

REPORT TO TRUSTEES OF  
THE SIR EDMUND HILLARY  
OUTDOOR PURSUIT CENTRE OF NEW ZEALAND

MANGATEPOPO GORGE INCIDENT, 15 APRIL 2008

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## Section A: Summary of Events

1. On 15 April 2008, 10 students and one teacher from Elim Christian College, led by an instructor from Sir Edmund Hillary Outdoor Pursuit Centre (OPC) undertook an “upstream trip” in the Mangatepopo Gorge.
2. A weather fax was received at approximately 06:45 that day. It referred to rain and poor visibility. It did not refer to thunderstorms or heavy rain. There was heavy rain in the area throughout the morning, including, at one point, a thunderstorm.
3. Commencing the Gorge trip the group passed the spillway at about 12:30. After reaching the turning point chosen by the instructor, and on the way back downstream, the river current became stronger, and crossings were deeper. At about 14:40 the group reached a ledge on the true left, and remained on it for some time.
4. The river level had risen dramatically. A decision was made to leave the ledge, with students (and the teacher) entering the water at intervals. Three pairs were tied together. The instructor and one student proceeded first, exiting the river on true left just prior to the spillway.
5. By this time, around 16:00, the flow was near its peak. It was a raging torrent. In the next short period, all members of the group left the ledge. Only one student was able to be assisted by throw bag to exit the river prior to the spillway; all the others and the teacher went over the spillway, with only two of those who did so, surviving. The remaining seven drowned in the very rough and turbulent water below the spillweir.<sup>1</sup> An extensive emergency response was undertaken.
6. This report analyses these tragic events.

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<sup>1</sup> Attached at Appendix 2 are photos of the river in flood taken on 12 July 2008. The measured peak, that day, was 8.9 cumecs, approximately half the peak recorded on 15 April 2008. The photos give a basic idea of the power and turbulence of the river in flood.

## **Section B: The Review Team's approach to its work**

### **Terms of Reference**

7. The Trustees of OPC:
  - 7.1 Wish to investigate, by way of an independent investigation review team (Review Team), the circumstances that led to the recent loss of life of six high school students and a teacher from the Elim Christian School.
  - 7.2 Seek a report from the Review Team that identifies any matters either unique to the particular events, or of more systemic nature, that could have contributed to the disaster, and makes recommendations to the Trustees about how improvements could be made to ensure that the OPC is as safe as is practicably possible given its mission.
  - 7.3 Do not ask the Review Team to establish legal or moral fault. Legal responsibility will be dealt with by other agencies.
8. The Terms of Reference of the Review Team request a report which:
  - 8.1 Establishes the essential facts leading to the loss of lives in the Mangatepopo Gorge on 15 April 2008, including OPC's emergency response on 15/16 April 2008;
  - 8.2 reviews OPC safety policies and practices relating to the Mangatepopo Gorge both in general terms and specifically in relation to the events on 15 April 2008, including OPC's emergency preparedness and performance on 15/16 April 2008;
  - 8.3 makes any recommendations in relation to those policies and practices the Review Team sees fit.

### **Methodology**

9. A focus on "what" and "how" rather than "why" the incident occurred would have restricted the investigation to a limited set of causes, and may have focused future prevention on disciplinary or procedural approaches, and would have been likely to have assigned responsibility and blame to those most immediately involved. It may also have led to short term, and ultimately ineffective, intervention since any underlying conditions (that may create vulnerability to a wider range of incidents) would remain unaddressed.
10. In contrast, a "systems based" approach analyses the full range of factors within the control of the organisation that may increase the risk of an incident occurring, and also trace the driver of those conditions.

11. Much has been written on these concepts, and this report is not the place to analyse the literature.<sup>2</sup> Suffice it to say that the Review Team has regarded the Terms of Reference as requiring an analysis of more than human error; it needs also to consider the systems at OPC. In order to adequately carry out such a review, it is necessary to look at all possible causes of the events of 15 April 2008. It is common in accidents of this nature that there are many contributory factors, which might combine in an unpredictable way. Consequently, there are often many lessons to be learned.
12. After referring to contextual facts in Section C, essential facts are described in Section D.
13. Causal factors of an accident are identified by analysing the facts.<sup>3</sup> Causal facts are the events and conditions that produced, contributed to, or failed to prevent the occurrence of an accident; there are usually four types of causal factors:
  - 13.1. Direct causes: these are discussed in Section E. They are the immediate events or conditions that led to the tragic outcome. For example, death in a river might be directly caused by trauma, drowning, or hypothermia.
  - 13.2. Contributing causes and circumstances: these are discussed in Section F. They are the failures and unsafe conditions associated with the Gorge trip itself. These include events or conditions that collectively with other causes increased the likelihood of the accident, but on their own would not lead inevitably to a death or serious injury. Contributing causes are determined by systematically examining all available data, with a low threshold for inclusion to ensure no possible way to prevent a future tragedy is overlooked. Normally there would be numerous contributing causes and circumstances, which, had any one of them

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<sup>2</sup> The approach adopted by the Review Team is consistent with accident analysis methods adopted in any major or complex accident, whether in the outdoor education sector, aviation, construction, medicine or otherwise. Resources which were of assistance to the RT were US Department of Electricity "Conducting Accident Investigations" (1999), ABS "Guidance Notes on the Investigation of Marine Accidents" 2005, Methods for Accident Investigation, Norwegian University of Science and Technology, S Sklet.

<sup>3</sup> The **morphological approach** to analytical incident investigation is based on the structure of the system being studied. The morphological approach focuses directly on potentially hazardous elements (for example operation, situations). The aim is to concentrate on the factors having the most significant influence on safety. When performing a morphological analysis, the analyst is primarily applying his or her past experience of incident investigation. Rather than looking at all possible deviations with and without a potential safety impact, the investigation focuses on known hazard sources. Typically, the morphological approach is an adaptation of deductive or inductive approaches, but with its own guidelines (Rausand, M., 2002, Methods for Accident Investigation, Norwegian University of Science and Technology). In this respect, the Review Team has adopted a morphological approach to analytical incident investigation, drawing in particular on its expertise in fatal incident analysis and prevention.



been otherwise, would have prevented the incident or mitigated its consequences.

- 13.3. Underlying causes: these are discussed in Section G, which examines management and organisational factors. These are also events or conditions that collectively with other causes increased the likelihood of the accident, but on their own would not lead inevitably to a death or serious injury. Again, these causes are determined by systematically examining all available data, with a low threshold for inclusion to ensure no possible way to prevent a future tragedy is overlooked. Underlying causes are not unique to the one incident, and the investigation of hypothesised underlying causes must look for evidence of other incidents in which the same conditions or factors were also present. Such examination of other incidents is confined to any common elements with the primary incident.
  - 13.4. Root causes: these are discussed in Section H. These are the causal factors that, if corrected, would prevent recurrence of the same or similar accidents. They may be derived or encompass several contributing causes. They are higher order, fundamental causal factors that address classes of deficiencies rather than single problems or faults. Root causes are determined analytically, with threshold for inclusion being expert opinion that correction of the root cause will prevent a similar tragedy.
14. A variety of core analytical techniques can be used to identify causal factors. In its approach, the Review Team has proceeded as follows:
    - 14.1. It has considered causal factors which were under OPC control; the Terms of Reference did not require it to consider circumstances or matters outside OPC control.
    - 14.2. The Review Team has used the term “violation” in a technical sense, as the category of an unsafe act which is analytically distinct from an “error” (mistake, slip or lapse). No reference of fault should be drawn from the use of the term.
    - 14.3. Barrier analysis considers every possible barrier, how the barrier performed, why it failed or partially failed, and any consequence. Unsafe acts are categorised as errors or violations, and failures attributed to latent causes (present on other occasions) or changes (factors unique to the incident). In lay terms barrier analysis simply seeks to comprehensively identify every weakness or failure in safety systems revealed by an incident. It is a conceptual approach, rather than a fixed set of procedures.

- 14.4. Readers are cautioned that barrier analysis is inherently negative, and exhaustive, with a low threshold for inclusion. It is quite unlike a safety audit, and should not be read as such. In particular a safety audit would:
- Test barriers against industry or other standards, rather than the circumstances of a particular incident.
  - Consider a range of safety practices present on the day which were effective, but which were not relevant to the incident under review.
- 14.5. Because the Terms of Reference excluded consideration of legal or moral fault, these have not been considered. Fault has neither been allocated nor ruled out by mitigating factors outside the Terms of Reference. Thus this report focuses on what contributed to the incident, and what could prevent an incident in the future, but it does not make judgments about what individuals should have done in the circumstances of the incident.

## **Hindsight**

15. The Review Team recognises that it has been charged with the task of applying hindsight. The justification for using hindsight judgment is to enable improvements to be made. High reliability organisations are not immune to adverse events, but they have learned the knack of converting setbacks into enhanced resilience of the system. The Review Team's analysis and recommendations have proceeded on the basis of such objectives. The Review Team has been careful not to make hindsight judgments about the culpability of individuals.

## **General Principles**

16. For the purposes of a safety audit or to establish legal or moral fault, it would be necessary to consider standards that might be linked to the activity (gorging), the environment (covering a range of possible activities in the Gorge or around water, such as rafting or tramping), or the group and might be derived from different authorities (including New Zealand and international organisations). Common local practices that might not have been formally recognised as "standards" might also be considered.
17. Standards can vary over time. A major incident frequently leads to a review of standards. There can be debate and disagreement about particular standards, which may or may not have entered the public domain. In the case of OPC, available New Zealand standards might not be independent of

OPC, because individual OPC staff and OPC operations have contributed to the development of those standards.

18. Major accident investigators have to apply a yardstick which is different to those of safety auditors (or those investigating the incident from a criminal law or compensation perspective). The object of accident investigation is to fully analyse the event with a view to achieving improvement.
19. Some general principles, which the Review Team found helpful included:
  - 19.1 There has to be a recognition of the potential educational, social and health benefits to students and young people undertaking outdoor activities in a challenging environment. All outdoors environments have some potential hazards and risk of mishap.
  - 19.2 The appropriate duty of care with regard to supervised activities is that of teachers involved in outdoor activities, acting in loco-parentis, such that the level of supervision given is appropriate to the environment, age, experience and ability and behaviour of students.<sup>4</sup>
  - 19.3 Reasonable parental expectations must be considered.
  - 19.4 Hindsight, as already indicated, is appropriate because the focus is on learning from the tragedy so as to prevent a recurrence.
  - 19.5 The focus has to be on the causes of *this* tragedy in the Mangatepopo Gorge, where seven fatalities occurred and there was a risk of injury to others. It is those outcomes which must be avoided in the future.
  - 19.6 What has to be assessed is the reasonable possibility of certain adverse events occurring, the gravity of resulting injury if they do, and the “burden of adequate precautions”. In this context, the “burden” should be taken to mean an assessment of human and social cost of adequate precautions, as well as financial.

### Information gathering:

20. An important aspect of the process of gathering information, and of forming its views, was for the Review Team to submit draft material to any person/entity, where the Review Team was inclined to make a statement which could be seen as adverse to the interests of that person or entity. That process has been undertaken, and the input thus received very carefully considered. As a result the Review Team was able to refine its conclusions. Because the responses were considerable, express reference has not been made to each

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<sup>4</sup> Overseas cases assessing a duty of care in an outdoor education environment have regarded these factors as relevant – eg **Woodbridge School v Chittock** [2002] EWCA CIV 915.

and every point made in the various responses. The Review Team is grateful, however, to those who assisted it in this way.

21. The Review Team has obtained information from a variety of sources:
  - 21.1 Interviews held with survivors, and others affiliated with the Elim Christian College, on 13 June 2008 at the school.
  - 21.2 Two site visits, in May and July 2008.
  - 21.3 Interviews held with staff at all levels at OPC, on 21-23 May and 15-17 July 2008 at OPC.
  - 21.4 Informal communications with staff and others such as Jill Dalton, Jarrod Bowler, Tyrone Smith (Bubs Smith), and Jon Tarrant.
  - 21.5 Copies of 33 transcripts of interviews taken by the Police/Department of Labour of all the above.
  - 21.6 A significant volume of technical information obtained from Genesis Energy, MetService, NIWA and the Department of Conservation.
  - 21.7 Considerable documentary evidence, particularly relevant records from OPC.
  - 21.8 Information submitted by those to whom the draft report was provided, for natural justice purposes.
22. The Review Team is appreciative of the cooperation it has received from all from whom it obtained information, including the above interviewees and organisations, but also the Coroner, the Police and the Department of Labour.

## Section C: Contextual matters

23. Before describing the essential events, it is necessary to summarise information received on a number of contextual matters.

### OPC

24. OPC has developed over the past 36 years into a large outdoor education provider, running courses for school students (and adults) predominantly from throughout the North Island. While school programmes have remained at the heart of OPC, the Centre has broadened its focus and now runs a range of skill, leadership and experiential training programmes. It has recently established a second water based centre, OPC Great Barrier, located on Great Barrier Island.<sup>5</sup>

### Adventure Challenge programmes

25. OPC runs a range of Adventure Challenge programmes for school groups. These are personal development programmes that aim to increase personal confidence and awareness through achievement, group work and fun while learning outdoor skills. While all of the Adventure Challenge programmes focus on those aims, they can be tailored to suit the age, needs and aims of each group. OPC uses a tiered approach to school programmes. This, combined with a needs analysis, enables OPC to provide programmes which tailor the outcomes of the OPC experience to each group. Level A (which is the relevant level for present purposes) is “little or no previous experience and outdoor education”.<sup>6</sup>

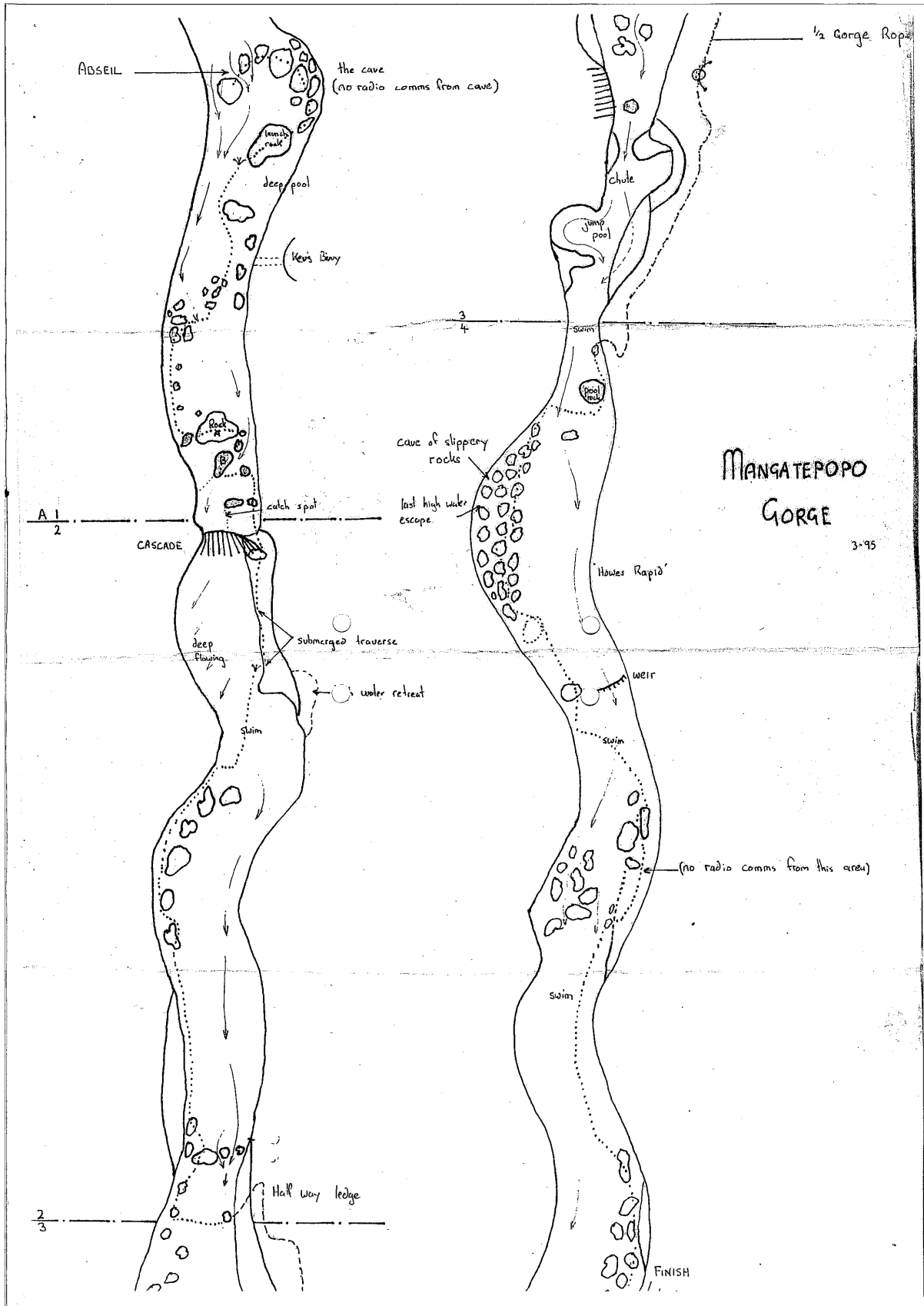
### Mangatepopo Stream

26. OPC is situated near Ketetahi, a short distance off the western side of State Highway 47, which runs from Turangi to National Park. The Mangatepopo Stream drains from Mt Tongariro. Near OPC itself, the stream undergoes a right angle and enters a gorge, approximately 500 metres in length.
27. On the next page is a sketch map, held by OPC, relating to the Gorge developed for training purposes and to identify key features of the Mangatepopo Stream. The left hand section of the map shows the first half of the downstream gorge trip; the right hand section of the map describes the second half of that trip, or the upstream gorge trip. Both are described in the next section.

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<sup>5</sup> Extracted from Information for Teachers, Handbook.

<sup>6</sup> Extracted from OPC Information for Teachers, Handbook, p11.



## History of downstream/upstream trips

28. The first OPC group to venture into the Mangatepopo Gorge was with Graeme Dingle in 1973. They started from the bottom and turned back when the gorge narrowed and steepened into waterfalls.<sup>7</sup> During the mid 1970s trips into the Gorge were commonplace, and groups were known to traverse the gorge from top to bottom. These trips were conducted like tramping trips, with no wet suits or helmets.
29. During recent years there have been two distinct trips in the gorge:

### 29.1. *The “Downstream Gorge” trip*

This involves abseiling or being lowered into the gorge at the top and working downstream to the exit at the Genesis intake/dam. This trip involves negotiating a steep sided valley with a number of river crossings and swims, mainly in moderately moving water. There is one active swim away from a wall while in other areas participants float to a point where the water gets shallow enough to stand. There are no jumps required to negotiate the gorge and at normal flows the level of swimming required is slightly higher than the ability to float. Part way down the gorge the route leaves the stream bed to avoid a tricky part and follows a traverse along a ledge above the river left. This is called the ‘half way ledge’ and being exposed requires some protection using fixed lines, harnesses and cows tails. There is also an escape route out of the gorge from the half way ledge. Having initially descended into the gorge, groups are to exit the same way with difficulty and most will need to traverse the gorge (at least to half way) to be able to ‘escape’. This level of commitment means that the Downstream Gorge trip is considered to be a serious activity.

### 29.2. *The “Upstream Gorge” trip*

This trip starts from the exit of the Downstream trip, either at the Genesis intake structure or by climbing up the face of the dam. This trip involves walking up beside the river and in some cases negotiating fairly slow flowing waist to chest deep water (at normal flows). If the students swim it is a float until they can regain their footing. One river crossing, above “Howe” rapid and just below the half way ledge, is normally conducted using mutual support and is spotted by the instructor. The upstream gorge trip normally finishes below the half way ledge at a spot called the plunge pool, where students can do a jump before starting their descent. The upstream gorge trip is approximately 300 metres, and involves at least two river crossings. This trip was considered by a number of OPC staff to be less serious

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<sup>7</sup> Moodie, 1998.

as groups who encounter difficulties on their way up the gorge can always choose to retreat over the ground they have passed over. Up until 15 April it was generally regarded that somebody would have adequate time in which to reach a point of safety before the stream flooded to unsafe levels.

30. It is uncertain when the upstream gorge trip was first established, although OPC staff from the mid 1990s recall that the upstream option was generally only used when the downstream entry point was inaccessible. It appears as though the upstream gorge trip became a usual activity sometime in the last 10 years, following an extended period during which the downstream couldn't be accessed because of instability at the abseil/lower in point.
31. Currently staff regard the upstream gorge trip as an easier option, and suggest that relative to the downstream gorge trip it suits a weaker group. Some staff suggested that a gorge 'experience', such as playing games at the outlet, and going a little way into the gorge, provides an alternative to the upstream gorge trip for some groups.
32. In discussion with the Review Team, OPC staff considered the most significant hazards in the gorge to involve river crossing, slipping and falling on boulders and the coldness of the water and air. The downstream trip also involves a rock scramble to avoid river flow into a bluff.
33. Safety procedures in the gorge have evolved over time. These are fully discussed below.

### **Descriptive summary of all known previous incidents in the gorge**

34. The accident/incident history of incidents in the Gorge is available from August 1977 when the first incident reports were documented and kept.
35. Late 1976 – Fatality. In *OPC - The Adventure Starts Here*, OPC's first fatality is described. Late in 1976 a young instructor:

*“was taking a group of fourth form girls through the Mangatepopo Gorge. It was raining and the river was coming up, but not dramatically. The instructor was standing behind a rock in the water pulling his group one at a time across the current to the bank. He pulled Sally across and turned to the next student. Moments later he caught sight of someone being swept down the next rapid. It was Sally. She was swept into a jumble of logs and submerged. With the current and the logs acting like a sieve, no one was able to pull her out in time to save her”. Graham Dingle later reflected that “everyone agreed the instructor had made the right decisions on the spot and all the instructional expertise in the world could not have prevented the*



*tragedy.” And “...it was agreed that only stronger groups should go down there”.*<sup>8</sup>

36. 16 March 1984 – River rose rapidly while a group was in the Gorge. One of three instructors had completed the Gorge trip once before. The group was caught by rising water, and became trapped river left just above the dam. The instructor, en route to seek assistance broke his leg (out of the Gorge, making his way along boulders beside the stream).
37. April 1987 – Suspected hypothermia. A student suffered suspected hypothermia (later comments suggested “more of a psychological problem”) and was evacuated via assisted hoist. The incident report notes that “This was a minor incident but the dangers of a gorge trip must be realised”.<sup>9</sup>
38. January 1988 – Fractured ankle. A student did not follow instructions about belly flopping into the last pool in the Mangatepopo gorge, and fractured her ankle. A staff training day to look at gorge rescue and group management was suggested and later actioned.<sup>10</sup>
39. 11 February 1989 – Near miss incident. Described as a river crossing that caused problems because the students tried to cross before the instructor had signalled them to do so.<sup>11</sup>
40. 1989 – an incident occurred as a result of someone just about being swept over the first waterfall.<sup>12</sup>
41. 16 September 1990 – Ankle sprain. Student sprained ankle ligaments jumping into pool, against instructions.
42. 6 May 1992 – Cold injury. A student suffered “cold injury”. Recommended gorge not standard until spring.
43. 16 March 1994 – Near miss incident, evacuation, rock struck shoulder, and rescue attempt was carried out overnight.
44. A group entered the gorge at low flow, although the weather conditions were heavy showers with intermittent fine spells, following a prolonged dry spell. The water level was noted to be a “dangerous torrent” by the time of the crossing before the halfway ledge. About that time a student had difficulties while crossing, got her foot stuck and was swept under the water (near miss). The group retreated from the gorge via the escape route. This process was prolonged when another student was hit on the shoulder by a rock.

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<sup>8</sup> Page 43, “OPC, The Adventure Starts Here.

<sup>9</sup> OPC Incident Book 2, April 1987.

<sup>10</sup> OPC Incident Book 2, January 1988.

<sup>11</sup> Page 3 of Chapman Tripp letter to Police of 5 June 2008.

<sup>12</sup> Page 13 of documents attached to Chapman Tripp letter to Police of 5 June 2008.

Eventually the group arrived back at OPC at 21:45. Meanwhile a rescue group entered the gorge, and spent the night on a ledge in the gorge (to become known as Kev's bivi).

45. Extensive reviews took place, and an action list of 'standard operating procedures' for the gorge was developed.<sup>13</sup>
46. 16 March 1994 – river rose, group downstream of ford. Student swept away and group split.<sup>14</sup>
47. 25 May 1994 – A group crossing the Mangatepopo Ford after heavy rain had to wait 15 minutes for the level to drop to safe level. Second crossing was ankle deep, but after the last student crossed the river rose to dangerous levels within one to two minutes – attributed to intake release.<sup>15</sup>
48. 20 March 1996 – Near miss incident. Two students jumped into the plunge pool and were carried past get out point.
49. 30 April 1996 – Near miss incident, rise in water level. An increase in water flow levels (15 – 20cm) and mud content of water was noted not long after entering Pukahinau Gorge. Weather conditions – light rain.<sup>16</sup>
50. 2 May 1996 – Near miss incident. Student was lowered onto rock, fell backwards into river, and was held under by the force of the current.
51. 17 November 1999 – Incident in which “overweight” student suffered a fall on an upstream Gorge trip. The instructor was working solo.
52. 16 July 2001 – Near miss incident. Rocks were dislodged on a group making their way up towards the plunge pool.
53. 12 December 2001 – Instructor with “inadequate knowledge or skill” (query) working solo, briefed group on how to descend the section, then heard a cry and saw a student had fallen, and was in the water being swept towards the undercut. A successful throw bag rescue was undertaken.
54. 19 January 2004 – Near miss incident. Instructor swept under submerged log.

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<sup>13</sup> OPC Incident Book, for 15 March 1994.

<sup>14</sup> Although not specifically in the Mangatepopo Gorge, this incident involved rising river levels of the Mangatepopo Stream, downstream of the Gorge.

<sup>15</sup> Although not specifically in the Mangatepopo Gorge, this incident involved rising river levels of the Mangatepopo Stream, downstream of the Gorge.

<sup>16</sup> Although not specifically in the Mangatepopo Gorge, this incident involved rising river levels in the nearby Pukahinau Gorge.

55. 31 January 2004 – Near miss incident. Student being lowering into gorge, lost his footing, went over a 1.5 metre waterfall, stopped and held under water by rope.
56. 15 February 2004 – Near miss incident. Began gorge trip while flow over maximum limit. Student swept under wall, and underwater for 20 secs.
57. 24 February 2005 – Knocked head. Student fell and knocked head.
58. 24 February 2005 – Near miss incident. Student fell 3m off waterfall.
59. 2 February 2008 – Abrasions and bruising. Student lost footing crossing by Howe rock and swept away. Rapid management to be discussed.

### **Statement by OPC to Police of amendments to safety procedures in gorge**

60. According to information supplied by OPC to the Review Team, the following are amendments to safety procedures or method of activity since date of commencement, and the reasons why.<sup>17</sup>
61. Standardised river crossing techniques were developed for the Gorge, in response to the incident in 1989 where someone was just about swept over the first waterfall. The method of crossing changed to individuals crossing fast-flowing narrow section of water by doing “belly-flop” dive one at a time.
62. Changes made after the incident of March 1994 were:
  - 62.1. Chief instructor (CI) or delegate to attend all morning briefings and flag/brief people on special conditions/environmental traps.
  - 62.2. All gorge trips to be signed in/out with CI or OM with discussion of the group (their condition/gorge condition).
  - 62.3. Plateau Guides were approached re “sharing of resource” and informing each other of use. This no longer occurs as Plateau Guides do not now use the gorge.
  - 62.4. Water gauges were built with benchmarks established.
  - 62.5. Weather maps were pinned up in MOW at morning briefings by CI with associated discussion.
  - 62.6. The availability of weather maps prior to morning meeting was investigated and these are now discussed at the morning meeting.
  - 62.7. There was a staff training trip in the gorge to establish:

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<sup>17</sup> Attachment to letter to New Zealand Police of 5 June 2008.

