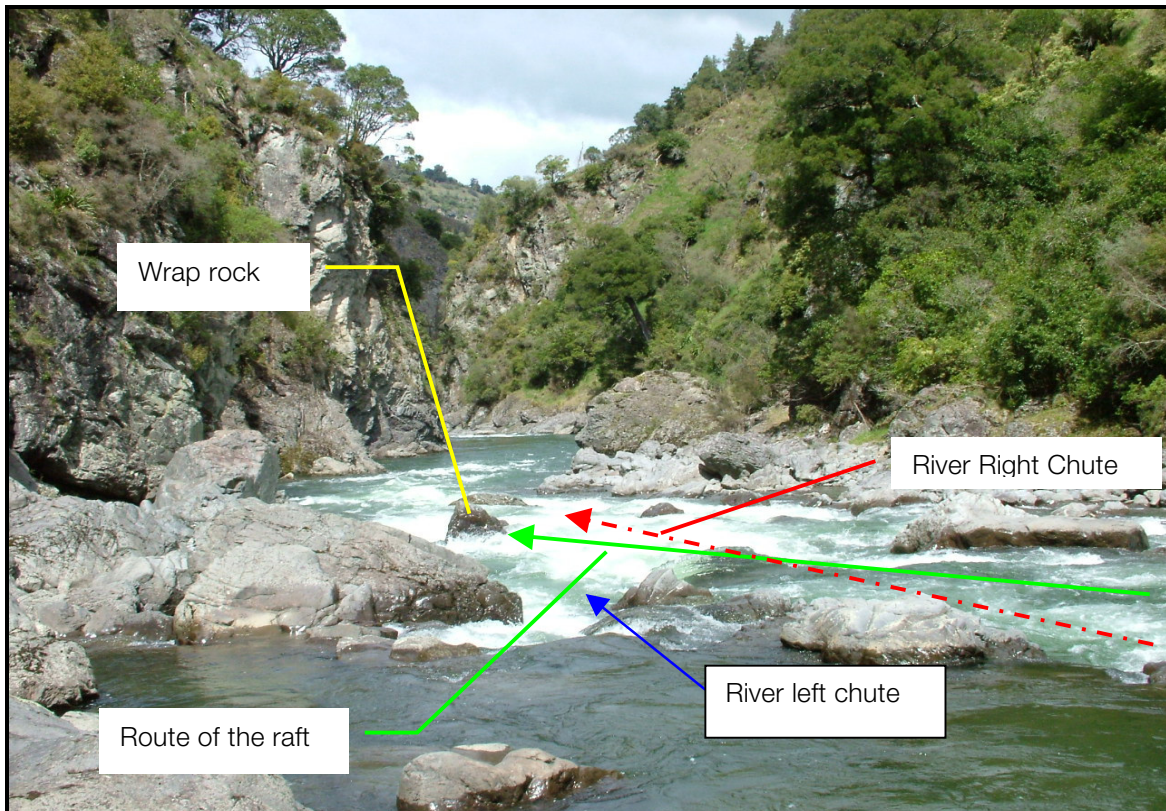


Figure 3

Real time river flow as displayed on the Horizon Regional Council website. The flow at the time of the accident was 40 136.5 litres per second or 40.136.5 cumecs, which is slightly in excess of the figures recorded in *Figure 2* at the time of the accident. The Regional Council show the information in litres per second because by this means they are able to record really low flows in the summer.