- Standard operating procedures, i.e. river crossing techniques.
- Escape route location.

62.8. These then formed part of the downstream gorge competency requirements.

62.9. The escape route at the halfway ledge was marked.

62.10. The gorge map accuracy was confirmed.

62.11. There was an idea of stashing an “emergency barrel of gear” at the halfway ledge. The idea was investigated and a waterproof barrel is now in place at the halfway ledge with sufficient equipment to conduct an assisted hoist.

62.12. Radios were purchased and methods developed to transport them in the gorge dry.

62.13. The radio transmission in the gorge was investigated and black spots identified.

62.14. The emergency procedure list was updated, then printed and placed by every phone.

63. Further changes in the Mangatepopo Gorge have included:

63.1. Placing fixed anchors and cables along the halfway ledge.

63.2. Building a via ferrata ladder out at the halfway ledge.

63.3. Constructing a lowered flying fox system to access the start of the downstream trip.

### **Documentation in respect of Mangatepopo Gorge**

64. OPC holds the following documentation<sup>18</sup> in respect to the Mangatepopo Gorge:

64.1. *Quality Management System (QMS), Chapter B – General Policy Statements including Safety and Crisis Response.* Along with all of OPC’s general safety statements, policies and standard operating procedures, this document includes policy statements relevant to

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<sup>18</sup> Other documentation is also maintained, for example RAMS sign off list, training officer’s notes; the Review team understands that experience logs are maintained – the Team asked to see that of JS, but it was unavailable.

"classic environmental hazards" specifically including flooding and weather.

- 64.2. *Quality Management System (QMS), Appendix 1 – Programme Activities*. This includes general policies for Instructors along with more specific information for different activities. The policies, guidelines, teaching points and gear list for Gorge activities (including for the Mangatepopo) are described on pages 80 – 83.
- 64.3. *Risk Analysis and Management System (RAMS) – Mangatepopo Upstream Gorge Trip, May 06*. This describes the risks, perils and hazards associated with the activity, along with strategies for managing hazards, and emergency requirements. It also describes industry standards, policies/guidelines and staff skills required.
- 64.4. *Instructors' competencies are signed off in their "OPC Core Competencies" book*. Sections specifically relevant to the Mangatepopo Gorge are; A: Risk Management Competency, and T: Gorge Competency.
- 64.5. *OPC's Accident and Incident Reports* date from August 1977, and contain a number of references to incidents that occurred in the Mangatepopo Gorge (see above).

### **Relevant staff deployment on 15 April 2008**

65. On 15 April 2008, OPC employed a Chief Executive, Centre Manager, Operations Manager, Field Manager, Training Officer, Programme Development Manager, Senior Instructor, and eighteen instructors. Personnel whose role will be discussed hereafter include:
- 65.1. Operations Manager: Bev Smith (BS)
- Bachelors degree in Botany/Zoo
  - Diploma in Teaching
  - NZOIA Level 1 Alpine and Kayaking<sup>19</sup>
  - NZOIA Level 2 Rock, and Assessor
  - Registered teacher
  - Paraglider PG3 pilot – and instructor
  - Former National President of NZOIA, 2 years
  - 15 years at OPC
  - 25 years total instructing experience
  -
- 65.2. Centre Manager : John Maxted (JM)

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<sup>19</sup> Levels refer to those of the New Zealand Outdoor Instructors Association.

- Masters degree (outdoor environmental leadership), Diploma of Teaching (secondary), PhD (continuing)
- 10 years at University of Otago, Lecturer in Outdoor Education
- Certificate in Outdoor Education (OPC)
- NZOIA Level 1, Kayak and Rock; MSC Bush 1
- 19 years outdoor teaching experience
- Mid-July 2007, one month induction at OPC
- Mid-September 2007, commenced employment as Centre Manager, Tongariro, responsible to the CE
- Only partially inducted into the field.

#### 65.3. Field Manager : Kerry Palmer (KP)

- Bachelor's degree in Botany/Zoology; National Diploma in Outdoor Recreational Leadership; PG Diploma in Professional Development in Education
- NZOIA Level 1, Alpine and Kayak
- NZOIA Level 2, Rock
- Commercial pilot's licence
- 10 years at OPC
- 15 years total instructing experience
- Supervises field staff, accountable to Centre Manager
- Other postgraduate courses in training and development (for Masters in Education)
- Mount Cook SAR training (1998)
- Managing Search and Operations course for SARINZ
- SFRITO<sup>20</sup> registered assessor

#### 65.4. Training Officer : Matt Bennett (MB)

- National Diploma in Outdoor Recreation Leadership (current)
- Certificate in Adult Teaching
- NZOIA Level 2 Alpine; Level 2 Kayak and Rock (also assessor); Senior raft guide, Grade 4 and 5
- Rescue 3 – rescue instructor
- PANZ Safety Skills and Standards
- SFRITO registered Workplace Assessor
- 21 years total instructing experience
- Commenced at OPC on 14 January 2008 (first time employed by OPC, but previously had at times been contracted by Otaki schools to attend OPC AC courses in the mid 1990s)

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<sup>20</sup> SFRITO is Sports Fitness Recreation Industry Training Organisation (now known as Skills Active Aotearoa).

- Three week induction (office/managerial site induction for one week; observed week; co-instruct week) – in third week explored QMS.<sup>21</sup>

#### 65.5. Instructor : Jodi Sullivan (JS)

- Bachelor of Physical Education
- OPC Certificate in Outdoor Education
- Volunteered at OPC for two weeks in May 2007 (one week being an observer week)
- Completed the 12 week outdoor educators' course in December 2007 (included being observer for a week, and co-instructor for a week)
- Commenced at OPC as an Instructor on 29 January 2008
- Office induction, 30-31 January 2008
- Field observation, 1-5 February, and 11-15 February 2008.
- Commenced instructing on 21 February
  - Worked in sole charge capacity providing five repeated “half day” experiences (caving and ropes course)
  - In following week, led two short school courses back to back (three days and four days)
  - Led her first five day adventure challenge course, sole charge, in week of 10-14 March
  - In following week, was on leave for three days, and ran two days of high ropes and caving experiences
  - She had a non contact week (support) in the following week, before leading AC challenge with Samuel Marsden College, the Elim Christian School
- Observed an upstream gorge trip with Mike Brenton in April 2007, briefed for an upstream gorge trip in late 2007; undertook a downstream gorge trip during induction with Matt Bennett and Matt Rowley; instructed on a downstream trip, observed by Matt Bennett.
- 
- Core competencies book stated, in respect of downstream gorge competency, that she had completed:
  - trip preparation
  - lower or abseil students
  - group management in the gorge
 but had yet to pass the competency for extracting students from the halfway ledge or abseil point (competencies passed by Training Manager).

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<sup>21</sup> Statement of 1 July 2008, pages 16-18.

- Was signed off for four of the six elements of the downstream Gorge competencies.
- She completed the river rescue competency during the 12 week Outdoor Education Certificate course, and formally received the competency on 10 March 2008.

66. Observations as to JS's gorge competence included:

66.1. John Maxted :

- JS was a former student of his, and had observed her in a number of context over several years;
- she had a reasonable grounding on OPC systems, having been a volunteer first;
- she may have felt some pressure to provide a water-based activity on 15 April 2008, but, typically, she would have bitten the bullet and said she was ready.

66.2. Kerry Palmer:

- Placed JS on several short programmes (3 days) prior to a full week (5 days).

66.3. Matt Bennett:

- Following the downstream trip, MB gave the following feedback:

*“Jodi led the downstream trip with a group of 9 New Plymouth Girls’ High School students. She did a stage briefing, starting at the RC, getting them kitted up and discussing with the group the need for each item of equipment. Then in the vehicle area she demonstrated and had students practice the fixed line system. At the top of the trail above the gorge she went over communication, white-water swim position and how to offer assistance. She did a good job of running and managing the flying fox platform. We discussed add-ons for improvement of this and the radio policy. Her intention was to radio from the base of the FF and we discussed radio black spots and levels of commitment to the gorge. In the gorge she positioned herself well to be able to manage and observe students, leading them along lines that met student competency, hazards and water flows. We discussed water level assessment, non-verbal communication systems, need to move quickly (hypothermia and flooding). I have asked that she needs to write up a lesson plan/activity flow plan, be observed a couple more times running the trip and see the gorge at higher flows. She also needs to*



*read the RAMS form. Overall I feel she did a great job of running the gorge.”*

- As above, explained to JS in the gorge the big issues were hypothermia and movement; she needed to shorten her briefings; needed to change management strategies if the flow was higher
- Told her he needed to see her in the gorge when it was a higher flow – either with him or with a senior instructor.
- Would have pointed out where the previous fatality had occurred (1976).
- Said he would have talked to her about getting stuck in the gorge in high flows.
- Would have explained patchy radio contact.
- Would like to have done more with JS, but there were resource implications.
- He thought there were pressures to put her out before she was ready – she was scheduled in advance to lead groups.
- JS had a range of experience, but not depth of experience.
- According to his diary he had worked with JS four days for the outside induction week; and according to the training database, for three other days, including a high ropes day, a general one day programme, and a downstream gorge (with JS under his competency).

### **Levels of experience**

67. Following its visit to OPC in July 2008, there was an exchange of correspondence between the Review Team and the Trustees as to levels of experience, and the need to employ contractors in the short term. The Review Team had a serious concern which required immediate action, rather than being left until the completion of the final report. The Review Team reported that the Centre had been operating with too few experienced staff and continued to do so. A concern the Review Team referred to was that, as at 1 August 2008, 7 out of 23 instructing staff had less than one year of experience at OPC. Those persons do not necessarily have “transferable skills”. This could have implications for the deployment of field activities, particularly those in more hazardous environments in which inexperienced staff instructed alone
68. Expanding on this, in a letter of 13 September 2008 the Review Team explained that years of experience at OPC is relevant to:
- Local knowledge of particular hazards
- Organisation culture
  - Corporate memory of previous incidents.
69. The Review Team further noted that:

OPC instructors can and often do operate on their own, which was a potential weakness in OPC's overall operations.

Competencies were not equivalent to experience at OPC. "Competencies" are categorical, whilst "experience" is incremental

70. The issue of extent of experience is one which is relevant to the events of 15 April 2008, and will be discussed more fully below.

### **Weather information from Meteorological Service of New Zealand Ltd (MetService)**

71. The Review Team has received considerable assistance from solicitors for MetService, as to the variety of products which were available in April 2008, together with the provision of examples of those products.
72. In particular, the Review Team was advised:

#### ***“Website***

*MetService has a large amount of information freely available on its website ([www.metservice.com](http://www.metservice.com)) including national and regional forecasts and severe weather information. Anyone may subscribe to an automated email service advising of severe weather warnings and watches. These messages are also available to be sent to mobile devices and this service is free of charge.*

#### ***Metfax***

*Metfax is a service providing forecast information by facsimile at times (up to 4 times per day) specified by individual customers who subscribe, or who call MetService for a particular product on an as required basis. Customers select the forecast area that they wish to receive. The Metfax service provides detailed forecasts for the relevant day and less specific information for the subsequent 3 days. It also includes forecast maps for the current situation, the next 24 hours and the next 36 hours.*

*Customers can subscribe to up to 4 faxes per day at a starting cost of \$125.00 including GST per month for 1 fax per day, or casual users can request a one off Metfax forecast (at a cost of \$5.40 for the first minute, and 99 cents for every minute thereafter including GST). Metfax is an aging product and is no longer used by many customers. Due to the age of the technology, severe weather warnings are not one of the components of the Metfax product.*

**Metphone**

*MetService provides a 0900 (0900 999 + area code) through which casual users can access pre-recorded forecasts and severe weather warnings. The forecast and severe weather warnings are updated frequently.*

*The Metphone 0900 999 07 service provides forecast and warning information for Waikato, Bay of Plenty, Taupo, Rotorua, Coromandel (land and marine) and Taumaruni. The Metphone 0900 999 06 service provides forecast and warning information for Hawke's Bay, Taranaki, Manawatu, Wanganui, Gisborne, Wairarapa, Taihape and Tongariro.*

*Metphone also provides access to other specialist marine, agriculture and some mountain regions forecasts including the central north island mountain and ski forecast. Calls cost \$1.30 per minute including GST.*

***Metconsult** is a 0900 number. Users may call and speak directly with the forecaster between 06:00 and 18:00 seven days per week. Calls cost \$30.00 for the first minute and 99 cents per minute thereafter.*

**Metconnect**

*Metconnect is a subscription based internet weather service containing the most up to date and highly detailed weather information available. The service is aimed at businesses and can be customised to suit the specific forecasting needs for subscribers. Severe weather warning information would normally be part of a subscriber's profile (as a free component of the service).*

*The cost is "modular" based, meaning that data is purchased in individual groups – the more modules subscribed to, the more expensive the subscription. The base price is \$125.00 plus GST per month.*

**Media and Other Agencies**

*The MetService supplies forecast and weather warning information to domestic television stations, newspapers and radio stations for the various organisations' regular, local and national weather forecasts. Severe weather information is also communicated to a variety of agencies, including the Ministry of Civil Defence and Emergency Management, the New Zealand Police and affected local and regional councils."*

73. The MetService website has a vast amount of information on it, and in some respects it was not easy to navigate. However, any user needing accurate information of a particular classification on a regular basis, could by spending some time considering the various options, work out which parts of the website were most useful.
74. There are other useful websites (some of them providing links on some categories of information to the MetService website), including [www.metvuw.com](http://www.metvuw.com), [www.sunrockice.com](http://www.sunrockice.com) and [www.eldersweather.com](http://www.eldersweather.com).

### **Weather, 14-16 April 2008**

75. A low over the Tasman Sea with an associated front moved over Nelson and the North Island, and produced heavy rainfall in Northland, Bay of Plenty, the central North Island and Nelson. One day totals of 126 mm. at Matamata, 108 mm. at Rotorua Airport, and 101 mm. at Taupo caused flooding and slips. There was also a deluge in the Tongariro National Park, which caused the flash flood on the Mangatepopo Stream. The specifics are more fully described below.

### **Review of Weather Forecasts Supplied by MetService:**

76. A number of the various MetService products have been reviewed – see Appendix 2.
77. The Metfax product is based on the Tongariro Alpine forecast. These are referred to more fully below, but in summary:

- 77.1. At 01:18 on 15 April, the alpine regional Tongariro forecast stated for that day:

*“Rain with isolated (sic) and poor visibility at times. Rain easing to showers tonight ...”*

- 77.2. At 06:30 on 15 April, the same forecast provided for that day:

*“Periods of rain with isolated thunderstorms and heavy falls. Poor visibility at times ...”*

78. The Metfax received by OPC at 06:45 on 15 April 2008 was based on the 01:18 Tongariro forecast – although this was not made clear on the Metfax itself, which is headed “Tongariro Alpine at 06-15am 15-Apr-07”, see Figure 7 below.

### **Print media Information:**

79. There is no indication that any reliance was placed on print media forecasts, but for completeness they have been reviewed – see Appendix 3. There was general concern in the media over preceding days as to severe weather in the mid to upper North Island.<sup>22</sup>

### **Summary of weather information available:**

80. In summary:

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<sup>22</sup> KP stated that he would usually watch evening television news, but did not do so on the evening of 14 April 2008; he normally also watched 06:30 news, but slept in due to adjusting to the time difference after international travel. He therefore missed the news and TV weather report at 06:30, and again at 07:00, when putting out the rubbish (paras 17, 18, statement of 29 April 2008).

- 80.1. A variety of MetService products indicated rain and thunderstorms for 15 April 2008. Severe weather was forecast for the upper North Island.
- 80.2. Heavy rain and thunderstorms were first predicted for the Tongariro area on 14 April 2008, in the Alpine/Regional Tongariro forecast. But this product, as issued at 01:18 on 15 April referred to “rain with isolated (sic) and poor visibility at times”. It contained a mistake – at least the omission of the word “thunderstorms”, and possibly the words “heavy rain”.
- 80.3. OPC received a MetFax at 06:45 on 15 April, and it contained the same mistake – the admitted omission of the word “thunderstorms”. The Review Team is concerned whether the actual omission was “thunderstorms and some heavy falls”, since this was what had been forecast the day before, and what was forecast subsequently. MetService does not accept this was the position. The Review Team has not been able to test the issue, and its concerns remain.
- 80.4. That fax was accompanied by a weather map which showed the situation at midnight Monday 14 April – particularly the approach from the west of a front, which could reasonably be expected to be preceded by a northerly flow and rain.
- 80.5. MetService updated its Tongariro alpine forecast at 06:36 by adding the words “thunderstorms and heavy falls”, but the updated forecast was not included on the fax sent to OPC at 06:45 because the MetFax system is updated hourly at 15 minutes past the hour. The updated forecast was available on the MetService website, and through other MetService products after about 07:15.
- 80.6. A variety of MetService products indicated by about 06:36, heavy rain and thunderstorms in the Tongariro area on 15 April:
  - The Tongariro alpine forecast as from about 06:36, available (free service) on the MetService website.
  - MetFax products sent by MetService after 07:15 (by subscription).
  - By the trends evident on rain radar, available (free service) on the MetService website. An example of rain radar (14:00 on 15 April 2008) is at Appendix 4.
  - The severe weather warning issued at 08:29 (free service).

- The severe thunderstorm watch issued at 09:49, which included reference to the Taupo weather forecast district, and expressly referred to the possibility of thunderstorms causing flash flooding (free service). The severe thunderstorm watch at 11:37 was to similar effect.

***Information provided by OPC to Police in letter of 5 June 2008:***

81. OPC subscribed to the MetService's Metfax service to receive the Tongariro Alpine forecast on the one fax per day basis. OPC had requested that forecast to be delivered at 06:45 each day.
82. OPC did not prior to 15 April 2008 subscribe to receive any severe weather outlook, severe thunderstorm outlook, severe weather watch or severe weather warning service. This information is often sent for free by email to subscribers. Nor did OPC subscribe to receive updates to warning services.
83. Following the incident on 15 April, persons at OPC became aware of the MetService email update. OPC stated that no one was aware of this service as at 15 April 2008, and it was also noted there was no reference to the availability of this service on any of the facsimile forecasts provided by OPC.
84. OPC understands that this lack of familiarity with the service is commonplace across other agencies in the central North Island, being agencies who would also require accurate and up to date weather information.
85. OPC understands that MetService has recently carried out a mail campaign to outdoor agencies to notify them of the update service, and that OPC was unaware of any mail campaign being carried out prior to 15 April, even to subscribers of other MetService services. MetService were unwilling to confirm this to the Review Team.
86. OPC also stated it was important to note the inherent unreliability of weather forecasts in this region. The letter to the Police stated the published forecasts are accurate less than fifty percent of the time. The most reliable indicator of weather at OPC is direct perception of the surrounding environment.<sup>23</sup>
87. It was also stated that a rain gauge present at OPC recorded approximately 32 mm of rain between 08:00 on 14 April and 08:00 on 16 April, which indicates how much rain fell at and around the OPC centre.

**Other information provided by OPC to Review Team.**

88. The forecast was delivered at 0645, because OPC has logistical meetings each morning at either 0730 or 0800 depending on the day and programme.

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<sup>23</sup> The Review Team did not assess whether OPC's view as to the accuracy of weather forecasting, particularly in relation to severe weather events in this region was warranted.

The faxed forecast was the most reliable way of obtaining updated information for staff to study prior to the meeting. OPC was not informed by MetService that the information was effectively five hours old at the time of issuing the Metfax.

89. Following the incident, OPC tried moving the Metfax time to 0730 to obtain the latest forecast. It does not arrive at OPC, however, until 0815, which is too late for the meetings.
90. OPC has other weather information gathering ability. The field management team have technology in their offices to access MetService and other websites, via satellite internet, at any time. They and field staff also have VHF and/or cellphone communication to call OPC and access the same information via office staff, if in doubt.
91. OPC also stated that due to its remote location, is not serviced by Broadband from major providers such as Telecom and Vodafone. Consequently it has installed a satellite internet service which offers a medium speed service. This service drops out at regular intervals and suffers from rain fade. Consequently, OPC has continued with the Metfax service which utilises phone lines as it provides a complementary service to website checks that use alternative communication technology.<sup>24</sup>

## Rainfall Data

92. The Review Team has received information as to rainfall in the Tongariro area, variety of sources, but the NIWA “report on climate, rain, soil and moisture and river flows in the Central North Island up to and including 15 April 2008” is the most specific. Paragraph 4.1 states, as to rain:

*“As described in section 2, an active trough affected the North Island and north of the South Island from 14<sup>th</sup> to 16<sup>th</sup> April ... rain began around 12 noon on the 14<sup>th</sup>, and then reduced in intensity between 6.00pm and 9.00pm. More rain followed overnight until a more or less general cessation between 4.00am and 10.00am on the 15<sup>th</sup>. After 10.00am the rain intensity increased again to rates similar to that experienced overnight. After 12 noon, rain intensities increased, to more than twice the previous values in some areas. Between 2.00pm and 4.00pm intensities reduced and rain had all but ceased by 6.00pm on the 15<sup>th</sup>.”*

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<sup>24</sup> OPC also stated that with regard to the MetService severe weather warning service, OPC’s inquiries following the incident show that no major outdoor pursuit operators in the Central North Island were aware of it; similarly, two local rafting companies contacted by DOL were unaware of, or used, the service. There is a preference to use Metvuw amongst a number of outdoor organisations, because of lack of ease of the MetService website. What other organisations did in this regard was outside the Review Team’s terms of reference.

The Review Team has also received information relating to Mangatepopo River flows from Genesis Energy; and this information has also been analysed in the NIWA report.

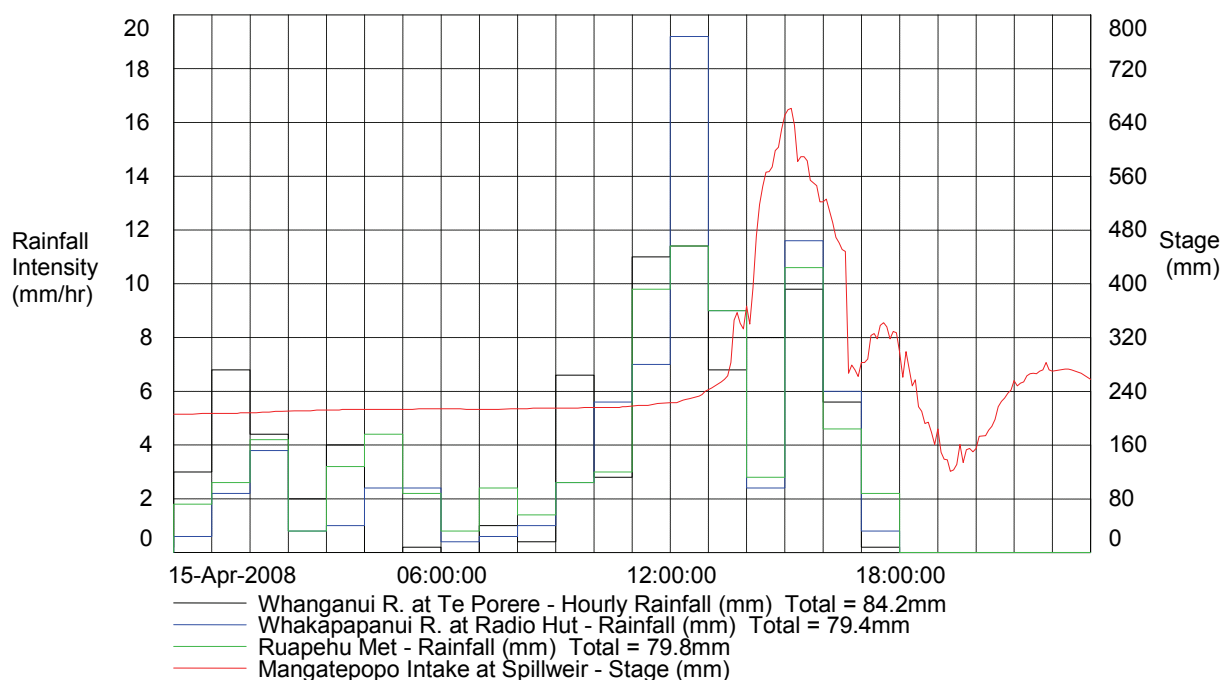
### ***Mangatepopo River flows***

93. Genesis Energy is required to meet certain minimum flow obligations under its resource consents for the ongoing operation of the Tongariro Power Scheme. Consequently, it has flow instrumentation on the Mangatepopo Stream as follows:
- 93.1. Compensation valve – this provides the 0.5 m<sup>3</sup>/s minimum flow required by resource consents (to an accuracy of +/- 1%).
  - 93.2. Mangatepopo spill weir – to indicate when the spillway is operating – Genesis Energy emphasised that the information provided to the Review Team in this respect is not precise, and was gathered for indicative purposes only.
  - 93.3. Te Whaiiau Canal – this is a combined flow of all rivers diverted from the Whakapapa, Okupata, Taurewa, Tawhitikuri and Mangatepopo intakes.
94. Data was supplied for 12 months for the Mangatepopo spill weir site.
95. The Mangatepopo Intake is designed to take up to a maximum of 4 m<sup>3</sup>/s. During normal operation all flow is taken through the intake screens located at the upstream side of the intake, into a catch chamber. Located within the catch chamber is a weir between the chamber and the tunnel. Water ponds in the catch chamber, and then flows over the weir into a tunnel. Located in the side of the catch chamber is a pipe that provides the downstream minimum flow (i.e. 0.5 cumecs) and located at the downstream end of the chamber is a sluice gate, which is used periodically to remove any gravel buildup within the chamber. When the intake is operating at full capacity (i.e. 4 cumecs), water backs up from the intake and flows over the spillway.
96. It is this flow that is measured at the spill weir site.
97. Genesis Energy emphasized that the data provided was provisional only, and further confirmation was required. Below is a graph showing the peak flow at the spill weir on the afternoon of 15 April 2008. The flow increased from 0.089 cumecs at 14:00 to 17.2 cumecs at 16:10.<sup>25</sup>

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<sup>25</sup> Mr J Bowler, of Genesis Energy, said the provisional data recorded in the graph shows 2 “dips” between 17:00 and 20:00, which are possibly due to the intake gauge being blocked by debris; it may be the descending line of the graph should remain smooth.





98. NIWA's database prepared for the purposes of its didymo programme states the mean flow of the stream is 2 cumecs; and that, at the spill weir, the catchment area is 31.36 km<sup>2</sup>. The catchment area is on the south-western slopes of Mount Tongariro.<sup>26</sup>
99. Genesis carried out a plot, showing rain distribution at three rainfall sites – Whanganui River at Te Porere (84.2 mm per hour at 14:00 hours), Whakapapanui River at Radio Hut (19.2 mm per hour at 14:00 hours), and Ruapehu Met (11.4 mm per hour at 14:00 hours). This was compared with the peak of the Mangatepopo intake at the spill weir (17.2 cumecs at 16:10, exclusive of the 4 cumecs flowing to the intake itself). The peak hour intensities were recorded for the previous hour's rainfall.
100. This data shows that the peak recorded at the spill weir was some 2-3 hours after the peak rainfall recorded at the respective rainfall sites.
101. That conclusion is endorsed when peak intensities of rainfall are taken from the proximate surrounding NIWA sites, as on the table below. The peak rainfalls for the two NIWA sites nearest to the Mangatepopo spill weir and the Lake Rotoaira site were also at 14:00 hours (with the site at Turangi 2 EWS, to the east of Mount Maunganamu, peaking at 15:00 hours).

<sup>26</sup> Bubs Smith interview.

Site	NIWA site number	Time of peak hourly rainfall	Intensity of peak hourly rainfall (mm per hour)		
			1 hour prior		1 hour after
Turangi 2 EWS (NIWA)	859707	15:00	12	17.2	8.5
Lake Rotoaira (Genesis)		14:00	15.5	21.4	7
Te Porere (Genesis)		14:00		11.4	
Whakapapanui River (Genesis)		14:00		19.2	
Ruapehu Met (Genesis)		14:00		11.4	
Mt. Ruapehu EWS (NIWA)	951503	14:00	10	11	10
Mokotuku at F Trig (NIWA)	953510	14:00	7.6	11.6	8.1
Mokotuku at SH47 (NIWA)	953511	13:00	6.1	14.8	8.2
Ohakune EWS (NIWA)	954409	13:00	5.6	11.7	10
Waiouru AWS (NIWA)	954607	14:00	3	8.8	6.4
Taumarunui (NIWA)	858305	14:00	7.4	15.8	11.6

102. The Genesis data for the Mangatepopo spill weir over the previous 12 months shows that there were dramatically increased flows:

102.1. Between 12:40 and 15:10 on 30 June 2007 (10.5 cumecs);

102.2. Between 23:45 on 5 July 2007 and 01:15 on 6 July 2007 (5.5 cumecs);

102.3. Between 03:30 and 05:45 on 5 November 2007 (7 cumecs).

Data from Genesis for 12 July 2008 confirms a measured peak of 8.9 cumecs, approximately half the peak recorded on 15 April 2008. Photos have also been provided to the Review Team of the river in flood on 12 June 2006 and 12 July 2008, which have provided an appreciation of the water turmoil when in flood.

103. From the data obtained by the Review Team, and indeed from many statements made by OPC staff, significant flood events on the Mangatepopo are not infrequent – although the flow of 15 April 2008 reached a peak higher than on many previous occasions.<sup>27</sup> On the information available to the

<sup>27</sup> Genesis advised that measurement of water levels at the spill weir site only commenced in February 2005, and they are used for indicative purposes only. They are not audited.

Review Team, it does not consider that the tragedy can simply be put down to being a freak “one in a hundred years” event.<sup>28</sup>

104. The NIWA report also reaches the conclusion that such an event was not unusual. On the basis of the more comprehensive information available to NIWA, their report concluded:

*“Thus there is a 50% chance of one or more floods this large in any year; alternatively we expect a flood of this size or greater once every two years on average. Many years have no events this large, but there were six in 1999 at Te Porere.”*

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<sup>28</sup> NIWA report page 11.

## Section D: Essential Facts

105. Section D is intended to provide an informative narration of the essential facts leading to the events of 15 April.

### Elim College OPC visit – essential facts prior to 13 April 2008

106. Elim College had booked a five-day standard Summer Adventure Challenge program, including unit standard assessments — NZQA (New Zealand Qualifications Authority) unit standard assessments 467 and 473.
107. Unit standard 467 required students to demonstrate personal and social development through participation in a high ropes course programme; and demonstrate safe practices in high ropes course activities. Unit standard 473 required students to demonstrate personal and social development through participation in an adventure based learning (ABL) programme; and demonstrate safe practices in ABL activities<sup>29</sup>.
108. Information provided to parents, seeking consent for their child to attend the centre, included:

Depending on the season, the activities offered at the Centre include kayaking, canoeing, tubing, rock climbing, snow and ice climbing, caving, tramping, skiing, gorge walking, camping and confidence courses. Tongariro National Park and the surrounding bush, lakes and rivers are some of the areas our programmes use.

The activities listed above contain some element of risk. This risk is countered by carefully structured and sequenced activities, and by supervising the activities with highly skilled instructors. It is important for safety purposes that students follow instructions given to them by their instructors and follow the few rules imposed by OPC. It should also be realised that because of the changeable and unpredictable nature of the outdoors that the risk can never be reduced to zero.

The Sir Edmund Hillary Outdoor Pursuits Centre of New Zealand has an enviable safety record.

### Figure 1 Information to parents

109. The teachers handbook included the following:

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<sup>29</sup> Definitions

*Adventure Based Learning (ABL)* is the deliberate use of a sequenced programme for the specific outcome of personal and social development. It includes cooperation, trust and problem solving activities.

*Personal and social development* is defined as an increase in self awareness; an increase in the awareness of the impact of actions on others; and behaviours which help the growth of others.

*Emotional safety* could include psychological and cultural safety.

We have a great site nestled on the edge of Tongariro National Park, highly skilled staff, excellent facilities and resources.

OPC has been a leader in Risk Management theory and practices and has a well developed health and safety policy based on current Risk Management practices. Our instructional staff are highly trained in both technical skills and in the skills of working with people. Our staff have extensive qualifications through the New Zealand Outdoor Instructors' Association, New Zealand Mountain Guides and Ski Instructors' Alliance etc. In addition many hold teaching and other tertiary qualifications and are trained in models such as Situational Leadership and Myers Briggs personality profiling.

At OPC, you and your students will have the opportunity to experience quality adventure programmes based on an educational philosophy, facilitated by highly trained staff that are committed to giving each group their best.

## Figure 2 Information for teachers

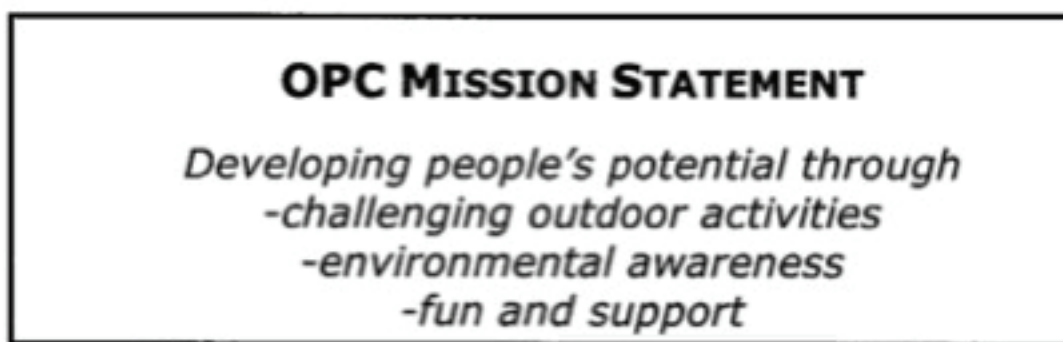
110. Thus, the information provided to parents and teachers suggests that OPC instructors are highly skilled, highly trained, have extensive outdoor qualifications and may hold teaching or other tertiary qualifications. Specifically a parent could expect that their child would be instructed by such an instructor. These descriptors are applied in Table 1.

	OPC level (1=lowest)	Employed at OPC	NZOIA/outdoor quals (1=lowest)	Teaching qual.?	Other
Matthew Rowley	3	15 months*	none	No	Dip. App. Rec
Jodie Sullivan	1	3 months	none	No	Bach PE OPC Cert. Out. Ed.
Rob Griffiths	3	1.3 years	ski instructor	No	Snr. Raft guide grade 3
<b>Contract staff</b>					
Pete Zimmer	3 (equivalent level 5)	4 – 5 months / year since 2000	2 level 2 1 level 1	No	Snr. Raft guide grade 5. Cert. Out. Rec.

\*including 1 year at Great Barrier

**Table 1** OPC staff deployed with Elim College groups, cross-referenced to information provided to parents and teachers.

111. A parent who wished to weigh potential risks against benefits might have considered OPC's mission statement (below). After an incident, a mission statement provides the beginning of a response to the question: "What was the group doing there?"



**Figure 3: OPC Mission Statement**

112. The mission statement might be read as giving equal weight to personal development, challenging outdoor activities, and outdoor environmental education.<sup>30</sup> No parent would think that OPC was a field studies centre. However, a parent who understood the distinction between outdoor activities involving an understanding of the local environment, and those framed around seeking personal or group challenges, might think that OPC tended towards the former. The Review Team found that in practice OPC programs emphasized skills, adventure, and group processes more than environmental understanding through outdoor activities.
113. These distinctions are important because (a) group and personal development outcomes can be obtained without necessarily taking activities which involve natural hazards or even outdoor environments and (b) programs focussed on environmental knowledge and understanding are inherently more likely to be attentive to environmental circumstances and hazards.

#### **Elim College OPC visit – essential facts 13 April 2008**

114. Four groups of ten students and two teachers from Elim Christian College arrived at OPC on Sunday 13 April at 12:55 for a five-day Adventure Challenge (AC) course.
115. The students had been organized into groups of ten by the school. OPC's maximum group size was ten – the OPC website advised schools to make the groups as close to ten as possible to minimize costs.
116. OPC policy was that responsibility for the safety of groups rested entirely with instructors<sup>31</sup>, although it was usual for schools to provide assistance for any student with a significant disability.

<sup>30</sup> At two extremes, environmental education emphasises knowledge and familiarity with an environment, while an adventure program seeks the *unknown*.

<sup>31</sup> OPC Quality Management System (QMS).

117. The Elim group included a student with cerebral palsy, Tom Hsu, although this was not stated on his medical form. Tony McLean accompanied Tom, and assisted him, but it is unclear how explicit that arrangement was. Tom was sufficiently disabled to have previously qualified for the NZ “Special Olympics”. The Elim Deputy Principal noted that “his coordination wasn’t the best”<sup>32</sup>. Some discussions had taken place between Elim College and OPC about the student and his needs, although the details are unknown to the Review Team and there was apparently no written record kept. Interview transcripts<sup>33</sup> indicate there was an understanding that the student did not want special treatment, but it is unclear whether an assessment was made about the reasonableness of this request, given the nature of the AC course. For her part JS considered Tom suitable for the upstream Gorge trip, having observed him undertake a range of activities.

### Elim College OPC visit – essential facts 14 April 2008

118. OPC Field Manager Kerry Palmer (KP) arrived at 6:45 for his first day back at work after one month of recreation leave. In his absence MB, JM, and Simon Graine had stood in as Field Manager.

DATES	FIELD MANAGER	TRAINING OFFICER
March 3-7	Kerry Palmer	Matt Bennett
March 10-14	Kerry Palmer	Matt Bennett
March 17-20	Matt Bennett	Nil
March 21-25 (Easter)	John Maxted	
March 26-28	Matt Bennett	Nil
March 31-April 4	Matt Bennett	Nil
April 7	John Maxted	
April 8-11	Simon Graine	
April 12 (Open Day)	Matt Bennett	
April 14-18	Kerry Palmer	Matt Bennett

Please note that the Training Officer position is split 75% training and 25% field instruction. The position descriptor for the Training Officer states that the role involves acting as Field Manager from time to time. No allowance has historically been made for having an acting Training Officer during periods when the TO is assuming the Field Manager role.

**Table 2**<sup>34</sup>: Field manager and training officer roles in the weeks prior to the incident. JS led her first Adventure Challenge course (sole charge) March 10-14

<sup>32</sup> *‘Deputy principal Gary Johnstone said Tom had been involved in Special Olympics since last year, competing in athletics and ten pin bowling. The teacher who died in the canyoning trip, Tony McClean, had accompanied Tom to athletics meets and is thought to have died trying to carry him to safety. Mr Johnstone said Tom joined a group of pupils and teachers on an overnight tramp in the Kaimai Range just this month, carrying a full tramping pack.*

*“His coordination wasn’t the best, but he certainly gave things a go. He was brilliant. He had quite a neat sense of humour and would take things in his stride. He was aware of his limitations but he gave it a go.”*

**Canyon victim a disabled Olympian**

By LANE NICHOLS and KIM RUSCOE - The Dominion Post | Saturday, 19 April 2008.

<sup>33</sup> Beverley Smith, Matthew Rowley.

<sup>34</sup> Figure provided by OPC September 2008.

and second April 7-11.<sup>35</sup> In practice, it appears: (1) the FM was not necessarily supported by a Training Officer (2) the FM was not necessarily inducted into the field program and (c) the FM might have no more than a few months local experience. These facts suggest that the FM role was to provide support for instructors in the field, but was not to second guess decisions made by instructors in the field.

119. As KP arrived he encountered an auditor for the “Outdoors Mark”, Jill Dalton, in the carpark. He had prepared for an audit prior to taking leave, but had left instructions for the audit to be arranged the week beginning April 21. In his absence the audit was arranged by Matt Bennett for April 14 at the request of the auditor. MB emailed KP about this. KP said the first he knew of the audit that week was when he met the auditor.
120. It is the Review Team’s view, based on its interview with KP that the presence of the auditor distracted him and occupied his attention. OPC would lose considerable face if it failed an audit.
121. At 07:30 KP attended a meeting chaired by the Operations Manager (BS). It was normal procedure to hold a meeting of operational staff at 07:30 on Mondays. The meeting had to be finished before breakfast at 08:00, and usually had a full agenda of logistical details. Instructors declared their plans for the day and the week and would receive feedback from others at the meeting. Any extended discussion on proposed plans would need to be followed up after the meeting. KP collected the weather fax prior to the meeting, and spoke to the meeting about the weather for the coming week. No one can recall the particular details of that discussion, but it was based on the weather fax, reproduced at figure 4.<sup>36</sup>

**66615: Tongariro Alpine at 06:15am 14-Apr-08**

<p>Today Cloud thickening. Outbreaks of rain developing in the afternoon, mainly on northern slopes. Wind at 1500 metres: Northeast gradually rising to 75 km/h. Wind at 3000 metres: Northeast gradually rising to 60 km/h, tending northerly in the afternoon. Freezing Level: 2800 metres, gradually rising to 3600 metres.</p> <p>Tuesday Often cloudy, with outbreaks of rain. Northerly winds, 70 km/h about the top, turning northwest and easing to 40 km/h at all levels. Freezing level above 3000 metres.</p> <p>Wednesday Rain easing to a few showers. Northwest winds, rising to 65 km/h at the top. Freezing level above 3000 metres.</p> <p>Thursday A few showers. Northwest winds, easing to 40 km/h at the top. Freezing level above 3000 metres.</p> <p>Friday A period of rain. Winds change southwest.</p>
--

**Figure 3 Weather fax text April 14**

<sup>35</sup> John Maxted had been employed at OPC as Centre Manager since September 2007. He had not been formally inducted into the field operations. Matt Bennett had been employed at OPC since 14 January 2008.

<sup>36</sup> Disclosure to Review Team.



122. Nine instructors were working with groups from the centre that week (4 Elim College, 2 Melville High, 1 Central HB, and 2 Diploma). One had worked at the Centre for 4 or 5 months a year since 2000. One had worked at the Centre for four years, and two for 15 months. Five of the field staff operating out of the Centre that week had between 3 and 5 months experience working at the Centre.

Pete Z	André R	Rob G	Brett D	Campbell P	Ros H	Dee C	Jodie S	Matt R
4-5 months X 9 years	48 months	15 months	15 months	5 months	5 months	4 months	3 months	3 months + 12 months GB
Elim	Melville High	Elim	Central HB	Diploma	Melville High	Instructing Diploma	Elim	Elim

**Table 3** Instructors with groups operating out of the Centre 14 April– length of time employed at OPC

123. Instructors worked independently, except that certain activities in certain conditions required FM approval. Planned activities were signalled at the morning staff meeting.
124. There was no “handover” from the acting FM, and no briefing from the Centre Manager or Training Officer. The Training Officer, who had been acting as FM for most of the time KP had been on leave, made several requests for a discussion with KP, but KP was occupied in discussions with the auditor. The first opportunity to do so was post lunch on Tuesday, as events started to unfold.
125. KP was unaware that the weather had been very dry during his absence.<sup>37</sup> OPC staff considered dry periods increased run-off. Knowledge of the dry period might have influenced KP’s decision making not only because of his belief about water repellency, but also because he could have realised staff might have become a little complacent about the possibility of heavy rain.
126. KP was not personally familiar with the training and induction that had taken place in his absence. Information that a handover might have drawn to his attention about Jodie Sullivan (JS) included:
- 126.1 Water days were a weak area<sup>38</sup>.
- 126.2 JS had completed a total of 13 days formal induction since commencing her employment, including observation of programs.

<sup>37</sup> NIWA, in its report concluded on this issue:

*"The early rain on the 14<sup>th</sup> had little effect on stream flow, because the catchments were very dry up until then, so this water simply replenished depleted soil moisture stores. The rain overnight further replenished the soil moisture, but there is still no reaction seen in the stream flow records. The renewed rain after midday on the 15<sup>th</sup> caused the soil moisture to approach field capacity rapidly. Rapid increases in flow follow."* (p14)

<sup>38</sup> Diary entry, MB.

- 126.4 Although the training officer had “signed off” JS’s competency book for 4 of 5 gorge competencies, the training officer identified that JS needed to accrue more experience in a range of conditions. He recorded feedback that she needed to prepare a written lesson plan/activity flow plan for the downstream gorge competency, that she needed to be observed a couple more times running the trip, and needed to see the gorge at higher flow, and needed to read and sign its risk analysis and management system) form for the Gorge trips.<sup>39</sup>
127. All four Elim groups were scheduled for a “local” day on April 14.
128. JS’s group comprised: students (all aged 16) Natasha Bray, Sarah Brooks, Portia McPhail, (Tom) Huan Hsu, Anthony Mulder, Floyd Fernandes, Tara Gregory, Ashley Smith, Kish Proctor, and (Peter) Shih. Teacher Tony McClean (29) accompanied the group.
129. JS’s group completed activities around the Centre, including the high ropes course. None of the activities involved water.
130. The OPC parental consent and medical information form asks: “Is your child a confident swimmer”, and provides a choice of “Yes” or “No”. The form did not seek or invite information on water competence, and none was provided by any of the parents.
131. JS reviewed the forms, which recorded that 3 students were “not confident swimmers” – Tom Hsu, Floyd Fernandes, and Ashley Smith. Portia McPhail’s form was carefully ticked on the line between “yes” and “no”, which would have to be taken as “no” from a safety perspective (anything less than a confident “yes” could not be taken to indicate water confidence).
132. A “water day” was scheduled for JS’s group on the Tuesday<sup>40</sup>:

*“A ‘water day’ at OPC typically means that you are allocated a vehicle, and so there is scope for instructors to undertake one or a combination of activities. Instructors make decisions regarding activity(s) based upon the ability of the group, weather conditions for the day, resource availability (vehicles, trailers, and equipment) as well as their own skills, experience, local area knowledge and held competencies. Instructors are not told what activities to undertake on any day nor are they*

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<sup>39</sup> JS’s statements indicate she thought she only needed to be signed off for the half-way ledge exit competency. Her competency book confirms this – all of the gorge sections are ticked off except the escape from the half-way ledge. However, she did not regard water as a strength. Asked to nominate her strengths, she stated navigation, bush stuff, and people skills. JS had completed a seven day aquatic course as part of her PE degree. This training including cold water immersion, hypothermia, self rescue, assisting others in difficulty, and effective swimming technique. She described herself as a strong swimmer, and held an American Red Cross lifesaving certificate – normally a 30 to 37 hour course.

<sup>40</sup> Information provided to Review Team by John Maxted.

*scheduled for specific activities. There is the understanding that there would be a water-orientation to the day but not the expectation that groups would need to be in water environs for extended periods (or at all if their group were not up to it). Typical ‘water day’ activities might include caving, single-tube trips on the upper Mangatepopo or upper Whanganui rivers, a Tokaanu stream ‘sit-upon’ experience, sit-upon or flat water kayak or open Canoeing experiences on Lake Taupo or Lake Otomangaukau, a gorge trip (Tawhitikuri, Mangatepopo, or Maungahouhounui), and a Tongariro River Tube Rafting trip. There are also ‘water’ experiences not involving equipment, such as blue duck ‘sighting explorations’ or down-river bush / tramp missions, and challenges for groups centred around the OPC pool. Staff might also work in with others involved with ‘local day’ and continue to undertake ‘local’ activities (ropes courses, climbing walls, orienteering, initiatives etc.). On April 15 (and throughout the week) a vehicle was available for JS and her group to use.”*

133. In addition to the constraint of four potential non-swimmers, JS was not “competent” to undertake tube rafting. Furthermore, the group was required to complete unit standard 467 (adventure based learning)<sup>41</sup>. It is not completely clear how and when JS intended to assess that unit standard, but she did recall that she wanted to get at least some of the unit standards out of the way so that she didn’t have to worry about them on the overnight campout.<sup>42</sup> Not all water activities might be suitable for the adventure based learning assessment.
134. JS had not had her unit standards competency signed off.
135. The Review Team was not able to determine whether or not JS was aware of all of the options potentially available to her. She did not at any stage mention the possibility of completing a river walk somewhere other than the gorge, or that she had observed any of lower-key options. She recalled taking into account Tom Hsu’s lack of confidence around water, but did not state whether this led her to conclude a gorge walk was more suitable than canoeing.

<b>Option</b>	<b>Constraints</b>
Caving	JS intended to combine caving with the overnight
Single-tube trips	4 non-swimmers. JS’s strength not moving-water activities.
River sit-upon experience	4 non-swimmers. JS’s strength not moving-water activities.
Flat water sit-upon or kayak or open canoe experience	4 non-swimmers. Weather unattractive for open water.
Gorge trip (3 options)	Unclear if JS was familiar with the other 2 gorges
River tube rafting	4 non-swimmers. JS’s strength not moving-water activities.
Blue duck sighting	Unclear if JS was familiar with this activity. JS had not completed “environmental” competency. Difficult to accommodate unit standard.

<sup>41</sup> Fax: Shelly Christenson to Mark Naidoo, 11/2/08 re: 2008 Booking.

<sup>42</sup> Police interview tape one.

Down-river bush tramp                      Unclear that JS knew of this option  
 Pool-based activities                      ) An experienced person could use pool and spillway games to  
 Games around the spillway) address US475.<sup>43</sup>

#### **Figure 4 Options potentially available to JS, and constraints**

136. Figure 5 outlines some considerations and constraints for JS. Another insight into what alternatives there were, is implicit in an observation made by Georgina Griffiths (Figure 5).

~~Matt came into the staff meeting room and asked what he could do as he was~~  
 not going gorging in the afternoon. He had decided this after talking to Pete.  
 This would have been about one o'clock or a bit later.

#### **Figure 5 Extract from Georgina Griffiths statement**

137. Matt Rowley had worked at the Tongario Centre for a similar length of time to JS. The fact he had to ask for suggestions in the staff room might indicate that the actual options for new instructors could be quite limited. Campbell Potter, who had been working at the Centre for five months, described the water day options without mentioning the down-river tramp, blue-duck sightings, pool-based activities, or games around the spillway<sup>44</sup>.

#### **Elim College OPC visit – essential facts 15 April 2008 – JS's group**

138. JS woke at 07:00, had breakfast, and organized some gear for the day in the Resource Centre.
139. Staff meeting 08:00. KP read out the weather forecast, based on the fax received at 06:45. The fax contained a forecast prepared at 01:18, and three weather maps. The first sentence of the forecast "Today rain with isolated and poor visibility at times", omitted the word "thunderstorms" according to the Met. Service. Subsequent forecasts included "thunderstorms and some heavy falls".
140. KP commented on the sentence with the missing word. The auditor, Jill Dalton, confirmed this. His comment referred to the apparent reference to "isolated ... visibility" rather than to the fact that a word was missing. No one recalled discussion about what word or phrase might be missing.
141. KP recalled forming the impression that the weather would be clearing in the afternoon<sup>45</sup> (the forecast stated "evening" for the rain to ease, but the last sentence for the Tuesday forecast referred to wind easing in the afternoon

<sup>43</sup> KP described games around the spillway as "essentially time-fillers" (Interview with Review Team).

<sup>44</sup> Campbell Potter statement to Police.


<sup>45</sup> Informal discussion with Review Team.

(above 3000 metres). JS stated that she recalled gaining the impression that rain would ease in the afternoon <sup>46</sup>.

142. KP did not look at the second page of the forecast. He has since stated that had he done so, he would have been alerted to the possibility of heavy rain.

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<sup>46</sup> Initial statement.

 <b>METFAX</b>	<b>0900 77 999</b>	Any problems or questions? Call the MetFax Helpline
<b>WEATHER WHEN IT MATTERS</b>		<b>0800 WEATHER</b> <small>(0800 932 843)</small>

**66615: Tongariro Alpine at 08:15am 15-Apr-08**

Today Rain with isolated and poor visibility at times. Rain easing to showers tonight. Wind at 1500 metres: Northerly 70 km/h, easing to northwest 30 km/h tonight. Wind at 3000 metres: Northwest 80 km/h, easing to 50 km/h this afternoon. Freezing Level: Above 3000 metres.

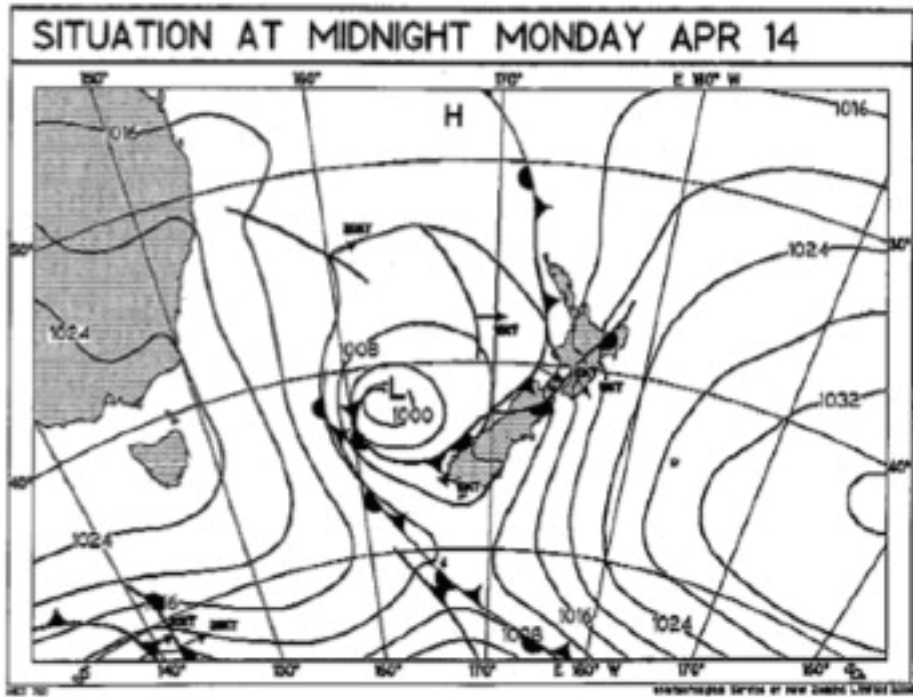
Wednesday Often cloudy with scattered rain. Northwest winds, rising to 60 km/h at the top. Freezing level above 3000 metres.

Thursday Scattered rain gradually clearing. Northwest winds, easing to 45 km/h at the top. Freezing level above 3000 metres.

Friday A few showers developing. Northwest winds change southwest. Freezing level above 3000 metres.

Saturday Early showers clearing and becoming fine. Southwest winds.