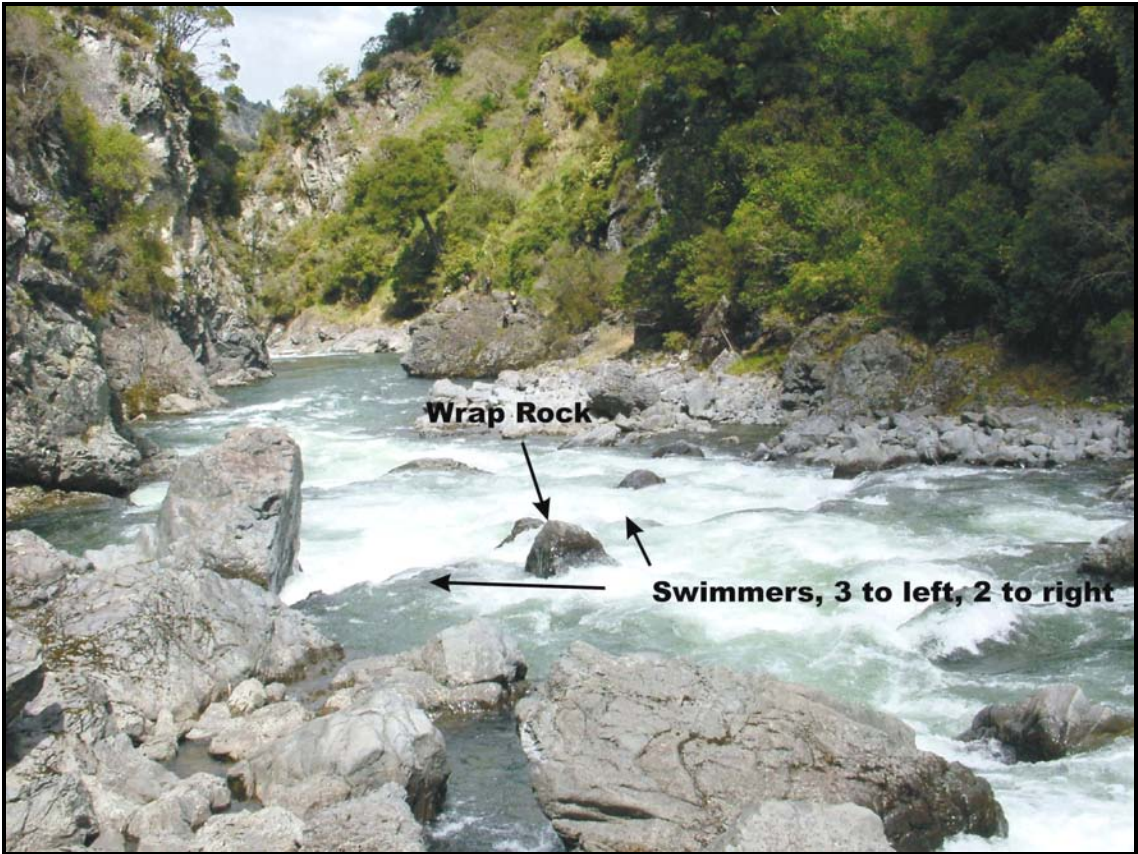
Photograph 2
Picket Rapid

Due to the lack of speed the guide was unable to get the raft to run down the river right chute which gives a clearer line into the rapid. However, there is no 'right' or 'wrong' entry into the rapid and the river left chute had been used on many occasions without incident (See *Photograph 2*). Usually, this is not a major problem as the raft can run down either side of the wrap rock safely. In this case the crew were unable to get to the left of the raft quickly enough to stop the raft from wrapping. If the crew could have got to the top of the tube then they may have been able to prevent a full wrap.