Next standard update by: 3:30am Tuesday




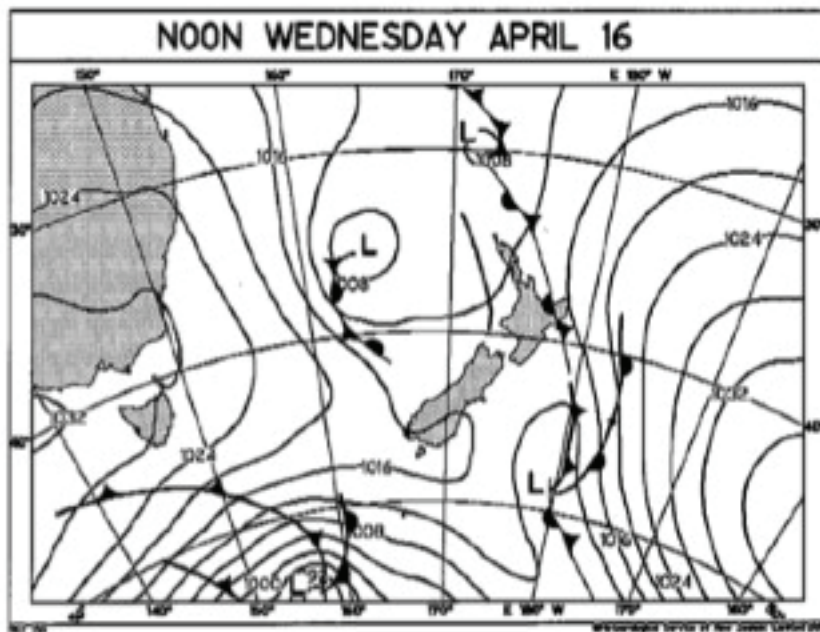
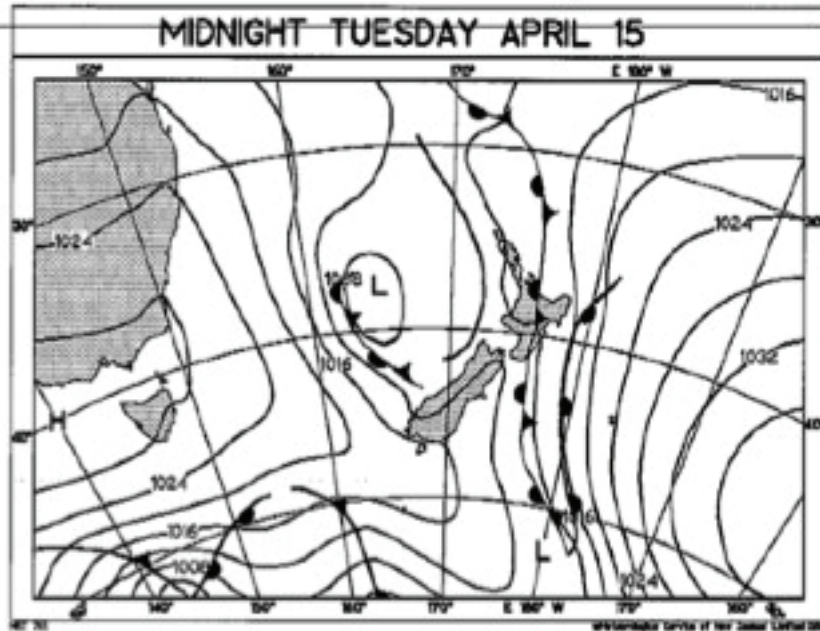
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Figure 6 Weather Fax April 15 (a)

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**WEATHER WHEN IT MATTERS** **0800 WEATHER** (0800 932 843)

Forecast maps



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Figure 7 Weather Fax April 15 (b)

143. Leaders of three groups – JS, Pete Zimmer, and Matt Rowley indicated intentions to do an upstream gorge trip that day. There was some discussion about logistics around the groups planning to use the high ropes and upstream gorge.
144. The meeting finished between 08:30 and 09:00. JS went to meet her group.
145. Participants in JS's group were enjoying the camp. Morale was good. Some were keener on the gorge than others, but most were looking forward to it. Some of them had heard about "the gorge trip" from students who had attended the OPC previously, although they might not have made a clear distinction between the upstream and downstream trips.

It appears from the evidence provided to the Review Team, no one at OPC was aware that at 08:29, an existing weather warning area was extended to include Taranaki, Taupo, Waitomo and Taumarunui. This warning highlighted that rainfall rates would be very high with intensities of 30 to 40mm per hour in localised thundery downpours. The warning advised people in threatened areas to be on the lookout for flash flooding and rapidly rising rivers and streams.

146. The group completed a high ropes course in the morning. This was really JS' only opportunity to assess the strength of individuals and make inferences about how they might cope with any difficulties in the gorge.<sup>47</sup> Some found that physically and mentally challenging. Kish Proctor had to boost Tom Hsu up the Jacobs ladder – Kish found that difficult. Ashley Smith, who later had difficulty in the gorge because of her fear of water, reported that she had no difficulty on the high ropes course. It is the capacity of the weakest individuals in the group which is most relevant in this assessment. It would have been difficult to assess how strong individuals might be in the gorge based on their performance on the high ropes.
147. It rained throughout the morning. Anecdotal accounts vary as to when it rained heavily, and how heavily. Jill Dalton, the Outdoors Mark auditor, remembers returning from the high ropes course, which she observed, to get an umbrella. One survivor described it as bucketing down, and recalls the gravel in front of the Resource Centre was flooded. Another recalls that it was raining non-stop "not heavy, but getting that way". (One survivor recalls noting

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<sup>47</sup> The death of Sally Howe (not far from the ledge where the group were marooned on April 15 2008) led to a policy that "...it was agreed that only stronger groups should go down there" in 1976. Current guidelines state: "This is an activity that is cold and demanding for groups and instructors. It should only be done after careful consideration of group strength and river levels, and requires a directive leadership style" (OPC Instructor Handbook p. 81).



an OPC motto “rain or shine we still run<sup>48</sup>”). Peter Shih recalled the rain as “small, not heavy”.<sup>49</sup>

148. The group observed one instance of thunder and lightning towards the end of their high ropes session.
149. The gorge trip was the first activity the group was to undertake involving water. There was no swimming activity or test prior to the gorge.
150. Prior to the gorge trip Ashley Smith discussed her lack of confidence in water with JS and Tony. Although Ashley had suffered a near-drowning incident in a pool when she was seven, and had an actual fear of water. JS did not establish this.
151. Students felt they had some choice about the order of activities, but that the gorge trip was chosen by the instructor.
152. At the Resource Centre the group were instructed in a downstream float position: students were to lie on their backs, feet downstream, head angled towards the direction they wanted to drift, “big arms” (both arms in a simultaneous backstroke motion).
153. JS had her instructor handbook with her, and used that to guide her briefing of students.
154. The Outdoors Mark auditor, Jill Dalton attended the briefing. She initiated a discussion with JS about what to do about students who were short-sighted but whose glasses might pose a problem in the gorge. She stated the briefing was carried out according to procedures and she assumed JS had the judgment to decide whether it was the right trip to do<sup>50 51</sup>.
155. None of the students recall being involved in any discussions about whether the gorge activity was suitable in the rain.
156. The students were told to wear two layers of polypropylene underwear top and bottom, a polar fleece, wetsuit, rain jacket (tramping style with open cuffs rather than canoeing style with elasticised cuffs) and personal flotation device (pfd). They wore lace-up rubberised boots rented from OPC, thermal socks, beanies, and helmets.

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<sup>48</sup> “OPC courses run rain or shine, all year round. Often the best adventures are to be had in what seems like the most challenging conditions. Groups therefore need to be prepared so that their clothing can handle any weather. Here is a list ...”.

<http://www.opc.org.nz/documents/School%20Gearlist.pdf>

<sup>49</sup> NIWA’s conclusions as to when intensities are set out above.

<sup>50</sup> Whether or not this aspect of the Outdoors Mark procedure is satisfactory falls outside the RT’s terms of reference.

<sup>51</sup> JD OSH statement, p11.

Survivors reported that the amount of clothing they wore restricted their movement somewhat.

157. While the group were getting ready there was a discussion between KP and JS about her intentions. Both KP and JS say they left the RC between 11-30-12-00, and the conversation took place before then.<sup>52</sup>
158. Accounts diverge at this point. JS's account of 29 April included:

While I was continuing to get ready Kerry came over and discussed my intentions regarding the gorge. He told me to be aware that the river may have risen. I said something like "Yip, I wouldn't take them where I would not go". I also told Kerry that they were a competent group, and that I had already decided that I would not do the full trip. I had made this decision because I wanted to get the group out of the gorge before it got too dark. Some of the group wore glasses, and they decided they would not have these on in the gorge. When it gets dark from cloud cover it also gets difficult to see. I wanted to get out of the gorge before this became an issue. The trip usually takes about two hours. I was aiming to complete the gorge by 3 o'clock at the latest.

**Figure 8 Extract from JS statement<sup>53</sup>**

159. KP stated<sup>54</sup>:

I cannot recall the exact words of with my conversation with Jodie, but I asked her whether she was still going into the gorge. I think I also told her that the gorge might rise quickly with the rain that had fallen, but that I had just checked it, and it was normal at that time. I recall Jodie saying that she would check the river when she got to the dam, and that she might not go too far in and they could just play some games around the dam. I did not tell Jodie that she could not go into the gorge.

**Figure 9 Extract from KP statement**

160. They had a snack, either a sandwich or OPC biscuits. Kish Proctor carried a team pack.
161. There was some discussion of swimming ability or confidence – the less confident swimmers positioned themselves in the line so that they would be supported by more confident swimmers.

<sup>52</sup> JS' information is contained in para 36 of her statement, and similarly in her Police statement, p22. KP's information is contained in para 23 of his statement, and in his Police statement at p42.

<sup>53</sup> It is unclear why darkness should be a consideration given the conversation almost certainly occurred before midday, and the intention to run a trip shorter than the normal 2 hours. JS clarified what she meant by the comment about not taking students where she would not go. She meant she would not lead a group anywhere she did not feel confident about leading.

<sup>54</sup> Statement 29/4/08.

162. It was raining. One student recalled it was “tropical rain”. The track was “flooded” on the way down to the stream.
163. At approximately 12.30<sup>55</sup> the group began moving upstream from the spillway.
164. Most students did not find the upstream leg difficult. The water was “pretty calm”, but cold, and deep in places. The water was chest deep in at least one place.
165. It was raining the whole time the group travelled upstream according to the surviving students. One student recalls looking up and seeing the rain, although JS said in her statement that it was not possible to distinguish between water dripping of trees and rain.
166. Tom Hsu did not slow the group in the gorge; however he needed assistance. One survivor has said he was “having the time of his life”. Some individuals struggled<sup>56</sup>.
167. At the first river crossing, Ashley Smith became frightened and was crying. In her words she was “freaking out”. Peter Shih recalled that Ashley wanted to turn back. This caused some delays. The group encouraged her. Each person travelled at their own pace. There was no sense of being hurried or of urgency.
168. The students gradually became aware that the current was becoming stronger. One survivor recalls the water becoming stronger and deeper as they went up. Just before the group turned around to go back downstream, Tom jumped to Anthony (who was very confident in the water) and was almost swept away.
169. Kish recalled discussion that the stream was not at normal level.
170. JS remained focussed on group dynamics, if anything taking things slowly and carefully.
171. JS does not refer to either Ashley’s distress prior to the ledge, or to the group being slow. It is clear the group was relatively slow. All of the survivors recalled Ashley being distressed and slow, although not all were sure when and where that became apparent.

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<sup>55</sup> JS estimated 1.00 pm, however the fact the group was out of sight when Pete Zimmer arrived at the intake structure at that time (he was more certain of the time than JS) points to an earlier time.

<sup>56</sup> The speed of JS group was not tested, but it did not at any stage move quickly. This is clear from the overall times, from the descriptions of survivors, and from the reported emphasis on group encouragement.

172. On the way back downstream the current became stronger and the crossings were deeper. Progress was slow. Ashley was still frightened. The method of river crossing involved jumping in and catching the hand of someone who had already crossed, or, (on the last crossing) catching the rope.
173. Prior to the last crossing the OPC map records “last high water exit”. It is not feasible to climb the walls of the gorge at that point, but there is a cave in which a group could take refuge. Mark Smith inspected this site and formed the view that it would probably be a better refuge than the ledge the group became stranded on. JS:
- 173.1 was not aware of this possible refuge
- 173.2 was not considering alternatives to getting the group out until the last crossing.
174. Anthony was confident, and assisted with the river crossings. Tony assisted Tom Hsu.
175. The last crossing took a long time. JS herself found it difficult to cross, and brought the group across one by one using a rope, using a pendulum technique. By that stage the crossing was probably irreversible.
176. Around 14:40<sup>57</sup> the group reached a ledge on the true left before the last wet section. The ledge was somewhat uneven, sloping up towards the canyon wall, which was overhanging. Overhead the walls were overhanging and almost met.
177. At this stage 0.6 cumecs was recorded flowing over the spillway, indicating a total flow above the intake of 4.6 cumecs (allowing for 4 cumecs taken at the intake).
178. JS decided to wait out the flood on the ledge. To exit from the ledge it would have been necessary for individuals to float some ten metres as close as possible to the true left wall, and then swim hard towards the left bank once the gorge opened out somewhat in order to escape the current.
179. As the water rose towards the ledge there was discussion about leaving.
180. Between 15:05 and 16:00 the flow across the spillway increased to 16 cumecs. The rate of increase peaked between these times.
181. JS said the group would have to leave the ledge if the water rose too high. She was “in a decision making mood” according to one survivor.

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<sup>57</sup> Interview with Kish Proctor.

182. The water reached the ledge, and came up to the knees of the teacher, standing on a lower part of the ledge. Students sitting or crouching towards the back of the ledge, where the walls overhung somewhat, had to stand up to keep out of the water. They huddled on the highest part of the ledge. Those on the outside could feel the current strongly on their calves. It was slippery and difficult to hear.
183. The students were cold. JS began to make preparations to leave the ledge. She clipped Ashley to Tony with a short sling or rope and karabiner<sup>58</sup>, then changed her mind. She then clipped Tony to Tom, Anthony to Floyd, and clipped herself to Ashley. She left the screw on the gate undone<sup>59</sup>. She reiterated the downstream float instructions originally provided in the Resource Centre. JS has stated that she instructed and signed to Tony to send the students after her at 5-minute intervals. Tony did not have a watch.
184. The noise of the water made it difficult to be heard without shouting. At some point JS tried the radio, but without success.
185. Tony and JS discussed leaving the ledge. According to JS, Tony concurred with her decision to leave the ledge. Tony's role was an accompanying teacher, with no instructional responsibilities. It cannot be concluded that Tony contributed to the decision to leave the ledge, although it seems likely that he continued to be supportive of JS and her decision-making. Ashley remembers JS asking the group if they wanted to leave or stay. All of the students wanted to leave.
186. JS did not disclose to the students that the decision to leave the ledge was something of a gamble, entailing entering the flood at the highest it had been to that point. The possibility that the river might rise further would have been self-evident, but the grave risk involved in entering the flood and possibly being swept over the spillway was not in their minds.

The plan to leave at 5 minute intervals would not have succeeded had the river kept rising as fast as it had done after 15:05. Before 40 minutes had elapsed whoever was still on the ledge would have been washed off. However, the river did not keep rising at that rate, and in fact the rate of increase slowed substantially shortly after JS left the ledge.

187. All of the survivors recall surprise at the power and turbulence of the water they subsequently encountered – they were unprepared for it. None of them thought that JS might not be able to retrieve them once they entered the water. None of them thought that JS might not succeed in exiting the river.

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<sup>58</sup> JS linked the PFDs. The review team could not establish whether one end was attached with a larks foot and the other with a karabiner, or both ends with karabiners.

<sup>59</sup> A karabiner is snap link designed to secure a rope by (a) a hook-like curve and (b) a spring-loaded gate across the opening and (c) a threaded collar which can be turned until it locks the gate. An unlocked karabiner would not normally be considered a quick-release device.

None of them were aware of the particular hazard posed by the spillway. None of them realized that their survival might depend on successfully swimming or defensive float/paddling as close as possible to the left hand bank.

188. Between 15:58 and 16:02: JS took a pack, and exited from the downstream end of the ledge, attached to Ashley.
189. The flow over the spillway at this point was just under 16 cumecs. The flow was still increasing, but the river rose more slowly from about 1600 as the peak approached at 16.10, at which point the river level began to drop. The rate of increase was not being observed. It seems likely that the first departures from the ledge preceded observable signs that the river was rising more slowly and the peak might have been approaching.
190. None of the surviving students recall feeling concerned as they watched JS and Ashley disappear out of sight around a left hand bend. They did not understand the gravity of the situation.
191. All of the survivors report that the water was turbulent when they went round the corner. Ashley recalls being dunked, and turning so she was no longer feet first. She lost a boot when she collided with a rock. She was frightened. At one point JS grabbed something, but Ashley was unable to regain her feet and they were swept away again. JS was able to stop a second time and they scrambled out of the water, just short of the spillway.
192. Kish Proctor went next, between 1 and 2 minutes after JS and Ashley. The group cheered and encouraged him <sup>60</sup>.
193. Kish found himself moving very fast. He did not try to actively paddle to the left bank. Water was going over his face. He thought the stream would narrow and that JS would pick him out of the water (Tony had said "you will float downstream and JS will pick you out of the water").
194. Kish saw JS struggling with Ashley on the opposite bank and realized then JS could not assist him. The river was wider than he expected. He thinks he heard JS say something like "oh no". He tried to grab some branches on the true right bank, but they broke off. He saw the inlet structure, and thought it was a building. He tried to head for that, but the current took him suddenly left and over the spillway. He struck what he thinks might have been a concrete block, and flew over the next drop face first. He prayed, got a breath, and climbed out on a log. It felt like forever. He could not see the dam, but knew it was upstream.

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<sup>60</sup> Kish Proctor, who went first, said the group had cheered him on as he went into the swollen torrent. "Our teacher Mr McClean was telling us, 'Guys, if it goes any higher we are going to have to float across' ... and the instructor would catch us and get us." NZ Herald April 18 2008.

195. Kish looked at his watch; he recalls the time as being 4.00 pm.
196. When Ashley was out of the water JS asked her to get the radio while JS got the throw rope. Ashley had not been shown how to assemble the radio (attach the aerial) but found it easy. JS was standing next to Ashley when she made the first 2 or 3 calls (meaning transmissions). Ashley could hear people replying.
197. At this point Jill Dalton began taking a communications log. This recorded two calls from JS, the second of which was an emergency call at 16:05 pm.
198. 16:05 (emergency call from JS logged): flow at the spillway of 16.80 cumecs.
199. After the first radio transmission Peter Shih came down the river. He was not frightened before he entered the water (by sliding in at the downstream end of the ledge), but he was when the current was carrying him. He understood that he had to keep his head to the left and paddle with his arms, with his head up and his body flat. He did that. He caught the rope JS threw and successfully pendulumed onto the bank. He was about 5 meters from the spillway. He recalls it was difficult to hold the rope. He also recalls JS talking on the radio (he thought to Tony). This indicates the logged emergency call at 16:05 was made after Peter was safe. No further calls from JS were logged.
200. Portia came down the river next, followed by Natasha.<sup>61</sup> Ashley yelled at them to grab the rope. At least one of them succeeded in grabbing the rope thrown by JS, but both were washed over the spillway<sup>62</sup>. Any person washed over the spillway while holding the rope would have been thrust underwater by the current, and subject to great force, causing them to lose their grip almost immediately.
201. Anthony and Floyd came down the river next, linked together. Anthony reached a hand out toward towards Ashley for her to grab, and Floyd called for help. They were in the middle of the river and she could not reach them. Jodie refers to “most” people grabbing the cable which ran above the spillway, so it seems likely Anthony and / or Floyd did so, but were unable to hold themselves against the current. They would have been held underwater, had they done so.
202. Tara came next. She was further away from Jodie, and struck the intake structure.

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<sup>61</sup> Sarah Brooks was quite certain Peter followed Portia down the river, because she recalled a conversation in which Natasha wanted to follow Portia (her friend) but Peter went first. However, Ashley has stated that she saw Portia after Peter. Peter has stated that Portia followed him. It therefore seems fairly certain that Portia came after Peter.

<sup>62</sup> JS statement paragraph 63; NZ Women’s Weekly interview 26/05/08 with Ashley, and her interview with RT.

203. Jon Tarrant observed someone go over the spillway. He ran down to the ford and saw the person go past. He could not tell whether or not the person was alive. The person would have been Tara<sup>63</sup>. He ran back up to the spillway again.
204. Sarah Brooks left the ledge, leaving Tony and Tom as the last. She reported being surprised by the speed of the water. She was tumbled onto her front, and her head went underwater. She panicked.
205. JS threw the rope to Sarah but Sarah missed it. She felt impeded by her clothing and wetsuit. Sarah blamed herself for not doing what she was told. She tried to grab the cable, but her glove came off. Sarah went over the spillway towards the left hand side, struck the bottom, and went straight over the next drop. Jon T did not observe Sarah go over the dam – it can be safely assumed this occurred during the brief interval in which he ran down to the ford before returning to the spillway.
206. Sarah was caught against a boulder, with her boot wedged. This stopped her descent downstream. She caught a branch and called for help from OPC staff who she could see on the intake structure<sup>64</sup>. Her boot came off, and she was able to scramble onto a rock.
207. Jon T had arrived back at the spillway. He saw Sarah Brooks in the water, then he saw two people go over the spillway (this would have been Tom and Tony).
208. 16:08: KP and JM departed from the Resource Centre to the dam in a vehicle (a distance of one kilometre by road). Before leaving they told Pete Zimmer and Brett Donaldson to get their gear on and come down to the dam.
209. Jon T ran back down to the ford. He saw the two float past the ford. He could not tell whether they were alive or not.
210. 16:10: the flood peaked at 17.14 cumecs. Neither of the students on the bank with JS remember having to shift position, or JS having to shift position, or other indications of rising water. Similarly, Sarah, the last to leave the ledge before Tony and Tom, does not recall the water rising above her or anyone's knees. She did not believe Tony was about to be swept off the ledge when she left. She perceived the current becoming stronger, but that might have been because she was initially in a huddle and would have been somewhat shielded. Sarah Brooks' recalled that Tony did not time the exits from the ledge, that everyone was keen to go, and that he just waited a bit and then sent the next person (her estimate was two minute intervals). Jon Tarrant's

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<sup>63</sup> The sequence of events Jon Tarrant described fits with him arriving at this point, and does not fit with him arriving at another time.

<sup>64</sup> Jon Tarrant was on the intake structure with Serena Halls, and reported seeing a student in the water among the branches on the other side of the river.



observations indicate the individuals or pairs left the ledge at something closer to one minute intervals.

211. 16:10: KP and JM met Jon T, who was on his way back to the “DUB” after observing what must have been Tony and Tom swept past the ford.<sup>65</sup>
212. On hearing that Jon T has just seen someone float past the ford, KP and JM both rushed downstream to intercept the person(s). They separated<sup>66</sup>.
213. KP returned a few minutes later, and drove with Jon T towards the dam.
214. Katerina Kosvancova, a volunteer was at the dam. She stated that KP was the first OPC staff person to arrive at the dam.
215. 16:15: The flow had now fallen to 16.4 cumecs. KP called for helicopter assistance.
216. 16:16: approx<sup>67</sup> Pete Z and Brett Donaldson arrived.<sup>68</sup> KP sent Jon T and Brett D back to the Resource Centre to recruit kayakers.
217. It might be that Brett D went the few meters to the intake structure before returning the Resources Centre. JS recalled Brett D as the first person she recognised on the intake structure. Pete Z recalls that he was alone at the dam at this stage.
218. 16:16 approx: Pete Z established verbal contact with JS. She told him that she has counted “seven” go over the spillway. According to her statement, this means seven students and the teacher, Tony.
219. 16:17: KP radioed for kayakers.
220. Kish had waited to see if anyone went past for fifteen minutes. He had lost his boots, helmet, beanie, and gloves. He was freezing. He climbed through steep dense bush – about 15 metres – and reached the access road to the intake structure (on the OPC side of the stream). He encountered BM, who took him to KP. KP checked him for spinal injuries then put him in the van.

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<sup>65</sup> KP stated that they drove to the dam and that he saw Jodie above the dam with several others, and several people in the water below the dam. This is inconsistent with other accounts. It seems likely that KP has confused what Jon told him with what he saw.

<sup>66</sup> KP describes very clearly seeing a body float past the ford. This is the most likely time that he made that observation, because that seems to be the only time he could have been at the ford on his own. No one else reported seeing the body. The observation must have been made after Tony and Tom (the last to leave the ledge) had been seen floating past the ford (by Jon Tarrant), which strongly suggests KP saw a body which had been held by a current upstream for several minutes.

<sup>67</sup> Pete Zimmer’s statement has it at 16:20 approx but the earlier time allows for the actions he took before relaying the message (“seven swimming”) to KP.

<sup>68</sup> The Review Team have not seen a statement from Brett Donaldson.

221. Kish did not see anyone go past. He might have been climbing out through the bush when Tara, and then Tony and Tom, went past (observed by Jon). It is possible Anthony and Floyd, and Portia, were retained in a stopper or eddy during that time. It is also possible he failed to notice them go past.
222. On the way down to the ford Brenda M encountered Kish. She took him back up to KP.
223. 16:21-22: Brenda M arrived at what was now the centre of the rescue (about half-way between the intake structure and the ford). KP told her to throw-bag at the ford.
224. Meanwhile, Pete Z visually checked the left bank from the intake structure, saw Sarah, and climbed down a ladder to try to communicate with her. He failed to do so. He checked for others, saw none, then went back down the road towards the ford.
225. Kish, by this stage in the van, knocked on the door and asked for help. Pete Z helped Kish get warm, then continued down towards the ford, where he met KP and Georgie Griffiths (although it appears she did not arrive until after 16:33).
226. 16:26: radio message from KP logged "seven swimming". This is almost certainly based on information provided to KP by Pete Z. No one interviewed reports seeing seven swimming except JS. She relayed this information to Pete Z at around 16:16.
227. 16:28: KP radioed "contact with one swimming". It is difficult to determine what this is a reference to. KP's first statement records that he saw a student going over the ford when he arrived, but that must have happened before Belinda was stationed at the ford. This might be the first radio report that Sarah Brooks was on the other side of the river, based on information conveyed by Pete Z.
228. Brenda M, at the ford, saw what she believed to be a body (now known to be that of Natasha Bray) upstream 50 m river left. She radioed KP.
229. 16:33: MB left the Centre to drive down to the river. Georgie Griffiths stated that she drove him down to the river. Her statement records that she thought she had seen Kish walking down the road, but this might have been after he had been seen by others. She also established verbal contact with JS, and relayed the information to KP, but it seems that this was some time later (there was a later transmission from JM noting seven swimming).
230. 16:34 approx: MB and BD arrived at the ford, and decided the river was too dangerous for kayakers.

231. MB ran up river towards the Tyrolean traverse (a wire used for crossing the river), and from there decided that what Brenda M had seen was a person.
232. MB went across the Tyrolean traverse, followed by Pete Z. He stated that the time was about 17:00, but it must have been before that.
233. 16:37: KP reported the body seen by BM as “student 100 m upstream clinging to rock”.
234. 16:53: Brenda M reported MB had recovered the student found upstream (this was a body, but the fact of the death was relayed to BS in person by JM).
235. At this point there was a large number of people at the river. The Review Team has not attempted to construct a detailed account of movements and times after 17:00 because of the magnitude of the task and a limited budget.
236. 17:45: Genesis gauge apparently developed a fault.

237. The Review Team notes that were it not for the intervention of Pete Zimmer a second OPC group might also have entered the gorge and been caught by the flood. It would be prudent to consider that possibility as a “near miss”

### **Elim College OPC visit – essential facts April 15<sup>th</sup> – Near misses**

13.30 arrive back at Resource Centre. As I walked in the door I meet Jill Dalton (outdoors mark auditor) and another OPC Instructor Matt Rowley. Jill asked: “what have you guys been up to?” Told her that we had been tube floating in the morning and that we had changed our plans for the afternoon and that we were not going upstream gorging anymore. At this stage I found out that Matt Rowley had also planned an upstream gorge trip for the afternoon. Felt it was my obligation / professional ethic to tell him about my decision to abort our planned gorge trip and asked him to reconsider his intentions and look at other activity options for the afternoon. Matt also told me during our brief conversation that Jodie had already left for an upstream gorge trip. I asked matt straight away: when did she leave. His reply was about an hour ago or so; he last saw her in the high ropes course. Instantly I felt a concern! At this stage I remember hearing rain hitting the roof of the resource centre. Matt went to talk to his group. I went to co-instructor – she had expressed an interest in the morning to learn how to use an OPC radio. I told her here is your chance, call Kerry and tell him that we have changed our intentions and that we will be indoor rock climbing at resource centre for the afternoon. I thought that will put him at ease and take some worry of his mind. Co-instructor called Field Manager at around 13.35. At approximate 13.40 Field Manager arrived at the resource centre. Field Manager asked me: “have you seen Jodie?” I replied: “no”. I sensed some concern in field manager. He was going to drive down to the dam to have a look for her. Told him to take our vehicle (YW) it still had the keys in it. I asked him if I should come with him. I was still dressed in my wetsuit from the morning and I thought I could quickly run up into the gorge. Field manager left to check the dam. Personally I was not happy that I did not go with him. Had a brief conversation with co-instructor about my concern that the situation was getting serious fast. At this stage I remember hearing rain falling onto the metal roof of the resource centre. For a moment I was considering the option to leave co-instructor alone with group. I was torn in my decision to do that and leave co-instructor alone and without supervision – which is against OPC Policy – and going down to the gorge. In the end I rationalised that I am employed / contracted to OPC to look after the customers including the co-instructor. My obligation and duty lies with the people / customers that OPC entrusts into my hands. OPC has policies and procedures and systems and a hierarchy in place that determines the operation of the Centre and deals with situations as they arise. At this stage I made a conscious decision to take my wetsuit off. Also made a decision to listen into the OPC radio to follow any communications. Field manager came back to Resource

**Figure 10 Extract from Pete Zimmer statement**

238. The Review Team did not analyse the "near miss" of Matt Rowley's group.

- Side by side with Jodie but because I was being inducted on big swing by Matt Bennett I ended up being in ropes course a bit longer i.e. 1.30 - 1.45pm. Made my way to Resources Centre (RC), still thinking I was going gorging + fortunately bumped into Pete Zimmer. Pete had been on upper river in the morning, then had gone and checked river at gorge entrance. He indicated that it was too high for him and he wasn't going to do it. He indicated that it was going over the spillway <sup>(using hands)</sup> 15cms. Because this came from a senior instructor I therefore chose not to go in there - this was a good enough reason if senior instructor wasn't going in there.
- Biggest thing for me was that I bumped into Pete Zimmer.
- Clarification from Matt that Pete described (using his hands) that water was approx 15 cm above flowing over spillway but only in section on "river left" where a dammed section of river (using rocks) channels the water to this spot.

Figure 11 Extracts from Matt Rowley's first statement

## Section E: Direct Causes

239. These are the immediate factors which brought about the deaths of seven people.

### Information as to time and cause of death

240. At 16:53 the first victim to be located, Natasha Bray was found between the spill weir and the ford.

241. Between 18:00 and 18:15, three victims were found, 40 metres downstream from the ford, by Rob Griffiths.<sup>69</sup> They were Tony McLean, Tom Hsu and Portia McPhail.

242. At 21:47, a further victim was found at the first right hand bend of the stream below the ford, at a small cave<sup>70</sup> - either Tara Gregory or Portia McPhail.

243. At about 01:55 on 16 April, two further victims, Anthony Mulder and Floyd Fernandes were found some 3.3 km below the ford, discovered by a team led by a DOC employee.<sup>71</sup>

244. The Coronial hearing has of course yet to be conducted, and the information which was available to the Review Team could only allow provisional conclusions as to cause of death to be drawn; the proper process for formal determination of those issues will fall on the Coroner.

245. The Police have, however, made available to the Review Team provisional Coronial autopsy reports for all victims, which record, following full post-mortem examination, the provisional cause of death as drowning. In three cases, the coronial autopsy report was available, and in those instances, in more detail, the pathologist confirmed death resulted from drowning. The three full reports record bruising; in two cases the injuries are said to have been of a minor nature, not contributing to death; in one case a contusion to the left temporal region indicates that person was subject to a blow, which raises the possibility that the victim may have been rendered unconscious.

246. Based on eyewitness accounts, and as discussed later in this report, all victims were alive before passing over the spill weir.

247. It is reasonable to conclude that death occurred soon thereafter. The Review Team has not had the advantage of obtaining opinion from a hydrologist, but it

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<sup>69</sup> See his statement, page 10.

<sup>70</sup> Log; SARS team number 3, confirmed at 21:56.

<sup>71</sup> Bub Smith's interview; log; M Lina's statement.

is aware of evidence from other enquiries involving deaths in a flash flood context.<sup>72</sup>

248. Expert evidence in such inquiries indicates that there is little published data on death in circumstances of a flash flood, but the following appears to be clear:

248.1. There would be considerable vertical and horizontal turbulence, which would have the effect of dragging anything floating up and down repetitively, as in a cyclical washing machine.

248.2. A combination of a person being unable to inhale air, inhaling water, and significant psychological stress would be likely to lead to unconsciousness, following which death would occur soon after.

249. On the provisional information made available which indicates drowning, and given the volumes recorded at the spill weir, the likelihood is that the victims drowned very soon after descending the spill weir, in the maelstrom which existed from that point onward; and probably in the spillway stopper. This point is returned to below.

### **Timing of events in relation to the flood pulse**

250. Figure 12 summarises the timing of events, relative to the flood pulse.

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<sup>72</sup> For example, Inquest into death of Nathan Chaina on 25 October 1999, Westmead Coroner's Court.

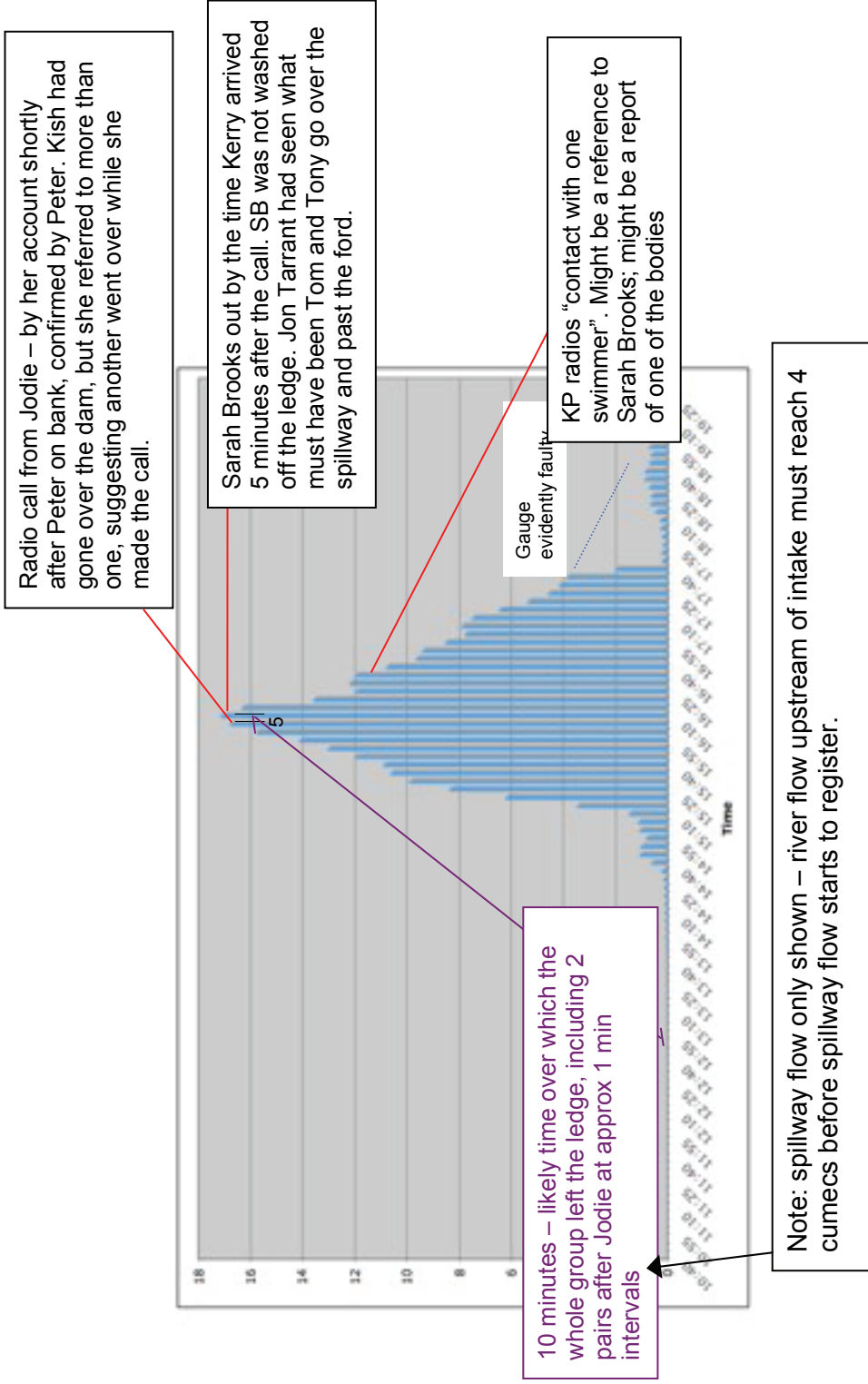


Figure 12



## Notes on Figure 12

250.1 The evacuation of the ledge coincided with the flood peak.

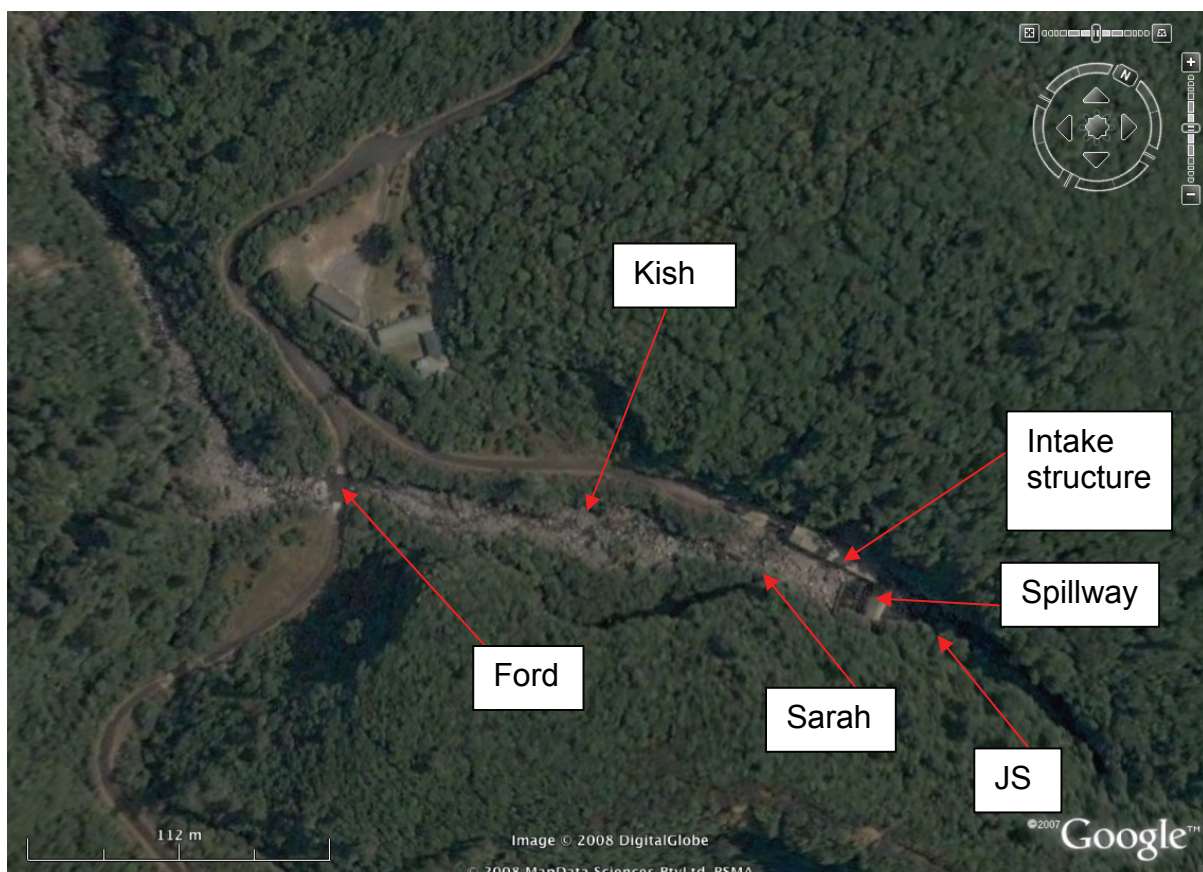
250.2 Sarah Brooks, Tony, and Tom possibly left the ledge just after the peak.

250.3 There is no evidence that anyone was washed off the ledge.

250.4 Had the group, or any individuals, remained on the ledge they would have been able to stay there. They would have been cold, but they would not have been washed off. In the clothing they were wearing they would have survived for hours.

250.5 No deaths occurred prior to the emergency call

250.6 All seven deaths had almost certainly occurred within five minutes of the call (ie before KP and JM arrived as first responders).



**Figure 13 Map of the spillway and ford area**



**Figure 14 Map showing location of gorge relative to OPC**

Name	Survived?	Spillway volume	Confident swimmer No. Fear of water.	Other relevant medical info.	Observations	Conclusion
Ashley Smith	Y	15.8	Yes		Survived linked to JS	
Kish Proctor	Y	15.8- 16.8	Yes	Asthma	Came down river right. Went over spillway, survived.	
Peter Shih	Y	16.8	Yes		Survived. Worked to keep left, caught throw rope, pendulumed in.	
Portia McPhail	N	16.8 17.14	Borderline (therefore not confident)		May have caught rope, went over spillway	Drowned, possibly in spillway stopper. Going over the spillway holding the rope might have contributed.
Natasha Bray	N	16.8 17.14	Yes		May have caught rope, went over spillway	Drowned, possibly in spillway stopper. Going over the spillway holding the rope might have contributed.
Floyd Fernandes	N	16.8 17.14	No		Linked to Anthony	Drowned, possibly in spillway stopper. Link to Anthony probably contributed.
Anthony Mulder	N	16.8 17.14	Yes		Linked to Floyd	Drowned, possibly in spillway stopper. Link to Floyd probably contributed.
Tara Gregory	N	16.8 17.14	Yes	Hearing impediment – difficult hearing in noisy situations	Collided with intake. Observed going over the spillway then ford	Drowned, observed going over the spillway and down to the ford.
Sarah Brooks	Y	16.8 17.14	Yes			
Tom Hsu	N	171.14	No	Cerebral Palsy. Not mentioned on medical form. Some verbal discussion about his condition. Non-swimmer – coordination problems	Linked to Tony. Observed going over the spillway – not caught in stopper.	Drowned. Link to Tony probably contributed. Going over spillway while Tony held the throw rope might have contributed.
Tony McClean	N	17.14	Yes. A surfer.		Linked to Tom. Caught throw rope, went over spillway. Observed going over spillway and ford.	Drowned. Link to Tom probably contributed. Going over spillway holding throw rope might have contributed.

**Table 4** Summary of individual victims and survivors.

## 251. Notes on 4

251.1 No witnesses reported clearly conscious individuals floating past the ford.

251.2 All who went over the spillway were alive when they went over.

251.3 The two who survived the spillway both reported striking the bottom and exiting with the current on the river bed.

251.4 Water was recirculating at the bottom of the spillway (Figure 14, Julian Malcolm statement. Edward Tutty made a similar, but less detailed observation).

The water was extremely heavy.

I could see the wire.

I remember being amazed at the mass of water coming downst

The water was re-circulating wildly over the blocks at the bottor and I remember thinking that if anyone got swept over the dam survive that.

There was debris swirling in the water over the blocks.

The force of the water was holding sticks there and then they w the water and come up again.

It was extremely noisy.

**Figure 15 Julian Malcolm observations of spillway stopper**

252. Pairs tied together would probably have been more vulnerable to one or both being caught in a circulating current at the base of the spillway. Tony and Tom were observed going down the spillway and on to the ford, which does not rule out the possibility that they were retained by recirculating currents for a short period.

253. One body was observed (by KP) floating past the ford after Tony and Tom. That body must have been caught up somewhere, although not necessarily at the base of the spillway.
254. Those who caught the throw rope, but went over the spillway, could have been suddenly thrust under water and forced to release the rope almost immediately, regardless of how hard they tried to hold on. They would have been more short of breath when the force of the water took them under at the base of the spillway than would have been the case had they not caught the rope, both because of the exertion of trying hold onto the rope and the suddenness of their immersion.
255. The evidence therefore supports the likelihood that some, if not all, of those who died drowned in the stopper at the base of the spillway.
256. Use of a towing tether saved Ashleigh, once she was in the water. (It should be borne in mind that she would almost certainly have survived, as would all victims, had she stayed on the ledge).
257. Of the survivors, only Peter reported making vigorous efforts to reach the true left bank as instructed. The others forgot what they had been told when they encountered turbulent water, but thought they would be rescued by JS. It is likely that some or all of those who died
  - 257.1 Did not fully comprehend that their chances of survival depending on the efforts they made to reach the true left bank before the spillway
  - 257.2 Did not fully comprehend that JS might not be able to extract them from the water.
258. Towing tethers almost certainly reduced the chances of survival of Tom, Tony, Anthony, and Floyd.
259. Use of a throw rope saved Peter.
260. Use of a throw rope, resulting in individuals holding the rope, possibly contributed to the deaths of Anthony (and Tom), and Portia or Natasha.

## **Section F: Contributory factors and circumstances**

261. The Review Team wishes to make it clear that in this and following sections, although it makes statements which might be construed as attributing fault, it neither attributes personal fault to nor exonerates JS in particular, or others. The RT's terms of reference prevent it from doing either. The RT wishes to emphasise that the fact that an unsafe act has been identified is not sufficient to attribute blame to the individual who made that act. The Review Team's analysis highlights shortcomings of decision making, so that in the concluding sections of the report, underlying causes and root causes can be properly analysed, and appropriate recommendations then made.
262. This section examines failures associated with the Gorge trip itself.

### **Informed consent**

263. In the light of the tragedy, some parents might believe that information provided to them about OPC was inadequate. It is possible that individual parents would not have consented to their child attending the camp had they been informed that their child might be under the sole care of an instructor for a particular activity, in a particular environment, who
- had limited experience in that activity and
  - had limited knowledge of that environment.<sup>73</sup>
264. In short, parents could have gained the impression that all OPC groups were instructed by experts in whatever activity they were undertaking in whatever environment they were in.

### **Information sought from parents on swimming confidence**

265. In the light of the tragedy, the outcome of which, in the end, was greatly influenced by swimming competence, simply to ask parents whether their child was a "confident swimmer" or not was inadequate. More complete information might have revealed Ashley's fear of water and led JS to rethink her intentions.

### **Information provided to parents – "Outdoors Mark" as evidence of a safe programme**

266. In the light of the tragedy, parents could form a view that a day-and-a-half field audit was manifestly inadequate for an organization that in effect ran dozens of programs under many different instructors. The Outdoors Mark audit on the day did, by happenstance, review the preparation for the gorge trip, but failed to identify the failures to adhere to OPC policy that this review has identified,

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<sup>73</sup> Both these points are discussed more fully below.

including the fact the JS had not signed off on the RAMS form, and that no one checked for a fresh weather forecast before entering the gorge.

Parents could have consented to their child attending the program based on a faulty impression of the significance of OPC's achievement of the "Outdoors Mark".

### **JS signed off to take upstream gorge trips**

267. The Gorge policy stated in respect of minimum instructor qualifications for the upstream trip, that the instructor needed to have "RMT competency, at least a familiarisation trip and FM to sign off".
268. There was no written sign-off for the upstream trip as such.
269. JS understood she had been assessed as competent to undertake an upstream Gorge trip, because she had covered the downstream components and the RMT,<sup>74</sup> which meant she had been assessed as competent for the upstream trip.
270. The following feedback was given in relation to a downstream trip, but it was also relevant for the upstream trip:
- Although signed off on the specific observable criteria in her competency book, the feedback provided by the training officer (MB), which adopted a more complete understanding of competence, clearly indicated she was not ready.
  - She had not seen the gorge with high flows
  - She did not know about the last-high water escape
  - She had not signed off on the RAMS form
  - Her weakest area were water days.
  - She was somewhat aware of, but had not learned about, previous incidents in the gorge.
271. MB informed the Review Team that he felt pressure to get JS working as an instructor. He stated that work schedules were constructed, deploying JS, on the assumption that her induction would proceed successfully and quickly. The Review Team formed the view based on interviews with instructing staff that it was not unusual to deploy instructors who only just met OPC's "competencies".

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<sup>74</sup> JS statement para 13.

### **KP returning from leave and not fully reintegrated into daily operations**

272. The team heard several times that JS was supervised by a very experienced Field Manager (KP). However he had just returned from 4 weeks leave, and was not up to date on the previous weather patterns, or on how the new instructors were going, and supervision of staff was one of many duties, some of which had banked up while he was away.
273. There was a failure to anticipate KP's need to settle back in.

### **The presence of the auditor**

274. KP told the Review Team the unexpected presence of the auditor distracted him, especially on the Monday. The Review Team have concluded that without the audit, KP would have met earlier with MB to discuss the new staff, to discuss the drought and would have checked the precipitation on a website he normally consulted, and might have reacted earlier to the weather observed while JS was in the gorge.

### **Assessment of the group on the first day (JS's group)**

275. It was OPC Policy that swimming ability must be checked before commencing any water based activities <sup>75</sup>. While parents were asked about swimming confidence, they were not asked about swimming ability which is not the same thing. There was no routine provision to test swimming before committing to an activity in which the ability to swim might be important.
276. The issue of swimming ability is relevant because it relates to:
- The capacity of students to successfully swim to safety in an emergency.
  - The capacity of students to execute a defensive float.
  - The decision made to link weak swimmers with strong swimmers.
277. In the light of the tragedy, assessment of the group's swimming ability was either inadequately performed or inadequately interpreted:
- the gorge trip proceeded even though one student had a real fear of water,
  - the decision to stay on the ledge, made when the river was much lower than it was when the group finally entered the water, was almost certainly could have been influenced by the fact the group contained 3

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<sup>75</sup> General Policy, page 10, Instructor Handbook.



non-swimmers, since an exit would have required some swimming, rather than just floating, and

- the decision to link individuals was also a consequence of setting out, and persisting, with non-swimmers in the gorge.

### **Provision of weather information**

278. OPC subscribed to the MetService's Metfax service to receive the Tongariro Alpine forecast on a one fax per day basis. OPC had requested that forecast to be delivered at 0645 each day.
279. OPC did not prior to 15 April 2008 subscribe to receive any severe weather outlook, severe thunderstorm outlook, severe weather watch or severe weather warning service. This information is sent for free by email to subscribers. OPC was unaware of this at the time. Nor did OPC subscribe to receive updates to warning services.

### **The wording of the weather fax**

280. Whether the wording of the weather fax was an adequate interpretation of the data available at the time of its compilation was not something on which the Review Team could reach a final conclusion. There is an admitted omission of the word "thunderstorms", and possibly an omission of the words "heavy rain". These omissions might have contributed to the incident. Against this, the Review Team heard more than once from more than one senior staff member that forecasts were not considered reliable, that the key resource from Met Service was the forecast map, and that staff also relied on visual observations.

### **Can-do attitude to weather – lack of a precautionary approach**

281. OPC advertised a "rain or shine" policy, and staff were used to carrying on activities in less than perfect weather. Staff were also somewhat dismissive of weather forecasts, which they stated were often found too inaccurate. The RT was not able to assess (a) how frequently weather forecasts failed to predict a severe weather event and (b) how frequently severe weather events that were forecast failed to eventuate, and (c) how often OPC changed planned programmes in response to weather conditions.
282. Adult adventurers might attempt a trip if there was the possibility of unsuitable weather.
283. With school children positive checks to ensure there are no weather warnings or severe weather events should be required.
284. Doubts about the reliability of weather forecasts should lead to caution even when the forecast weather is suitable for an activity, not to an overall

discounting of weather forecasts which extended to lack of diligent attention to the possibility of an adverse forecast.

### **Failure to sight the weather map – redundancy failure**

285. KP stated that he did not look at the weather map:
286. Doing so may well have made a difference.
287. The FM had the responsibility of presenting weather information at the 0800 staff meeting.
288. But all field staff should have been capable of interpreting a weather map, and capable of checking a forecast which was available to them in the staffroom.
289. No other staff either sighted the weather map, or if they did noticed anything untoward.

### **KP's failure to categorically rule out the upstream Gorge trip**

290. There appeared to be a view that KP was primarily responsible for the incident by allowing the Gorge trip to proceed.
291. It is necessary to consider a number of factors.
292. The first relates to the understanding which OPC staff had as to the FM's role regarding the safety of any particular activity:
- (a) The FM's own view of his role was, that on occasions, he could and would stop instructors undertaking a planned activity, but this happened rarely. The instructors knew what they were competent to do, and that they could not perform activities for which they had not been signed off as being competent. In the occasional situation where an activity might be inappropriate due to a factor such as the weather, he would usually try and provide advice, rather than tell instructors that something could not be done. That advice would involve suggesting that a different activity was more appropriate that day. If he had concerns about any instructor's activities, he would discuss the concern after the morning meeting.<sup>76</sup>
- (b) This was also the understanding of members of staff.<sup>77</sup>
293. Next, it is necessary to consider the OPC documentation relating to FM and Instructor responsibilities for safety:

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<sup>76</sup> KP statement para 15.

<sup>77</sup> Georgina Griffiths' statement para 5, Campbell Potter's statement para 10, Julian Malcolm's statement para 4, Rosalind Hughes' statement para 4 and Belinda Manning's statement para 5.

- (a) The FM job description stated as one of its purposes, that the FM was “... *to be responsible for the safety systems of all areas of the OPC operation*”.
- (b) Chapter A of the QMS stated that the FM role included: “*to ensure high levels of educational and safety outcomes*”, and “*to monitor health and safety aspects within the field*”.

Chapter B of the QMS stated that as an aspect of standard operating procedures the “*FM will be monitoring environmental factors, activity related and programme related hazards in combination with staff competencies and advise accordingly.*”.

- (c) The QMS also stated, in respect of instructors:

*“The OPC instructor is in charge of and responsible for the safety of the group at all times during a programme. This responsibility cannot be delegated to anyone else.”*

These documents, then, placed responsibilities for safety on both FM and instructors, but did not expressly state that the FM had a final responsibility.

294. Turning to the Instructor Handbook policies regarding the Mangatepopo Gorge:

- (a) The FM was required to sign off that an instructor was qualified to take the upstream Gorge trip (see Figure 17). JS conducted her first upstream Mangatepopo Gorge trip in the week beginning 7 April. KP was on leave at that time. The decision to sign JS off to run such trips was not his. It was not suggested to the Review Team that she should not have been signed off.
- (b) The FM was required to give clearance to operate Gorge trips *after* a flood. That condition did not apply on 15 April.
- (c) The FM had to specifically approve the use of the middle section for any group (see Figure 18) – JS did not intend to use the middle section on 15 April, so that condition did not apply.
- (d) “*Every Mangetepopo gorge trip must be confirmed with the FM prior to entry, and immediately when group exits...*” (Figure 19). The intent of this requirement (of the instructor) could be to clarify intentions and confirm return, or “to allow the FM to say that they can still go ahead”<sup>78</sup> (emphasis added). The Review Team were unable to categorically confirm that the later was the case.

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<sup>78</sup> GD’s response to draft para 271.

The policy documents do not, therefore, resolve the issue of final responsibility for this particular trip.