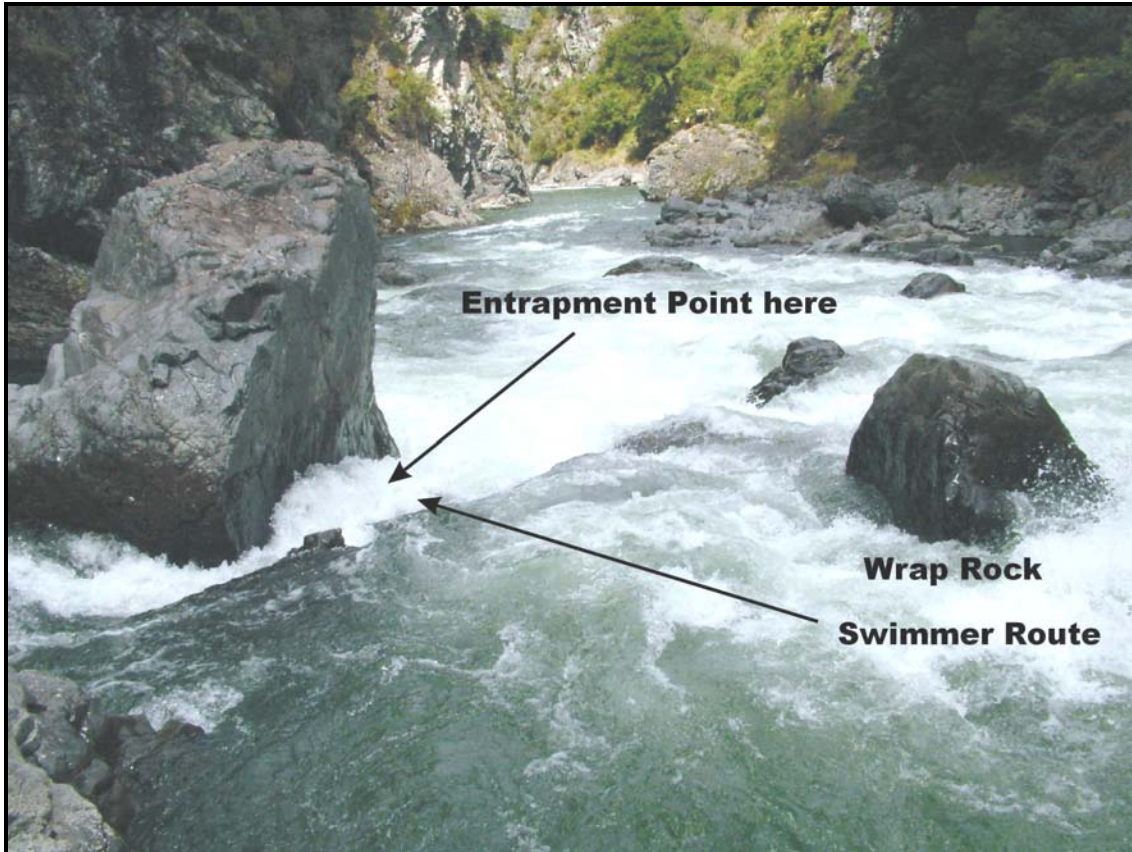
Fatigue

The Guide may have underestimated the fatigue suffered by the crew near the end of what was a fairly physical raft trip. Picket rapid was the ninth rapid to be negotiated and was the last major rapid in this two hour white water rafting trip. There were six more minor rapids to transit before the end of the trip.

During the trip no major problems were encountered while transiting the rapids until reaching Picket rapid. It was the opinion of the Guide that he may have overestimated the enthusiasm of the passengers and underestimated the flow of the water.



Photograph 3



Photograph 4

Communication

The guides were communicating using a recognised rafting sign language. At times this was hard to achieve due to the large amount of noise generated by the rapids and the doubt created by some ambiguous signs that were not fully understood. One of these related to whether the first or the second raft should run the rapid first. The other related to the misunderstanding by the Trip Leader that it was clear for him to run this rapid when it was known that Mr Warren was missing.

The trip carried two radios that were linked to a repeater and back to River Valley base. Some communications took place cross-river using these radios, but the vast majority was done using sign language.

CONCLUSIONS

N.B. These are not listed in order of importance

- **Incept 22** was unable to gain enough speed to counter the river flow coming from the right hand side of the raft. Consequently, the Guide could not put the raft in the ideal transit position for Picket rapid.
- The guide instructed the crew to move to 'over left', but this was not achieved and a wrap occurred in which five of the six passengers fell out of the raft.
- The raft exited the wrap shortly after the passengers fell out of the raft.
- Mr Warren was swept to river left and was entrapped almost immediately under a large rock and held in this position by the force of the water pressure until his body was retrieved some two hours later.
- Two other passengers were swept along the same course as Mr Warren. They were flushed out below the rapid and rescued.
- The guides and passengers attempted unsuccessfully to find Mr Warren. He drowned while trapped in a slot under the rock.
- Communications were affected due to the large amount of river flow noise in the area. Sign language was used but was confusing at times for all the guides. A number of messages had to be re-signed for better clarity.
- The post mortem stated that Mr Warren died as a result of drowning.
- The guide may have underestimated the fatigue suffered by the crew of his raft and overestimated their enthusiasm.
- Since the accident, River Valley Ventures have instructed their guides to repeat every hand signal to ensure the signal has been correctly understood.

SAFETY RECOMMENDATIONS

1. That River Valley Ventures Ltd investigate all guides carrying either a repeater radio or a small line-of-site radio for better communications cross river for use in an emergency.
2. That Maritime New Zealand seeks feedback from the rafting industry on how to compile guidelines to better send and receive hand signals across river. Particular thought should be given to how to clarify the 'OK' signal so it can become less ambiguous.
3. That River Valley Ventures critically review the white water rafting trip procedures to reflect the positive changes that have come out of this tragedy.
4. That included in the above procedural changes is the need for raft guides to be aware that the trip is not over until the raft is safely beached at the end of the trip. The guides need to be mindful that passengers can and will get fatigued throughout the trip.
5. That Maritime New Zealand distributes a summary of this report to industry via the SOP newsletter, and that a full version of the report is available on www.maritimenz.govt.nz.

ACTION TAKEN

River Valley Ventures have made a number of changes to policy and operations. The two following points directly represent immediate changes:

Raft Entry Into Rapid

Following a comprehensive session analysing the movements of the raft, the following changes will be placed into the Master Hazard List.

“When the rock in the entry channel of Picket is covered, forming a hole, then rafts MUST enter the rapid from below the guard rocks on river left, with a ferry angle to fully clear the wrap rock and sieves on river left. Rafts should be running either through the hole or to the right of it.”

Communication

Change to SOP under “On river signals”. Text to read - When using signals, guides shall repeat the signal given to them to show that they have understood it correctly. The exception to this is where the OK signal is given. This will not be repeated where the situation is clearly NOT okay”