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- 1. MINIMUM INSTRUCTOR QUALIFICATIONS:**
- a) Mangatepopo 'Downstream' trip and Mangahouhounui gorge: Gorge Competency.
  - b) Mangatepopo 'Upstream' trip (up to halfway ledge) and Pukehinau gorge: RMT Competency, at least a familiarisation trip, and FM to sign off.
  - c) Great Barrier gorges and steep bush creeks: certain GB creeks require Steep Bush Creek Competency, others require Bush and Rock Competencies.
  - d) All other sections and gorges: FM approval.
2. RATIO

**Figure 16 Instructor qualifications gorge trips**

### **POLICY – MANGATEPOPO**

- 9. Every Mangatepopo gorge trip must be confirmed with the FM prior to entry, and immediately when group exits the gorge.
- 
- 10. The middle gorge section (under the halfway ledge) must not be used unless specifically approved for your group by the FM (except upstreaming to the jump pool).
  - 11. The following must also be confirmed

**Figure 17 Mangatepopo policy - FM role**

- 295. JS was relatively inexperienced, a factor of which the FM should have been aware, giving an enhanced responsibility on his part to ensure the activities of her group were safe.
- 296. At the time of the meeting at 0800 on 15 April, the FM had it in mind, based upon the forecast for the day, that the downstream Gorge activity was closed. He did not say anything about the downstream Gorge trip at that meeting because nobody was planning to undertake it. He said that if the forecast had been for heavier rain he "would have some concerns about the upstream activity because the river can rise quickly". He would not, he said, at that time have prevented the activity but rather would have put a watch on it and

warned staff to watch for rising water levels.<sup>79</sup> This approach was consistent with KP's understanding of his role, namely that he was to monitor instructor decision making.

297. The Review Team has concluded that although it was not KP's role specifically to sanction the JS' upstream Gorge trip, he did have an overriding responsibility and ability to stop it if he believed there were health and safety factors requiring a decision.
298. At the time JS left, none of the experienced staff who were aware of her plans, all of whom had an overriding responsibility to speak up if lives were at risk, were impelled to do so (bearing in mind none were aware of the current weather warnings). Pete Zimmer, probably the most experienced river guide present, at that time still regarded a gorge trip as an option – he did not rule it out until after JS was out of sight up the river. The Outdoors Mark auditor watched the group depart. The Training Officer, Centre Manager, and Operations Manager, all with considerable outdoors experience, were aware of JS' intention to contemplate a gorge trip of some kind. It remained open to her to stay around the dam and judge conditions as she found them, but none felt obliged to intervene.
299. From the point of view of those present on the day, and bearing in mind their confidence in OPCs systems, procedures, and normal practices, JS' plan did not cross a threshold which would lead to the FM (or another experienced staff member) to challenge her decision making.

### **Failure to check for revised weather forecasts or warnings**

300. It is almost certain that the seven deaths would not have occurred had just one person checked for a more up-to date forecast at any time after 08:30. JS violated OPC policy by not seeking a revised forecast prior to setting out for the gorge<sup>80</sup>. The Outdoors Mark auditor did not check the weather, or note that JS did not check the weather. In the first rain for weeks, apparently no one looked at a rain radar map on the internet, which indicated the approach of heavy rain, or checked for weather warnings by phone. The warnings publicly available,<sup>81</sup> (causing parents some concern), were not picked up by any OPC staff member. So:

- someone could have checked – JS was not the only group near a river that day, and KP was not the only person capable of checking a weather forecast and

<sup>79</sup> KP's initial statement para 24.

<sup>80</sup> "Instructors must check the weather forecast at the start of every trip". General Policy, page 10, item 6, Instructor Handbook.

<sup>81</sup> See Appendix 2.

- anyone who did check could have warned others, and in all likelihood would, given the nature of the weather warnings issued after the morning meeting.

### **Failure to clarify whether trip was proceeding**

301. KP raised his concerns about the gorge with JS. He did so in a non-directive way, as was his usual approach;<sup>82</sup> it would have been very difficult for him to start trying to micromanage instructors in the field by remote control. Instructors clearly understood this to be the practical reality (Figure 19).

Once training is complete and you have your competencies, I would say that for the Field Manager, managing many instructors, it would seem there are only so many people one could manage competently.

In the field you are basically on your own. The only contact with supervisor is radio. In my experience there has always been someone available on the radio. This is more a support service than supervision.

Supervision is proactive in terms of morning meetings and when and what you're planning to do. That's when your decision making process is scrutinised.

### **Figure 19, extract Campbell Potter statement**

302. KP understood that JS "might not go too far in". In their conversation, she had not ruled out completely the possibility of doing so. Due to the low level of water, he thought it was probably all right, and did not consider the issue further; he went for a run.<sup>83</sup>
303. KP told the Review Team he had thought that if she went in, she would not go very far up, perhaps 100 metres.
304. He may have thought that she would radio in if she did, although in practice leaders did not always radio in before an upstream gorge trip<sup>84</sup>.
305. In hindsight, he should have clarified with her that she needed to do so if in fact she was going to the gorge.

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<sup>82</sup> JM interview with RT.

<sup>83</sup> Statement of 29 April 2008, para 34; police statement pp32-33.

<sup>84</sup> Review Team interview KP.

### **Failure to radio in that the group was entering the Gorge**

306. The policy requirement to confirm with the FM prior to entry to the Gorge was understood to be met by radioing in prior to entering the Gorge (though this was not stated in the policy to be the case). JS did not radio in. She regarded her conversation with KP at the Resource Centre as meeting this requirement. Had she done so

- KP would have known categorically that JS actually intended to enter the gorge
- KP would have known at what time she entered the gorge
- KP would have been prompted to review the weather and river conditions sooner.

307. The Review Team formed the view that this procedure was routinely violated for the “upstream” gorge trip.

### **Failure to stick to intended plan:**

308. It seems clear that JS herself did not intend to undertake a full upstream trip. She said that the group would not undertake “the full trip”. She wanted to get the group out of the Gorge before it got too dark. The trip usually took about two hours. She was aiming to complete the Gorge trip by 3.00pm at the latest.<sup>85</sup> She also said the trip usually takes about two hours. With an experienced instructor, it would take 1½ hours.<sup>86</sup> However:

- The group did proceed as far as the half-way ledge.
- It was relatively slow, and reached that ledge at about 0200.
- The trip was not sticking to its intended timetable.

309. Several reasons might explain why JS did not just turn the group around and leave the gorge as soon as it became clear the group was running behind the anticipated time::

- enthusiasm for the task of facilitating group cooperation, as per the Unit Standard,
- inexperience – lacking a standard to compare the group’s pace to,
- inexperience – preoccupation with the here and now rather than the weather conditions and the potential for a flood,

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<sup>85</sup> Statement para 35.

<sup>86</sup> A Robich.

- erroneously confusing the relatively non-technical nature of the activity with relative low-risk, as did others,
  - failure fully to understand the particular hazards of the gorge.
310. The gorge trip violated OPC Policy – daily intentions must be sufficiently clear to enable a rapid emergency response. Emergency response was delayed while KP tried to work out exactly what JS was doing.

### **Failed assessment of chance of significant rise in river level**

311. As already stated, OPC Gorge Policy stated that “river levels must be assessed as safe and no significant chance of the level rising above a safe point during the trip”. The policy is in the instructor handbook, which instructors carry with them. From this it could be assumed that the instructor is expected to make that assessment.
312. At the time JS went in, which was approximately 12:30:
- There had been steady and consistent rain from mid morning.
  - At about 11:00, there was a thunderstorm which MB recalled as a single flash and a single boom, which he measured as being about seven miles away; he obtained a two second count, and specifically pointed out to JS the significance of a lightning storm when she was on the ropes course; that event was brought to her attention.
  - Heavier rain followed.
  - She was warned by KP of the possibility of the river rising.<sup>87</sup>
313. JS did not link the weather information she would have had to the statement in the policy.

### **Insufficient staff with the group – redundancy failure**

314. A second instructor with the group is likely have averted some, if not all, the deaths. Among the options available, one instructor could have gone for help, while the group hung on as long as possible. Alternatively, once one student had gone over the dam, had JS been able to radio a second instructor on the ledge she would have advised them to stay put as long as they could, and to

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<sup>87</sup> It is clear from both the Genesis and NIWA information that increased river flows did not occur in the region until 1400; and this is confirmed by the Genesis data which puts the flow at the time JS entered the gorge at approx 0.038cumecs (0.045 at 1300, and 0.056 at 1330).



reinforce the importance that individuals swim towards the left bank as hard as they could if they did leave the ledge.

315. The vulnerability of a group in the gorge with just one instructor was acknowledged specifically in the QMS (Figure 20).

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If an instructor/guide was incapacitated in the gorge the group would quickly be exposed to a rapidly increasing level of risk. If an instructor was incapacitated in the bush the group would be exposed to a significantly lower level of risk. Hence OPC generally avoids activities that need a guiding behaviour unless the gains are significant and instructor independent safety controls can be put in place. (e.g., for the gorge there are very prescriptive policies and SOPs controlling when a gorge trip is appropriate)

### **Figure 20 Extract from QMS, risk in the gorge**

316. Once JS left the ledge the remaining members of the group were indeed exposed to serious risk. OPC did not have independent safety controls for a situation in the gorge in which either the instructor was incapacitated, or the instructor was incapable of managing the whole group alone.
317. There had been several previous incidents in which a single instructor struggled to manage an incident, which are discussed more fully below. All involved either steep ground or moving water in which the group had to descend one by one, and the instructor had to be either with the group at the top or the group at the bottom. All involved circumstances in which the instructor had to concentrate on the activity of a particular student, and therefore could not provide routine supervision.

### **Insufficient radios with the group – redundancy failure**

318. Had two radios been carried, JS could have left one with the group on the ledge. She would very likely have been able to communicate using simplex with the group she left behind. Waiting on the ledge until she told them it was safe to come down would have been a better plan, had that option been open to her. She would have been able to call off the planned evacuation of the ledge as soon as it was clear one student had gone over the spillway (the first student to go over the spillway, Kish, survived, and the next student to come down, Peter was successfully rescued, so all deaths could have been averted had the evacuation been called off as soon as Kish went over the spillway).

### **General failure to adequately comprehend the hazardous nature of the upstream gorge trip**

319. Even after the incident, the Review Team encountered the view that the “upstream trip” was less hazardous than the “downstream trip”. The principle hazard – a group being caught in the gorge by rising waters – is the same for both trips. The downstream trip began with a flying fox descent that could not readily be reversed. Very early in the upstream trip groups traversed a section of river that would become impassable in flood. The upstream trip was less

technical, but the main environmental hazard was the same for both trips. The reasons for this apparent blind spot seemed to be:

- The upstream trip was seen as a way to allow instructors not qualified for the downstream trip, or groups not strong enough for the downstream trip, to complete a gorge trip, and/or to build experience.
- A lack of knowledge and focus on environmental hazards, in particular the local environment.

### **Failure to sign off on the RAMS (Risk Assessment and Management System) form for the upstream gorge.**

320. It was a requirement that instructors were to be familiar with the RAMS form, policy, and guidelines for all activities they were doing with their clients.<sup>88</sup>
321. “Knowledge of RAMS” competency was a pre-requisite for Gorge competency.<sup>89</sup>
322. The RAMS sign-off sheet was in the operations room. JS had not signed this off.
323. MB’s feedback to JS for the Gorge competency stated “*she also needs to read the RAMS form*”. This was dated 27 March 2008. JS could not recall whether or not she had read the RAMS form, and acknowledged she had not signed it.
324. While sign-off of RAMS forms does not in itself test knowledge of safety issues in a particular environment, in this instance the form did contain information about some generic environmental hazards.

### **Failure of “challenge by choice”**

325. The OPC QMS devotes more than two pages to what it describes as “challenge by choice”, which is presented as central to OPC’s educational philosophy. The implications for instructors are spelled out in Figure 18.

The instructor’s main job is in establishing a positive environment in the group whereby there is the support to:

- choose to carry out a potentially scary/challenging activity
- back away from the activity if it is found to be too much at the time (while reserving the right to...)
- have another go at the activity at a future time
- explore differences in risk taking and choice

**Figure 18 "Challenge by choice" QMS**

<sup>88</sup> General policy, instructor handbook, p10 para 2.

<sup>89</sup> Competency book.

326. The QMS goes on to describe examples in which an individual might make a choice, such as using a flying fox. Instructors are given little guidance on how “choice” works for a student who is part of a group in circumstances in which the whole group must stay together. Instructors are also given little guidance on how students are to choose a “challenge” they might not fully comprehend. But:

- the individuals in the Elim group did not choose the gorge activity in a meaningful way. There was not a clear alternative for individuals who might not have wanted what others wanted. The group had a unit standard to complete. Individuals did not have a good knowledge of what the gorge trip entailed.
- in the gorge, Ashley was crying and wanted go back, from the first encounter with deep water. JS had no way of allowing Ashley her choice, other than curtailing the activity for the whole group.

### Failure of mentoring system

327. The QMS describes a mentoring system, which includes specific policy that delegates the final word on safety judgements to the mentor (Figure 22, Figure 23).

#### **MENTOR SCHEME FOR INSTRUCTORS**

A mentor (senior staff member) will be chosen by the developer (new instructor) and will have the necessary background as judged by the Field Manager. The mentor's main role is to:

- Help facilitate induction
- Be a ready source of information concerning activities, operations, resources and general philosophy
- Provide local knowledge
- Give guidance in the application of the safety framework
- Be especially concerned for the Individuals' welfare

#### **Responsibilities**

##### *Standard Operating Procedure*

The following procedures will provide some guidance for the responsibilities of both the mentor and developer

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- 12 -

Figure 22 QMS extract, Mentoring, Chapter E p. 12

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- Make an effort to get to know each other – perhaps a dinner or a day of playing
- Discuss the scheme and what it means to each of you. Establish a two-way commitment to meeting regularly and how and when it is OK for the developer to get in contact with the mentor at another times
- Research each other's credentials/abilities/philosophies etc
- Use the regular meetings as a way of monitoring and evaluating the new instructor's learning'
- Inform the Field Manager of concerns you have regarding the new instructor e.g. well being, programming, frustrations, progress, safety issues.

#### **Skills and Characteristics of Mentors and Developers**

There are certain skills and characteristics required of mentors and developers (Pfeiffer and company 1994 Annual):

The Mentor's characteristics and skills:

- Knowledge of organisation (culture, values and philosophy)
- Technical competence
- Personal Power
- Willingness to be responsible for someone else's growth
- Personal security and self confidence
- Ability to communicate effectively
- Openess to sharing experience

The Developer's characteristics and skills:

- Desire to learn and grow
- Orientation towards a goal
- Initiative
- Ability to be introspective

#### **Policy**

- ➔ **If any activity is in doubt because of safety, or a policy needs clarification, the mentor's opinion must be followed**
- ➔ **If disagreement still persists the Field Manager should be consulted before the activity is carried out**

#### **Figure 19 QMS extract, Mentoring, Chapter E p. 13**

328. The role of mentor appears to bridge the gap between the limited capacity of the FM to supervise instructors in the field, beyond noting activities at the brief morning meeting and providing a source of advice via cell-phone or radio, and the need for more individual support for new instructors, such as JS and Matt Rowley.
329. JS did not have a mentor formally assigned to her – although MB was fulfilling this role.
330. The mentoring system described in the QMS did not appear to be in place; had it been in place, JS may have had more individual support, and oversight.

#### **Failure of the "half-way ledge" exit**

331. The half-way ledge provided an exit that the group could have used at the first signs that the river was rising.

332. Exiting from the half-way ledge had a specific competency. JS was not signed off for this competency, but OPC policy did not require this competency to be signed off for an instructor to lead an upstream gorge trip. Apparently a group at the half-way ledge had to be able to exit had they come downstream to that point, but not a group which had come upstream.
333. The ledge itself provided a refuge, even if the group did not use the rope-assisted exit that JS was not signed off for.
334. JS stated that:
- She would have used the half-way ledge exit, despite not being “signed off” for it, had she feared for the safety of the group.
  - At the time when making for the ledge was feasible, she was not concerned about the rising water.
335. It appears JS and the group were at the half-way point between 0130 and 0200.
336. By 0105, one other instructor, PZ, had noticed discolouration starting to occur and that flows were more than what they had been for most of the summer.<sup>90</sup> At around 0200, KP considered the river was in such a condition that if JS was not out of the Gorge she would be stuck.<sup>91</sup>
337. The Genesis data also confirms an increase in the river volume by 0200 to 0.089 cumecs (at the dam – it would had been 0.038 cumecs at 1230 when the group entered the Gorge).
338. There was a basis for being concerned about the rising water.
339. It cannot be known what decision JS might have made had the half-way ledge exit been a straightforward option, rather than one which required her to be concerned enough to violate OPC policy. However it can be said, with hindsight, that permitting instructors to take the upstream trip without having the half-way ledge competency signed off was an error, and a latent contributor to the incident.

#### **Failure of the “last high water escape”**

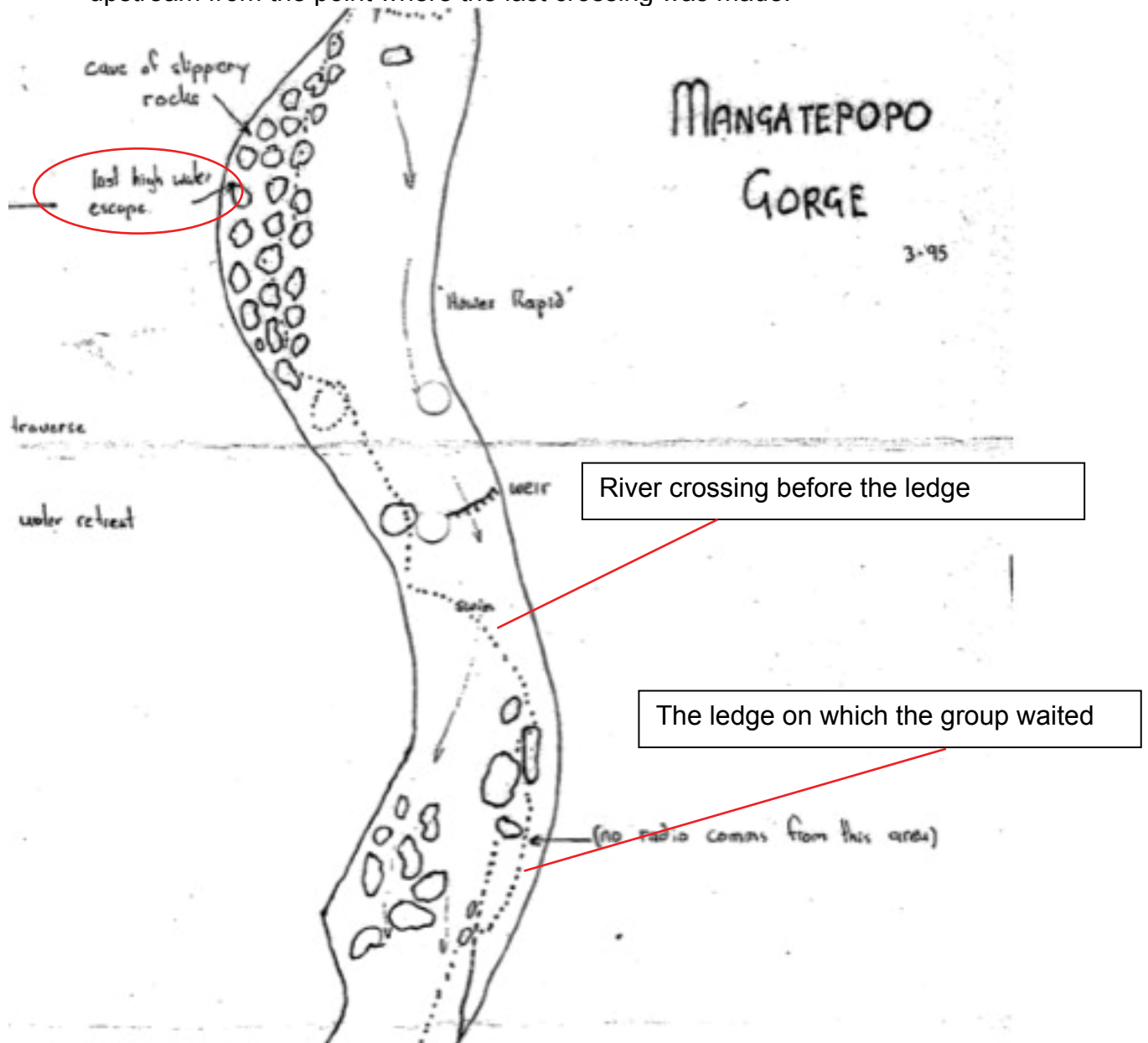
340. A sketch map of the gorge was on the wall in KP’s office. The map had been prepared following a near miss in 1994. A section of the map is shown in Figure 24.

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<sup>90</sup> PZ statement, 20 April 2008.

<sup>91</sup> KP statement, para 38.

341. By the time the group approached the last river crossing before the ledge, JS was concerned. She became increasingly concerned as she tried to get the group across. The “last high water escape” was no more than 50 meters upstream from the point where the last crossing was made.<sup>92</sup>



**Figure 24 Section of Mangatepopo Gorge map showing "last high water escape"**

342. Even after some had crossed the river, once it became clear the river was rising those who had not crossed could have been sent back to the “last high water escape”.

<sup>92</sup> As already mentioned, this site was inspected by Mark Smith, and the view formed that it would probably have been a better refuge than the ledge on which the group became stranded.

343. JS did not know about the map, or the “last high water escape”. She said no one had shown it to her. She did not know more than vague details of previous incidents in the gorge.
344. Even had JS studied the RAMS for the gorge, and it appears that she had not, the map was not part of the RAMS.
345. JS did not anticipate how long the last river crossing would take. It is likely that a more experienced river instructor would have either recognised that, and sought refuge nearby (and so recognised the possibility of refuge at the point marked on the map), or found a way to execute the river crossing quickly.

### **Failure to get at least some of the group out when they might have got out safely**

346. With hindsight, the group entered the river at the worst possible time – right at the flood peak. It is difficult to be certain how high the river was when the group stopped on the ledge, but the flow was considerably less than it was at the peak. It is likely that the members of the group would have had a much better chance of survival had they left the ledge much earlier; however:
  - Four “not confident” swimmers would have made JS reluctant to attempt a swimming exit;
  - JS did not contemplate the river rising above the ledge until it did so, so the ledge seemed the safer option;
  - JS did not have a means of evacuating just the strong swimmers because she was the only instructor with the group;
  - JS was taking what seemed to be the most cautious approach, in deference to her own relative inexperience.
347. It is possible that a more experienced river instructor would have kept going and got the group out rather than wait on the ledge.

### **Communication failure on the ledge**

348. OPC policy required a radio or cell-phone to be carried if a group was more than ten minutes from any OPC base or other communication.
349. It was unclear where in the Gorge the radios worked; and although they were intended to be waterproof, they were not.
350. These two factors led to JS not regarding the radio as a usable in the Gorge. Thus:

- She did not attempt to communicate prior to the group deciding to wait out the flood on the ledge.
  - She did try to use the radio on the ledge, without expecting it to work.
351. JS did not attempt to communicate prior to the group deciding to wait out the flood on the ledge. The radio was double-bagged and disassembled, because although the radios were intended to be waterproof, they were not, and so were kept wrapped and not quickly accessible. She did try to use the radio on the ledge, without expecting it to work.
352. The Review Team was not able to establish whether she tried duplex, simplex, or both.
353. There were two possible missed opportunities to communicate with the group on the ledge:
- Bev Smith went to check to river from the intake structure, with Chris Whitehouse. The river was in “big flood”. JS would definitely have been on the ledge at that point. It should have been possible to communicate between the intake structure and ledge on simplex.
  - Shortly before Jodie’s emergency call, MB went to check the halfway ledge. Simplex transmission from his position at the top of the half-way ledge to the ledge might have worked.
354. Had JS kept her radio on, on the assumption the OPC staff would notice the flood and begin efforts to contact her, and had someone been stationed at the intake with a radio, there is a good chance that JS could have been provided with advice and encouragement to stay on the ledge. Had an evacuation of the ledge become unavoidable, radio communication would have enabled more time to put rescuers in place. Alternatively, when leaving the ledge, an option would have been to have left the radio with the group, and then to seek assistance from OPC staff. Those staff would have been able to communicate with Tony McLean and the remaining students by simplex channel from the spillway.

**Policy violation: never enter a flooded river**

355. OPC policy stated categorically: “groups must not attempt to cross flooded streams/riders”<sup>93</sup>.
356. JS stated that she took the group off the ledge because she feared the group would be washed off.

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<sup>93</sup> OPC Instructor Handbook p. 30 #6.



357. It would have been a very difficult situation for an inexperienced instructor. Some of the students were questioning the decision to stay on the ledge. Initially, they had been seated at the highest point of the ledge, against the wall (the wall was overhanging, and obliged them to lean forward). When the water reached their feet they stood up, further out on the ledge (because of the overhang) where the water was a little deeper. At no stage did the water rise above anyone's knees, but members of the group were cold and uncomfortable.
358. It is in this context – an inexperienced instructor in a situation well beyond her capability – that the decision to leave the ledge must be placed.
359. In hindsight the plan was clearly inadequate:
- Three non-swimmers were connected to swimmers by cows-tails and karabiners. This was totally unorthodox. No consideration was given to the possibility that linking individuals might drown both.
  - The group were advised to adopt a defensive float and paddle with a backstroke motion. The alternative of swimming hard to the left with a conventional stroke (on the front) combined with advice to keep feet up and not stand up in the current, was considered and rejected. It may well have been the preferable option. Given the depth of the water, and the desperate importance of moving to river left, swimming hard to the left with a conventional stroke (on the front), combined with advice to keep feet up and not stand up in the current, should have been considered.
  - JS stated the plan was for individuals to leave at five minute intervals. While that would have allowed time to rescue one person and then set up for the next person, this would have had the last person to leave the ledge having to wait 40 minutes for their turn – a very long time if there was a fear that the group would be washed off the ledge.
  - Although JS gave oral instructions and visual demonstrations and communicated the need for urgency when in the water, the brief about what to do when in the water was ineffectual. Of the survivors, only Peter Shih made a determined effort to follow instructions. The others forgot what they had been told when they felt the power of the water, but assumed that JS could rescue them.
  - Individuals were not advised to get themselves out of the current and onto the left bank if they could, with the throw bag as a back-up only.
  - No advice or instruction was given on what to do if carried over the spillway. The spillway was obviously a very significant risk.

- No warning was given about the intake.
  - No warning was given that JS might drown and not be available to provide the throw bag; no consideration was given to the possibility that the throw bag rescue would not work.
360. At the time the members of the group entered the water, staying put was much safer than entering the flood.
361. It is not possible to say how a more experienced instructor would have managed an exit from the ledge (bearing in mind that the water in fact did not rise any higher, and the group could have stayed put). Such an instructor in the same situation would have recognised the weakness in the plan to leave the ledge, and determined to wait the flood out, particularly given the risks posed by the spillway.

**Inability to communicate once the group was split. Failure to call off the exit plan once the first student went over the spillway.**

362. JS had no way of communicating with the group once she had left them.

**Failure of linking swimmers and non-swimmers**

363. JS, a strong swimmer, successfully towed Ashley to safety, but she only just succeeded in avoiding being swept over the spillway. She had the advantage of knowing that whatever happened she had to swim to the bank.
364. Neither Tony nor Anthony, who were both linked to non-swimmers, knew that they must reach the shore. It seems unlikely that they knew that JS would have great difficulty holding two people on a throw-rope against the current.
365. The outcome might have been different had the two strong swimmers known that they must swim towards the left bank with the same desperation JS had known.
366. It seems likely that linking the two pairs decreased the chances of survival of all four individuals. Two of the five individuals who went over the spillway survived. All four who went over the spillway linked to another drowned.

**Throw-bag failures**

367. JS had recently been taught and practiced throw bag rescues in very different conditions from those encountered on the day.
368. JS could not obtain a stance that ensured those who caught the rope would not be carried over the spillway before they could be pendulumed in to the bank. It is an axiom of throw bag rescues not to swing the person being

rescued into danger. Any person who went over the spillway whilst holding the throw rope may well have had a reduced chance of surviving the turbulence below the spillway.

### **Failure to rescue seven individuals**

369. When the emergency call from JS was received at OPC Kish had been washed over the spillway and survived. Peter and Ashley were on the bank with Jodie. There had been no deaths. On receiving the call KP left the Resource Centre 3 minutes later, and would have arrived at the road junction just above the ford no more than 2 minutes after that. He met Jon Tarrant, who had just observed what would have been Tony and Tom washed past the ford. It is likely that at that point, five minutes after the call, all seven victims had already drowned.
370. A more experienced instructor might have sent the teacher down the river with a radio to get help, or might have left instructions to the group to wait as long as possible before exiting the ledge. Either strategy would have given OPC staff more time to put some rescue efforts in place.
371. However:
- It is not clear that any individuals were still alive when they reached the ford. Rescue efforts based there might not have achieved anything.
  - There is not much anyone could have done from the intake structure or its environs.
  - Rescuing any of the individuals tied to another would have been particularly difficult.
372. There was nothing that OPC staff could have done in the five minutes that elapsed between the emergency call and the seven deaths which would have saved any lives.

## **Section G: Underlying Causes**

373. Underlying causes are the factors (including organisational, management and human) that may have influenced the behaviour, or led to the unsafe conditions, that directly influenced the incident. In order for the Review Team to conclude that a factor was an underlying cause that factor had to (a) be causal in the April 15 incident and (b) be present on other occasions, and not unique to the April 15 incident.
374. The Review Team cautions that:
- 374.1 There may be other safety deficiencies at OPC that the 15 April incident did not reveal
- 374.2 There may be causal factors that appear to be unique to the 15 April incident, which have in fact been present on other occasions, unbeknown to the Review Team
375. The Review Team identified the following underlying causes, based on its analysis of direct causes.

### **Inadequate parental consent**

376. For parents to provide proper informed consent for their child, they need to be able to accurately weigh up the risks and benefits associated with the programme and/or activities that their child will undertake. It should not be assumed that parents (or participants) understand any of the potential risks, especially when these risks are not accurately described. The more information and detail they are given, the more they will be able to make a sound decision about their child's participation.
377. The consent form used by OPC does not give an accurate representation of the potential risks involved, the skill of staff, or the benefits associated with participating in an Adventure Challenge programme.

### **Inadequate medical information form**

378. The purpose of gathering information about participant medical condition(s), health status and/or fitness level is to enable staff/the centre to better manage participants' health and safety. If this information is not accurate or sufficient, then problems can arise.
379. Where a programme includes activities that require a reasonable level of fitness, or may require swimming ability, more information about these factors should be obtained.

### **Inadequate competency sign off**

380. “Staff competence is the most important safety factor”<sup>94</sup>. Instructor competencies should focus on establishing whether staff have sufficient skills and experience to independently manage, and instruct/facilitate to the required level, a group of clients in each activity and/or environment.
381. In the case of OPC’s Mangatepopo ‘Upstream Gorge’ trip, the requirement of staff is “RMT Competency, at least a familiarization trip, and FM to sign off”. This falls short in several ways:
- 381.1 This competency requirement is inadequate. It is minimal compared to the requirement for the ‘Downstream Gorge’ trip, despite the major hazards being the same. It does not support/require any understanding of specific environmental information (high water escapes, radio blind spots, weather effects), significant hazards or relevant previous incidents.
- 381.2 The competency requirement should establish that the candidate is genuinely competent and able to perform the required skill(s) in a range of environments and conditions. As it is understood that instructors are often assessed once, and often in as close to ideal conditions as possible, it might not follow that an instructor is able to carry out these same skills in other circumstances particularly when they are inexperienced. Thus, an assessor’s sign off should be treated more as ‘competent in the conditions at the time’ rather than unreservedly competent.
- 381.3 It is important that an assessor only signs off a competency when they are genuinely satisfied of a holistic picture of competence, and not so as to ‘tick them off’.

### **JS experience:**

382. As detailed earlier, the Review Team has found multiple points where it was reasonable to conclude a more experienced instructor could have made safer decisions.

### **Lack of clarity as to field manager’s role in supervising field staff**

383. The OPC safety system appears to be based on a model of competent instructors being “in charge of and responsible for the safety of the group”. The extent to which the Field Manager is required to actively supervise instructing staff after the morning meeting is unclear.

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<sup>94</sup> M Baillie, AALA, UK.

384. In some organisations, experienced staff are utilised to supervise staff in the field (sometimes directly, sometimes less so) – providing support, assisting with decision making, and playing a back-up safety role. In this way instructors can gain experience while being appropriately supported.
385. Another level of responsibility could exist where the Field Manager would have to give express sanction for Instructors before they could commence an activity. This was not the case with the Mangatepopo Upstream activity, and becomes unworkable if extended to more than a few distinct circumstances.
386. If the active supervision of field staff after the morning meeting was a requirement of the OPC Field Manager’s role, this was not clear to the Field Manager or to other staff. Furthermore:
- (a) They should be able to focus primarily on this responsibility, and not be distracted by catching up after weeks away, or supporting an external audit.
  - (b) Supervision requirements should be manageable in terms of the number of resources under the control of the FM.<sup>95</sup>

### **Failure to identify required swimming ability**

387. The OPC Instructor Handbook provides a general policy that “student swimming ability must be checked before commencing any water based activities”. Instructors and management staff tended to regard swimming ability as relatively unimportant for the gorge activity.<sup>96</sup> The common attitude was ‘they need to be able to float, and a wetsuit and PFD (particularly with weak swimmers<sup>97</sup>) will help with this’<sup>98</sup>. Consequently no effort was made to actually test water confidence and swimming ability before beginning the gorge activity.
388. While the upstream trip does require ‘floating ability’ in normal conditions, water confidence would be helpful, and in higher flow swimming ability could become a necessity.

### **Poor vigilance as to weather and effects**

389. Irrespective of what methodology was used to provide weather information for the morning meeting, it did not appear to be common practice for OPC staff to update their knowledge of weather forecasts or at least check for warnings beyond that time. This was despite often changeable weather at OPC, the

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<sup>95</sup> The FM considered there was an excessive span of control which mitigated against the possibility of being able to provide direct supervision; moreover KP and MB believed there was also too much pressure on the training officer for the FM to delegate to the TO, if he was too committed.

<sup>96</sup> Staff Interviews, for example MB.

<sup>97</sup> Instructor Handbook, p. 81.

<sup>98</sup> Staff Interviews.

common use of very weather-dependant activities and environments, and the multiple options available for updating weather information.

390. As a result:

390.1 no-one re-checked the weather forecast later in the day

390.2 inadequate consideration was given (albeit by an inexperienced Instructor) to the potential effects of the weather on an activity about to be undertaken.

### **Requirement to radio in not understood**

391. Although JS may have considered that her conversation with KP met the requirement for ‘confirmation with the FM prior to entry’<sup>99</sup> for a Mangatepopo Gorge trip, it is clear that she did not understand why she needed to radio in. The purpose of calling ‘in’ and ‘out’ was a means of providing intentions information. Had this been clear to JS (and other Instructors) she might have made more effort to provide an accurate time when her group actually entered the Gorge (and thus also her intent to). The Review Team found some indications that the requirement to radio in for the downstream trip was routinely overlooked.

### **Unclear policy statement**

392. The Instructor Handbook states that river levels must “have no significant chance of the level rising above a safe point...”<sup>100</sup>. This is statement is not very clear, and as a measure, ‘no significant chance’ is open to subjective interpretation. A robust safety measure should be more categorical, that is “no chance” (meaning, not while raining, or any rain forecast).

### **Failure to recognise similarities between upstream and downstream trips**

393. OPC staff clearly had a mindset that the Upstream Gorge trip was easier and less hazardous than the Downstream Gorge trip, although the key difference was that it was less committing (to a point). This mindset is thought to have eventuated after the upstream trip was re-introduced. Although the Mangatepopo Gorge was initially explored and used upstream in the early 1970s, the recent use of the upstream Gorge trip appears to have restarted in the mid 1990s. It was regarded as an easier option, following a closure of a downstream trip. In this way the upstream trip may not have been treated as a new activity/environment which needed a fresh approach to hazard identification and management. Instead the concept of ‘easier than downstream’ led to ongoing assumptions which were never re-considered, ‘risk shift’ and the development of an unsafe mindset.

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<sup>99</sup> Instructor Handbook, p81.

<sup>100</sup> Instructor Handbook, p80.

### **Inadequate induction**

394. An induction programme should ensure that an instructor not only has the technical skills to do the job, but can also perform in particular environments, with the particular client group, and with the right emphasis and philosophy.
395. OPC's three week induction period was originally designed to introduce an experienced instructor (ie someone with NZOIA qualifications) into a new workplace, programme and set of environments<sup>101</sup>. It is not long enough for a recent graduate<sup>102</sup>, and in addition, JS had her induction shortened even further to 13 days. JS' induction was not sufficient to provide her training and competency sign-off for a range of water based activities.
396. It is understood that financial constraints provide the limitation on induction length (a three month process would be more effective).<sup>103</sup>

### **RAMS ineffective as a hazard management tool**

397. The identification and management of hazards in a systematic manner is a legislative requirement.<sup>104</sup> At OPC the RAMS form "provides a systems approach to identifying the Risks, Perils and Hazards associated with an activity... ..and can be used to determine risk management strategies".<sup>105</sup>
398. An effective hazard management process should enable the identification, assessment, control and the communication of hazards. RAMS forms tend to fall short in assessing the significance of hazards, and in communicating them. The 'sign off' method used to motivate instructors to read RAMS forms did not work;<sup>106</sup> and besides, reading does not always mean understanding.
399. An Instructors Handbook was bought in a few years ago to supplement the RAMS form approach. However, these two documents are not well correlated; there could be greater alignment between the two. The RAMS form should focus on identifying, assessing and developing appropriate hazard controls, while the Instructor Handbook should concentrate on communicating control strategies and other key information (ie identifying the significant hazards).

### **Flawed RAMs for the Gorge**

400. Whether JS had ever sighted the RAMS form for the upstream gorge is unclear. She told the Review Team she couldn't remember if she had or not. Regardless of this, the RAMS form for the upstream gorge trip was flawed:

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<sup>101</sup> Staff Interviews.

<sup>102</sup> Staff Interviews.

<sup>103</sup> Staff Interviews.

<sup>104</sup> HSE Act.

<sup>105</sup> QMS, Section B, OPC Safety Systems.

<sup>106</sup> RT observation.



400.1 As has been pointed out previously in the literature,<sup>107</sup> RAMS forms can overwhelm new instructors with detail. In particular, they can bury the imperative to prevent death and serious injury in a mass of less serious material.

400.2 The RAMS form lacked a map, even though crucial hazards (and refuges) were specific to particular locations.<sup>108</sup>

400.3 The spillway was not included as a hazard

400.4 The intake was not included as a hazard

400.5 There was no history of previous incidents

400.6 Every hazard was dealt with in the final column.

### **Over-reliance on a solo instructor**

401. The group in the gorge would have been safer with two instructors. In a moving water environment, or on steep ground two instructors provide a substantial safety margin.

### **No rescue plan for the Gorge**

402. JS may have stayed on the ledge longer (and, as it happens, would have discovered that the water was beginning to recede), had she known that (a) OPC would recognize she was in difficulty, (b) would locate her and (c) would help her get out. OPC had no specific rescue plan for Gorge trips.

### **Failure to learn from previous incidents**

403. OPC has maintained what appears to be a comprehensive file of previous incidents and reported near-misses. OPC did not appear to have undertaken its own review of past incidents to look for patterns in incidents involving death, serious injury, close calls, or the possibility of death, in order to discover any systematic problems or concerns.<sup>109</sup> Had a prior review of previous incidents, specifically focussing on the risks of death or serious injury been undertaken, it is possible the tragedy of 15 April might have been prevented. Similarly, if the staff induction program had been extended to include the careful study of lessons learned from previous serious incidents, the tragedy might have been averted.

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<sup>107</sup> Hogan, R. (2002). "The crux of risk management in outdoor programs - minimising the possibility of death and disabling injury." *Australian Journal of Outdoor Education* 6(2): 72-76.

<sup>108</sup> A map of the gorge was on the wall of the FM's office. Maps are often used as hazard management tools in environments where specific hazards and safe areas/routes change with conditions and over time, eg rivers, glaciers.

<sup>109</sup> The Review Team has not reviewed any analysis undertaken by the Trustees' Safety Committee.

404. It might be that some particular combination of factors on 15 April activated a hitherto latent causal factor, therefore it was logical for the Review Team to examine the record of previous incidents to determine:
- 404.1 Had there been any previous incidents in the gorge with common elements to the 15 April incident?
  - 404.2 Had there been any previous incidents involving deaths, or close calls, and if so what characteristics did those incidents share with the 15 April incident?
  - 404.3 Had there been any potentially serious incidents with common elements to the 15 April incident, in locations other than the gorge?
405. It must be understood that while the Review Team examined all records of previous incidents, it confined itself only to those incidents which threw some light onto possible systematic elements of the 15 April incident.
406. It should not be assumed that nothing further is to be learned from analysis of OPC's incident records. It should also be understood that the Review Team relied entirely on OPC's records and recorded analysis of previous incidents. It did not conduct any independent inquiries into previous incidents.
407. 16 March 1984 – Mangatepopo Gorge trip, lack of local knowledge, river rose rapidly while a group in the Gorge: one of three instructors had completed the Gorge trip once before. Group caught by rising water. Instructor en-route to seek assistance broke his leg.
408. The Mangatepopo gorge incident, 15 March 1994: on 15 March an AC group led by a trainee instructor was caught by rising waters in the gorge in the course of a downstream trip. The group had entered the gorge in heavy rain after a dry spell. The river level was low when they entered. The incident was a close call for the whole group, and also involved rock fall which struck one student and another student rescued from a foot entrapment in the river. There are at least three recorded reviews of the incident by staff members. A number of causal factors were identified, which were repeated in the 15 April incident:
- Caught in the gorge in a flood
  - A non-swimming student, worried students (not a strong group)
  - New staff member
  - (Lack of ) instructor local knowledge
  - A drought followed by rain, small catchment, lack of escape route
  - Absence of the CI

Response to 1994 incident	Outcome, 15 April 2008 incident
<p>Chief instructor (CI) or delegate attends all morning briefings &amp; flags/briefs people on special conditions/environmental traps. All gorge trips are signed in/out with CI or OM with discussion of the group (their condition/gorge condition)</p> <p>Plateau guides were approached re “sharing of resource” &amp; informing each other of use. But this no longer occurs as Plateau Guides do not now use the gorge. Water gauges were built with benchmarks established. Weather maps were pinned up in MOW at morning briefings by CI with associated discussion. The availability of weather maps prior to morning meeting was investigated and these are now discussed at the morning meeting.</p>	<p>Failed, partly due to forecast.</p> <p>Failed – the policy attempted to deal with instructor inexperience – identified by the analyses of the 1994 incident – indirectly. Appears to have devolved to a busy FM Redundant.</p> <p>Failed – maps were not referred to.</p> <p>Failed – method used since 1995 had the group in 2008 operating off a forecast prepared shortly after 01:00, and which was faulty (at least insofar as the wording didn't make sense).</p>
<p>There was a staff training trip in the gorge to establish: Standard operating procedures ie River crossing techniques. Escape route location. These form part of the downstream gorge competency requirements.</p>	<p>Defeated by the practice of allowing upstream trips led by staff not “signed off” for the upstream ledge exit, and a collective failure to recognise that the environment was just as hazardous regardless of whether the group had travelled up or downstream</p>
<p>The escape route at the half way ledge was marked. The gorge map accuracy was confirmed.</p>	<p>Defeated by an overall de-emphasis on environmental knowledge, and the particular fact that the gorge map was kept on the wall in the FM's office but few claimed knowledge of it. It should have been in the instructor manual, and knowledge of it should have been part of the sign-off. Not relevant</p>
<p>There was an idea of stashing an “emergency barrel of gear” at the half way ledge. This idea was investigated and a waterproof barrel is now in place at the half way ledge with sufficient equipment to conduct an assisted hoist. Radios were purchased and methods developed to transport them in the gorge dry The radio transmission in the gorge was investigated and black spots identified.</p>	<p>Defeated by a practice of keeping the radios dry in the gorge, rather than accessible Defeated by the failure to pass on knowledge of black spots – the whole gorge came to be treated as a black spot.</p>
<p>The emergency procedure list was up dated, then printed and placed by every phone.</p>	<p>Inadequate. There was no specific emergency procedure for a group caught in the gorge.</p>

### Table 5 Evaluation of OPC responses to 1994 Mangatepopo incident

409. 16 March 1994 – solo inexperienced instructor, river rose rapidly; river crossing under the ropes course. The river rose swiftly while five students were crossing together, one student was swept 15m downstream. The river was uncrossable, with the group split. The instructor shouted instructions to the group on the other side.
410. 25 May 1994 – river rose rapidly: a group crossing the Mangatepopo ford after heavy rain had to wait 15 minutes for the level to drop to a safe level. The second crossing was ankle deep, but after the last student crossed the river rose to dangerous levels within 1-2 minutes (attributed to intake release, although it is unclear how the instructor knew this).
411. OPC's recommended actions were “Instructors to be aware of how fast local rivers can rise especially at this time of year”.

The 25 May incident brought to 3 the number of potentially serious incidents on the Mangatepopo Stream in 1994. Although there has been high turnover of instructional staff at OPC, at least some staff present at that time were still employed in 2008.

412. 17 November 1999 – solo instructor, violation of “strong group” policy: incident in which an “overweight” student suffered a fall on an upstream gorge trip. The Instructor was working solo.

Although a sign of “slippage” in the policy that only strong groups would undertake gorge trips, the OPC comment merely noted that the instructor had left and therefore the incident could not be discussed with him. The tendency to focus on the instructor is a consistent pattern in the accident record. As this incident illustrates, aside from the risk of developing a “blame” culture rather than a “safety” culture, the tactic of providing feedback to individuals after incidents had occurred could be defeated by high staff turnover. While the outdoor field might benefit from “lessons learned” at OPC, OPC itself would be destined to keep encountering similar incidents.

413. 12 December 2001 – serious incident, solo instructor: instructor with “inadequate knowledge or skill (query)”<sup>110</sup> working solo, briefed group on how to descend a section, then heard a cry a saw a student had fallen, and was in the water being swept towards the undercut (see also 15 February 2004 incident). A successful throw-bag rescue was undertaken.
414. 19 January 2004 – potentially serious incident, solo instructor: instructor working solo swept under a submerged log. Succeeded in extracting himself and stopping group.
415. 31 January 2004 – potentially serious incident, solo instructor: instructor working solo had to manage abseil into the gorge by briefing a student to assist others at the bottom of the abseil, which the instructor could not see. The instructor heard students crying out. The last student had lost his footing, and fallen into the water and over a waterfall. He was being held under water by the rope, although the instructor could not see that. The instructor guessed what had happened and let a lot more rope out.

This incident is one of many in which a single instructor was not enough to properly supervise students. In this, and other cases, OPC analysis did not consider instructor ratios.

416. 13 February 2004 – close call, solo instructor: a group entered the gorge travelling downstream with the river level slightly above the cut-off of 2 on the gauge. In the course of the trip, one boy was unable to execute the instructions he had been given and was swept under an undercut. This was

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<sup>110</sup> OPC analysis of incident.

close to being a serious incident. The instructor was given a verbal warning for operating outside policy.

417. In the course of the incident the instructor had part of the group upstream, part downstream, and a rescue situation in between. Once he entered the current to go downstream he may not have been able to go back to the group members still upstream.
418. 24 February 2005 (i) – potentially serious incident, solo instructor: solo instructor was helping one student onto a ledge. A student who had been told to wait started climbing while the instructor was not looking, and fell 3 m into the base of the waterfall and resurfaced 3m from the base. Instructor dived in to rescue.
419. 2 February 2008 – potentially serious incident. “Inexperienced instructor” (OPC analysis), working solo with a group, had a student swept away in the Howe Rapid (the rapid which later caused JS particular problems, named after the girl who drowned in 1978). Attempt to use a throw rope to rescue the student swept furthest downstream failed when the student did not grab the rope. Instructor had to contend with the main group, two students caught on a rock and afraid to move, and the student swept further downstream.

④. Mangatepopo Gorge - Upstream Gorge.  
 Girl swept down thru ~~the~~<sup>low</sup> rapid. High flow, not  
 coloured, Facial injuries.  
 Causes - <sup>Leader</sup> Inadequate training/experience  
 - Participant and inadequate supervision.  
 - Water.  
 Recommendation - Divers right of rapid with staff.

**Figure 25. OPC response to Mangatepopo incident 2 Feb 2008**

420. Analysis of the above incidents reveals the following contributory themes:
- Inexperienced instructor
  - Solo instructor
  - Insufficient knowledge of environment
  - Involved flooding / high water flow
  - Non-confident swimmers.
421. These issues were not adequately dealt with by previous amendments to safety procedures in the Gorge (see section B).

422. Analysis of other close call/potentially serious incidents reveals the same themes.<sup>111</sup>

### **Failure to properly consider the risk of death**

423. Fatal incidents are normally so infrequent in outdoor education that it is not meaningful to speak of a fatality rate. Unless an organization conducts hundreds of thousands of participant days, has an unusually high risk of a fatal incident, or has had unusually bad luck, any fatal incident is likely to be a first fatal incident for that organization. Review of incidents therefore normally focuses more on the incident itself, and how it might have been prevented, rather than on the rate of fatal (or near-fatal) incidents.
424. Specifically, accidental deaths in Australia for teenagers occur at 23 per 100 000 per year, or about 1 in 1.6 million person days. The figure for NZ is likely to be broadly comparable. On those figures, if OPC achieved its stated aim of a level of risk no greater than that experienced in everyday life Figure 26, then OPC would expect less than one death every 40 years<sup>112</sup>. Taking into account OPC provides a supervised, known environment, and that many deaths of teenagers in everyday life would involve drugs, alcohol, motor vehicles, and lack of supervision, the number would be more like 1 death in 100 years. Aside from the 15 April incident, it would be reasonable to expect that OPC had had no previous deaths or close calls, or at least no more than one or two.

A level of risk as perceived by the participant is essential to achieving our mission. Real risk is inherent in any activity where people enter the outdoor environment. The key question is "How much real risk is acceptable for our programs?"

OPC has the following guiding principle to help establish acceptable levels of real risk:

- People - the level of real risk that any person is exposed to (whether staff or student) should be no greater than that experienced in every day life

It should be read from this that acceptable levels of risk are low. Instructors are to operate conservatively within their range of skills. If an activity is an adventure for an instructor it will most probably involve too much risk for their students. These principles are interpreted throughout this handbook and more fully within Appendix 1 - the Instructor Handbook.

### **Figure 26 OPC statement of acceptable risk**

425. In fact, prior to the Mangatepopo incident of April 15, there were clear indications that the risk of accidental death at OPC has been greater than the risk of accidental deaths for an adolescent in everyday life for much of its history.

<sup>111</sup> Refer Appendix 5: Other close call / potentially serious incidents with common elements to 15 April incident.

<sup>112</sup> OPC offers less than 40 000 person days of activities per year. The average over its entire history would be more like 20 000 person days per year.

426. OPC had not only previously had a death, on the same AC program, about the same section of river which held up JS's group as they tried to exit the gorge (the Howe Rapid), but had also recorded in its accident records three other deaths and at least seven close calls:<sup>113</sup>
- April 1 2007 - skills course, kayaker pinned underwater – close call (not a teenager)
  - Feb 24 2005 - 3 m fall Mangatepopo – close call
  - Feb 15 2004 - student swept under undercut Mangatepopo – close call
  - July 9 2004 - 40 m fall Red Crater – close call
  - April 3 2000 - 9 m fall (broken femur) – close call (Polytechnic course)
  - May 26 1993 - student slid 120 m – close call
  - July 22 1991 - 2 deaths (avalanche, adults)
  - April 29 1986 - student somersaulted 50 m – close call
  - June 11 1985 – 1 death (fall)
  - 1977 - 1 death Mangatepopo
427. Fatal incidents and close-calls alone were greater than OPC's guiding principles (Figure 26) would indicate.
428. Other incidents (particularly those involving moving water) described situations with potential for death. These are more difficult to define categorically, however there can be little doubt that even prior to the 15 April tragedy OPC operated in environments in which the risk of death is considerably greater than the risk of death for a teenager in everyday life.
429. This finding is significant, because it provides a strong indication that some causes of the 15 April incident were neither recent developments nor limited to the Mangatepopo Gorge activity.

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<sup>113</sup> Any one of the close calls might have led to a fatality.

## Section H: Root causes

430. Where the immediate causal factors influence the outcome just prior to the incident, the underlying causes influence the behaviour, or lead to the unsafe conditions that directly lead to the incident. Root causes further underlie these. The Review Team has not examined the question of who might carry any responsibility for the identified root causes.
431. The Review Team considered whether the 15 April incident was caused by factors unique to the day, unique to gorging, and recent, or whether there were factors that extended across the AC program activities and/or OPC's other activities and which had been present for some time.
432. By definition root causes associated with gorging would have to have manifested themselves on other gorge trips; any associated with water environments on other water days; any associated with hazardous environments generally would have to be evident on non-water days, such as mountain days. Root causes that had been present over time might be expected to have manifested themselves over time. The Review Team therefore had to consider if and how causal factors present on 15 April were present on other occasions and in other locations.

### Inadequate design and development of the AC programme

433. Each of the elements present in the 15 April tragedy can be found in previous incidents at OPC. Much of what the Review Team have identified as causal in the April 15<sup>th</sup> incident has been documented previously by OPC staff, in some instances quite recently. The occurrence of potentially serious incidents in the Mangatepopo Gorge (and elsewhere) has been a relatively consistent characteristic of the AC program over its entire history.
434. The Review Team are of the view that the AC program contains elements in which there is a risk of death well above the risk of death for a teenager in everyday life, particularly around steep ground and moving water. The program does not meet the standard of acceptable risk OPC describes in the QMS.
435. The Review Team noted a comment on an OPC review of an incident in which a student became hypothermic referring to a "fine line between adventure and misadventure". There is indeed a fine line between adventure and misadventure for adult adventurers who choose to test their limits in a hazardous environment, such as the Mangatepopo Gorge. For school children on an outdoor education camp there should be a considerable margin between what they are doing and an elevated risk of death. All of the educational aims espoused by OPC can be achieved in relatively safe environments. There is a clear distinction between outdoor education with



school children, and skills instruction in outdoor recreation with adults, which OPC has not properly delineated, although it might not be alone in that.<sup>114</sup>

436. BS, one of the longest service OPC staff members described the AC programme as unchanged for 40 years. Of course there had been incremental changes – she meant the essence of the programme was unchanged. OPC does not appear to have had an effective way to review the overall shape and direction of the AC course, in light of the risk factors which had been identified. The AC course seems to have been treated as given.
437. The AC model is particularly vulnerable to deficiencies in staff skill or experience, as it has instructional staff, for the most part, conducting an entire program alone. An alternative is to have specialist staff run activities in higher risk environments. On the day of the Mangatepopo tragedy OPC did have staff who would have been better suited than JS to be working in a gorge environment.

#### **Failure to maintain staff with sufficient instructing experience, or to provide sufficient supervision**

438. As an Instructor with less than 1 year total instructing experience<sup>115</sup> JS was inexperienced, yet she was required to work by herself with clients (and without supervision or support) in a hazardous environment. This did not appear to be particularly unusual.
439. Concerns regarding experience levels of instructing staff were raised in safety audits carried out during 1996 and 2000<sup>116</sup> - where they were specifically linked to possible future fatalities (Figure 27).

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<sup>114</sup> The NZ “Outdoors Mark” purports to be modelled in the AALA system in the UK – but the UK system is specifically and exclusively for outdoor activities with young people. The published material on the NZ Outdoors Mark does not appear to acknowledge a distinction between outdoor activities with minors and adult volunteers.

<sup>115</sup> From “OPC Personnel April 15”.

<sup>116</sup> OSI Safety Audits, 1996 & 2000.

**Experience of current staff**

The staff are skilled in the activities they are required to undertake, with many of them actively working toward outdoor qualifications. Clear definition of the tasks required of them is in place although a few of those interviewed were not fully understanding of what these requirements were.

Only a very few of the staff have extensive experience in outdoor education and pursuit experience<sup>4</sup>. Those that do are tied into management roles. The experience of staff in the field is reasonably light averaging only 4 years.

OPC Trust must consider ways to ensure that the margins of safety required in staff, in terms of the skills, experience and knowledge of are not compromised. The current margins for error appear very tight, and reasonably common place scenarios such as staff becoming sick or unable to participate in running activities at short notice puts pressure on the ability of the OPC to continue running with optimal margins of safety. The use of contract staff has gone a long way toward relieving this pressure to manage foreseeable shortfalls.

In considering the recommendations of OSI the fundamental question OPC Trust needs to ask is

*'is the level of risk the OPC Trust places on students balanced by the rewards to be gained from the challenge activities OPC programmes create'.*

Should any thing ever call this into question the OPC Trust must be able to justify this stance to the participants, their parents and to the authorities and to the general public.

It must be stressed that the possibility of injury and fatality will never be reduced to zero.

**Figure 27 Extract from OSI Audit 2000**

440. A comparison of staff experience levels suggests that while there were more staff with six years plus experience in April 2008 than in 2000, there were also twice as many inexperienced staff (with two years or less experience). Thus although average experience levels have been retained, when the more experienced staff are occupied with tertiary and skills level training there are fewer staff with adequate experience to support/monitor the inexperienced staff working with Adventure Challenge groups.<sup>117</sup>

**Deficiencies in system of identifying & managing hazards**

441. Many of the contributory factors and underlying causes that contributed to the incident were the result of inadequate hazard identification and management.
442. The hazard management system did not adequately identify (among other things):
- appropriate participant medical requirements/physical limitations for the upstream gorge trip
  - specific environmental hazards associated with the trip

<sup>117</sup> Data obtained from "staff employed by OPC on 15 April 2008", RT information request; and OSI Safety Audits.

- the appropriate skills required of an instructor (including the skills that were required once an emergency situation arose)
  - any activity, or environment, specific training required
  - the critical importance of weather conditions and effects in the gorge.
443. The hazard management system used failed at both management and delivery levels.
444. At a management level, the system used for hazard identification, assessment and control should identify elements for each programme/activity such as staff training and supervision needs, contingency measures and emergency procedures.
445. Instructors should be involved in the process of hazard identification for each activity and location, so as to develop a clear understanding of specific environmental hazards. This should ensure that instructors have no doubt as to what actions/behaviours are required to keep their students safe.

### **Lessons from past incidents lost due to staff turnover**

446. All of the elements of the 15 April tragedy were foreseeable. Indeed, parallels could be struck between each of the contributing causes of the 15 April incident and some earlier incidents on OPC files.
447. The knowledge that might have prevented the tragedy on 15 April that could have been learnt from past incidents was dispersed as staff left the organization. The strategy of passing on lessons after each incident, and recording some consequential changes to SOPs, RAMs, or elsewhere, was defeated by high staff turnover.
448. Because of high staff turnover:
- 448.1 Lessons passed on in discussions individuals or instructions to the whole group would have had a half-life of less than a year due to staff turnover, as the individuals who benefited from those discussion left the organization.
- 448.2 The effectiveness of changes to operating systems or procedures was very likely diminished in proportion to the reasons for the changes being collectively forgotten.
449. High turnover can also create problems through:
- Difficulties creating a strong safety culture within an organisation.
  - A focus on constant recruitment and induction of new staff, resulting in existing staff getting less support from management

- More experienced staff being continually involved in inducting and supporting new staff.
  - Staff being 'fast tracked' into responsibilities they may not be ready for.
  - Re-cycling of common 'issues' - that keep being addressed and then re-arising.<sup>118</sup>
450. As a result the organisation gains little return from its training investment, and wastes resources. The longer that staff stay the more value they are to the organisation. High turnover organisations require more robust systems of induction, staff supervision, operating procedures, staff and safety communication, and incident, accident and emergency procedures.
451. There can be little doubt that OPC has been beset by high staff turnover for many years:
- High staff turnover was universally acknowledged by all senior staff interviewed<sup>119</sup>, and it was suggested that turnover rates have increased in recent years: "staff contracts have changed over the last five years, from two years to one and a half years"<sup>120</sup>, and staff "only being retained two to three years"<sup>121</sup>.
  - The accident register records the names of the entire staff for certain years, and names individuals associated with each incident, and it too evidences high turnover.
  - It was put to the Review Team that in recent years turnover of instructional staff reached almost 100%.
  - The records of the safety and management committee meetings frequently contain reference to staffing difficulties eg "Discussion of staff turnover and effect...", "Senior Staff leaving is an issue...", "high staff turnover and contractors ⇒ high expense".
  - The resources which OPC clearly puts into staff induction and initial training are testament to high staff turnover.
  - The QMS refers to "continual staff turnover"<sup>122</sup> as one reason why an otherwise desirable team-based approach to operations was found not to be sustainable.

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<sup>118</sup> Quality at OPC – Staff Association Discussion Document.

<sup>119</sup> The CEO was an exception, in that he stated that he did not regard the turnover as necessarily a problem.

<sup>120</sup> Interview, Andre R.

<sup>121</sup> Interview Matt B.

<sup>122</sup> From QMS.

- In March 2003, a submission from the staff association focused on ways to address high staff turnover. It noted that OPC has “significant staff turnover” and that new staff “are not fully aware of the history of why some things are done the way they are”.<sup>123</sup>
452. The potential problems of staff turnover and lack of experienced staff were clearly signalled in the Safety Audit Report prepared by the Outdoor Safety Institute in June 2000.
453. The safety audit prepared in 2003 by Outer Ring Consulting also referred to high staff turnover as a fact, although it did not signal concerns about safety implications.
454. This audit noted (point 21) that OPC had employed more experienced staff after the previous audit, which postulated that less experienced staff on site were balanced by those who are more experienced. However, the Review Team has already noted that the system of individual instructors running a whole AC program rendered the presence of experienced staff elsewhere almost irrelevant the deployment of an instructor who was less experienced at particular activity or environment. The mere presence of experienced staff elsewhere does not balance the inexperience of another staff person.
455. The UK’s Adventure Activity Licensing Authority provides a measure of turnover, and identifies that ideally “most current activity leaders have been actively involved with the organisation on a year-round basis for over two years.”<sup>124</sup>
456. As at 15 April, 39% of OPC instructing staff had been employed on a year round basis for over two years, while 30% had been at OPC for less than one year.
457. The practice of deploying individual instructors to work largely alone on an entire AC program made OPC particularly vulnerable to high staff turnover, and therefore, inevitably, staff with limited local knowledge, who lacked knowledge of past incidents, and who could not be fully integrated into a safety culture.
458. The Review Team did not investigate the reasons why OPC has suffered high staff turnover.

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The new model was successful in fostering understanding across the departments and some wonderful projects were achieved in the various groups. However it became difficult to sustain the structure because of practical issues around induction and buy-in because of continual staff turnover and the issue of energy levels, to use the scheduled Friday afternoon time slot effectively, being often low after a busy week.

<sup>123</sup> Staff Association submission, March 10 2003.

*open to interpretation. I.e OPC has a significant staff turnover, which means that quite often new staff are not fully aware of the history of why some things are done the way they are.*

<sup>124</sup> Adventure Activity Licensing Authority – Self Assessment and Guidance Pack.

### **Impact of financial pressure, and consequentially production pressure on OPC operation**

459. The Review Team confined its enquiries to aspects of OPC's operation specifically linked to the Mangatepopo tragedy. It did not, therefore, undertake a detailed survey of OPC finances, staff perception of financial pressure, and any consequential production pressure.
460. Perception of financial pressure may well be significant, because it can serve to constrain what staff see as possible or feasible. Deploying two staff, not one, with groups on all trips involving steep ground or moving water, for example, would clearly be costly. In an environment in which funds were scarce staff might not even suggest such a thing.
461. Production pressure would be a likely explanation for completing an induction process as quickly as possible, and to "find a way" to keep operating when obstacles appeared.<sup>125</sup> These were elements of the 15 April incident, and the Review Team found evidence that none were unique to that incident.
462. In its inquiries into the tragedy the Review Team encountered clear signs that OPC operated under very tight financial constraints. Senior staff confirmed this both during interviews and privately. Indeed, the Trust took some pains to emphasise to the Review Team that its funds were very limited.
463. Production pressure was evident in conflict with staff over deployment for duties on weekends in 2007. It was also evident in correspondence from the then marketing manager in February 2008, in effect placing pressure on the FM to accept bookings even if suitable staff were not available. From a safety perspective, that incident should have resulted in very clear direction to the marketing manager that pressure to accept bookings must not be allowed to override the judgment of field staff about staffing capacity<sup>126</sup>.
464. A number of (current and recent past) OPC staff told the Review Team of their perception of a culture of production. 'Sausage factory' was a phrase used, and was also referred to in recent staff feedback<sup>127</sup>.

#### **Over-reliance on competency-based assessments:**

465. Individual staff knowledge and experience of the particular environment they enter is the first, essential factor in fatal incident prevention in the outdoors.
466. In OPC's case staff were expected to be "all-rounders", which means the question of each staff member's knowledge and experience became a series of questions, about *each* of the potentially hazardous environments they encounter. Even after the incident the Review Team found a reluctance

<sup>125</sup> OPC staff referred to these issues when interviewed by the RT.

<sup>126</sup> Email from Jill Prew 18 February 2009.

<sup>127</sup> OPC Management Meeting Minutes.

among senior OPC staff to fully acknowledge that what mattered in the gorge was not how experienced the staff deployed elsewhere were, nor how experienced the Field Manager was, nor what expertise the instructor in the gorge might have had in other activities and other environments.

467. What mattered was how well the instructor understood the Mangetepopo gorge and its hazards, and how equipped the instructor was to deal with them.
468. OPC has relied on a system of SOPs and competency-based assessments. While competencies – that is skills that can be directly observed in a single performance – are a valid component of “competence”, they cannot be taken as constituting the entirety of competence. “Competencies” must be combined with consideration of experience and knowledge. The competencies for the downstream gorge trip (which were not, in fact, even required for the upstream gorge trip) represent only a sub-set of the knowledge required to ensure all reasonable steps were taken to prevent fatalities in the gorge. Knowledge of the environment and its hazards was neither required nor directly assessed. Knowledge of past incidents was not included.

#### **Over-confidence in OPC’s systems**

469. It is understandable that OPC place great store in its safety credentials. However, the Review Team formed a view that as an organization OPC had become over-confident in its safety systems.
470. OPC’s leadership in safety management seemed to have become less something borne entirely based on a safety record – indeed, the record of close calls and incidents that could have had a fatal outcome suggests the contrary – but more an article of faith that for some reason was not open to question.

## Section I: Emergency Response:

### Comms Log:

471. The Review Team was also required to consider OPC's emergency response on 15/16 April 2008. It is convenient to use the Comms log, taken by BS, as the basis of this issue.
472. The focus of the following account is the Comms Log, taken by BS.
473. At 1605 hours an emergency radio response was received from JS. The call was not clear and was quite broken. It was apparent to those receiving it, however, that she was in difficulty, that she was above the intake, and that she required immediate assistance.
474. As KD left the administration office to give that assistance, BS tried to clarify which radio channels would be used. She said "I'll go radio" (meaning she would be the incident controller). However this was not clarified in the rushed circumstances. She told JD that she would be needed as a scribe.
475. There were two channels available – the OPC Simplex, and the second via an OPC repeater. KP believes that he asked BS to monitor both radio channels. KD and JM raced to the Resource Centre, grabbed throw bags, helmets, and PFDs, before heading down to the river in a vehicle.
476. In so doing KD told Pete Z and Brett Donaldson to obtain wetsuits and gear and to come to the river.
477. KD drove to the river with JM, and the events which occurred immediately thereafter have already been described.
478. At 1605 KP radioed BS to request assistance.
479. At 1617, KP requested kayakers in the water.
480. At 1622, he stated a helicopter needed to undertake a scout of the river, and that two students may be in the river.
481. At 1626, he stated that seven students were swimming, and there was an urgent need for a kayaking team.
482. At 1628, KP stated he had contact with one person swimming (Kish).
483. At 1633, MB stated he was obtaining kayaking gear and was proceeding down to the ford with Belinda.
484. At 1635, KP recorded he had recovered Kish, and suggested obtaining Garth Ogden, a rafting guide.
485. At 1644, JM reported that seven students had floated past the ford.



486. At 1645, KP requested a helicopter for a quick run of the river. The rescue chopper from Taupo was unable to get through, but subsequently the Taumarunui chopper did arrive, but was unable to give constructive assistance.
487. MB and BM, after assessing the river decided it was unsafe for kayakers. KP confirmed that was an appropriate call.
488. At 1645, KP radioed that the river was too big for kayakers, and that a stop was required.
489. At 1648, Wellington Comms, of Police, were briefed.
490. At 1653, MB pulled a person from the water upstream of the ford, true left, and Belinda reported this.
491. At 1700, National Park Police (Conrad Smith) arrived at OPC administration.
492. At approx 1700, PZ and MB traversed the river by tyrolean, and proceeded upstream to a person they had seen – Sarah. PZ carried on to establish contact with JS, and MB returned to look after Sarah Brooks. He later assisted JS, and two students (Peter and Ashley) back down true left, and ultimately across the river by tyrolean.
493. At 1705 and thereafter, attempts were made to contact GD and other members of Trust. The Chair was briefed at 1725 and GD at 1804.
494. At 1709, Kish was returned to the base, with the assistance of Chris Whitehouse.
495. At 1710, Conrad Smith assumed a coordination function, with BS and JD maintaining communications. By this time, additional staff had returned to OPC, and were despatched by BS (refer her Police statement).
496. At 1722, JM recovered a deceased student.
497. At 1723, the helicopter arrived, and subsequently undertook a run up and down the river, with nothing seen (by 1754).
498. At 1803, an ambulance arrived.
499. At 1806, three bodies were secured.
500. At 1900 hours and onwards, SAR and extra Police arrived, with multiple staff involved in river search operations.
501. It is apparent from the statements taken by the Police that a considerable volume of detail will be presented to the Coroner's Court as regards the

emergency response, from this time onwards, and the adequacy of responses made by third party agencies will be able to be assessed by that Court.

**OPC emergency response plan and crisis management plan:**

502. The OPC emergency response plan provides a critical decision and action sheet for person first receiving emergency call, which describes the way in which critical decision making roles are to be allocated.
503. At one stage during the incident, BS stated that she would check that everything was being done according to the emergency management plan. She was unable, initially, to locate it, but, she said, key steps were able to be undertaken because of the experience of herself, JD and Jill Prew; and also because an emergency response scenario had been rehearsed two years previously.
504. The crisis management plan describes the management roles which need to be undertaken which included:
- Overall coordination – director, JM.
  - Incident controller – field manager, KP.
  - Continue ongoing operations and support – operations manager, BS.
  - Log taker: BS, with assistance from Jill Dalton.
  - Public inquiries – JP.
505. Although the plan provides, in appendices, guidance for some particular events (fire, serious earthquake, volcanic event, chemical or industrial accident, storm force wind and cyclone and electrical storms) there is no appendix for a gorge incident.

**Assessment of emergency response:**

506. Although the following comments may be made as regards the emergency response, the Review Team does not consider that any different approach to the emergency response would have resulted in the saving of any lives which were lost on 15 April; this is because it appears the deaths occurred within a comparatively short period of time, and by approximately 16:20. The main points which can be made, however, are:
- 506.1 Once Pete Z established verbal contact with JS on the intake structure, the main source of information from her was verbal. Radio contact was not used, JS' radio having been handed to Ashley. It is clear that she was completely focused and occupied with establishing whether there were any further persons to come down the river, whom she would be ready to assist.

506.2 There was some confusion as which radio channels to use. Some were using the Simplex channel, and BM had to relay information which she obtained via the Simplex channel to BS on the Duplex channel. This was potentially clumsy and inefficient.

506.3 KP, in the circumstances, took appropriate steps. He:

- Ensured both radio channels were being monitored.
- Requested assistance at an early point.
- Called for kayakers, but when it was apparent they could not enter the river, he endorsed the decision that they not be used.
- Considered other options, including a possible need for a helicopter stop, and a rafting guide, neither of which could given the state of the weather/river be used. There is evidence of some staff taking independent steps – such as PZ deciding independently to cross the river by tyrolean and proceed up the opposite bank.

## Section J: Recommendations

507. Before setting out the Review Team's recommendations, it makes two preliminary comments:

507.1 The Review Team's analysis of the incident on 15 April 2008 has led it to conclude that there are significant underlying and root cause factors which have implications not only for trips in the Mangatepopo Gorge, but for other hazardous activities undertaken by students under the AC programme. The Review Team was not requested to analyse other activities which might be operated by OPC, but the factors identified by the Review Team will have equal application throughout OPC's operations.

507.2 The Review Team is mindful that the lessons learned from this incident might well apply across the industry. It is aware that there is a great deal of interest in this report, and it hopes the Trust will see fit to share the conclusions herein fully.

### Fundamental recommendations:

508. That the Trustees consider the implications of the Review Team's comments on the causes arising from the incident on 15 April 2008, with regard to all its activities.

509. That the Trustees instigate a major review of the AC programme:

- To be driven by educational aims rather than simply varying the "original" programme.
- To incorporate a substantial margin of safety against the risk of death or serious injury.

510. That the Trustees review OPC's approach to safety, in particular:

- The systems used for hazard identification, assessment and control.
- Giving the highest priority to prevention of fatal accidents and serious harm incidents.

511. That where a substantial margin of safety in a programme cannot be funded direct that the programme be not offered.

512. That the Trustees obtain outside assistance when implementing recommendations.

**Operational recommendations:*****Parental disclosure:***

513. That OPC revises the information provided to parents to ensure that parents are able to make an informed judgment about their child's participation.

***Student swimming:***

514. That OPC develops clearer guidelines for assessing swimming ability, swimming confidence, and what options are available once those assessments have been made.

***Hazard analysis and management:***

515. That as a matter of urgency, RAMS forms for all environments are reviewed to ensure:
- 515.1 The highest priority and prominence is given to fatality prevention as a separate analysis,
  - 515.2 RAMS include accident history.
  - 515.3 RAMS include a map, including known hazards and evacuation/rescue routes or locations.
  - 515.4 Staff knowledge of RAMS content for the activities that they take is tested.

***Weather Information:***

516. That OPC ensures staff can obtain up to date weather forecasts and warnings whenever practicable.
517. That OPC develops SOPS for potentially hazardous weather with school groups that clearly mandate a precautionary approach.

***Staffing policies for programmes:***

518. That the Trustees urgently review the method of deploying staff with school groups to ensure that individuals deployed for environments with particular hazards have sufficient knowledge and experience of that environment, irrespective of how much experience they might have in different environments. This may result in no longer deploying a single instructor with a group for a whole AC course.
519. That solo instructors are not deployed on moving water or on steep ground with school groups.

***Staff induction, training and turnover:***

- 520. That for inexperienced staff, the induction process be extended from three weeks to three months, with formal mentoring and instruction throughout.
- 521. That further periods of induction be included during the first twelve months of employment, to ensure that learning is incremental, and that induction covers all seasons and seasonal activities.
- 522. That OPC uses learning's from previous accidents as a substantial component of staff training and induction.
- 523. That an understanding of fatality prevention for particular locations and environments is included in induction and tested.
- 524. That the Trustees review OPC's approach to establishing staff competence by giving more weight to a candidate's knowledge and experience, than to observable competencies; and include assessment of:
  - 524.1 Knowledge of previous incidents.
  - 524.2 Logged experience in the particular environment.
- 525. That OPC monitor and reward the accrual by instructing staff of personal outdoor experience and local knowledge.
- 526. That the Trustees develop a staff model to reduce staff turnover substantially.

***Incident Analysis:***

- 527. That OPC ensure that any analysis of a potentially serious incident includes consideration of safety systems.

***Emergency Response:***

- 528. That emergency responses be prepared for each specific location.
- 529. That OPC devise effective measures to ensure instructors understand and know emergency responses for each location.
- 530. That there be a review of the emergency response plan, so that:
  - 530.1 There is an emergency plan checklist for the first responder (as distinct from the incident controller).
  - 530.2 Survivors are interviewed as soon as possible after (and if appropriate during an incident).

**Appendix 1: Mangatepopo River on 12 July 2008; photos taken from and around intake structure**











## Appendix 2 : Review of weather forecasts

1. NZ short forecasts: The first NZ short forecast which related to Tuesday, 15 April 2008, was issued at 13:20 on Monday, 14 April 2008. It predicted rain, with some heavy falls and isolated thunderstorms for Northland to Wanganui, Coromandel Peninsula, Bay of Plenty and the Central High Country. It was updated on several occasions thereafter on 14 April and early 15 April. The 04:21 forecast for 15 April stated:

*“Northland to Wanganui, also Coromandel Peninsula: Occasional showers. Isolated thunderstorms about Northland and Taranaki at first but possible elsewhere from afternoon. Bay of Plenty, Gisborne north of Tolaga Bay and the central high country: Rain, with some heavy falls and isolated thunderstorms. The rain easing in the west late afternoon or evening.”*

2. “Heavy falls and thunderstorms” were first mentioned in relation to the central high country area in the forecast issued at 10:55 on 14 April 2008. The forecast issued at 04:21 on 15 April 2008 had the same entry.
3. The possibility of heavy falls of rain and scattered thunderstorms for the central plateau was mentioned in the NZ short forecast at 07:21 on 15 April. By 11:03 this forecast applied to Taupo and Taumarunui.
4. North Island regional forecasts: By 11:00 on 14 April, the regional forecast for Taupo with regard to the next day referred to “rain, with heavy and possible thundery falls, especially during the afternoon and evening ...”; similarly for Taumarunui. The 04:51 RNZ regional forecast (broadcast on National Radio) stated in respect of Bay of Plenty, Rotorua, Taupo and northern Gisborne, “rain with heavy falls, easing in the west this evening ...”; and for Taranaki, Taumarunui, Taihape and Wanganui, “occasional showers with isolated thunderstorms, easing for a time late morning ...”. At 11:07 the North Island regional forecast for Taupo and Taumarunui referred to “rain, with some heavy and thundery falls, rain easing to showers overnight”; and for Taumarunui “... rain, with some heavy falls and isolated thunderstorms”.
5. Brief mountain forecasts: the RNZ mountain forecast, issued at 12:32 on 14 April, stated in respect of the North Island:

*“Rain north of Ruahine Range spreading everywhere by evening. Some heavy falls, possibly with thunderstorms, and poor visibility are likely about Egmont and Tongariro National Parks this evening and during Tuesday ...”*

6. Tongariro alpine forecasts: The MetService website mountain forecast at 04:28 on 15 April stated in respect of the North Island:

*“Occasional rain with some heavy falls and poor visibility, especially north of the Ruahine Range. Isolated thunderstorms about Egmont National Park, and possibly Tongariro National Park from this afternoon ...”*

7. The Alpine Regional Tongariro forecast for 14 April, 11:40 stated in respect of the following day:

*“Rain about the northern slopes, with some heavy and possible thundery falls during the afternoon and evening. Cloudy elsewhere with scattered rain.”*

8. A similar forecast for the next day was issued at 13:30 on 14 April.

9. At 01:18 on 15 April, this forecast stated for Tuesday:

*“Rain with isolated and poor visibility at times. Rain easing to showers tonight ...”*

10. At 06:36 on 15 April, this forecast provided for Tuesday:

*“Periods of rain with isolated thunderstorms and heavy falls. Poor visibility at times ...”*

11. Metfax forecasts: OPC received one Metfax product daily, at about 06:45.

12. The Review Team has copies of these for 10, 11, 14, 15 and 16 April. It does not have them for 12 and 13 April; and understands that neither OPC nor MetService are able to provide them (although MetService can reconstruct the content, as is described below).

13. The Metfax for 11 April 2008 (06:15) stated in respect of the following Tuesday:

*“Cloud increasing. Northeasterlies developing, strong about high ground later. Freezing level about 3000 metres.”*

14. The Metfax for 14 April 2008 (06:15) stated in respect of the following day:

*“Often cloudy, with outbreaks of rain. Northerly winds, 70 km/h about the top, turning northwest and easing to 40 km/h at all levels. Freezing level above 3000 metres.”*

15. The MetService advises that the Metfax products are generated by compiling electronically different components of information such as forecasts and maps. Although the analysis chart for the Metfax sent to OPC on 15 April 2008 is still available, the products for the preceding days are not. However, archived data was able to be used to recreate the analysis charts.
16. Forecasters update the three main components of Metfax being extended outlooks for Tongariro, the Alpine regional Tongariro forecasts and any new analysis charts separately.
17. The words “thunderstorms” was omitted after the word “isolated” from the Tongariro Alpine forecast of 01:18. It was updated again and filed at 06:36 on Tuesday, 15 April with the new text as above. It included mention of both “thunderstorms” and “heavy falls”.
18. This updated forecast was not included in the Metfax product sent to OPC at about 06:45. This was because the Metfax system is updated hourly at 15 minutes past the hour – although the updated forecast was available on the MetService website, and via other means including Metfax after about 07:15.
19. Because OPC subscribed to one Metfax per day, which was sent at 06:45, OPC did not receive the updated product.
20. Severe weather outlooks: MetService produces daily severe weather outlooks which provide information of potential severe weather that may arise somewhere in the country on days 3-6 (counting “today” as day 1). It also produces severe convection/thunderstorm outlooks which provide information on likely thunderstorms or severe convection events through to midnight of the following day.
21. Severe weather outlooks and severe convection/thunderstorm outlooks are produced for the whole of New Zealand and indicate areas considered likely to be affected within the period covered.
22. Severe weather outlooks are issued daily at approximately 14:00. A severe convection/thunderstorm outlook is issued daily at approximately 09:00 for the period up to midnight of the same day. By about 11:00 a further two charts covering midnight to noon, and noon to midnight of the following day are issued. These three charts are kept under review and further updated if necessary during the afternoon.
23. Severe outlooks and severe convection/thunderstorm outlooks are freely available on the MetService website, and to both casual users and subscribers.
24. Severe weather watches, severe weather warnings and severe thunderstorm watches were issued as follows:

- Severe weather warnings were issued on 14 April 2008 for a variety of areas that did not include the Taupo/Central North Island.
- A severe weather warning was issued at 08:29 on 15 April for the Taranaki, Taumarunui, Waitomo, Waikato, Taupo, Coromandel Peninsula, Bay of Plenty and Gisborne areas. It stated:

*“The front is preceded by a humid northerly flow bringing widespread rain and scattered thunderstorms to the northern half of the North Island. Heavy, thundery falls are expected in parts of Waikato down to inland Taranaki and Taupo today, with 60 to 80 mm. likely through to late afternoon. Rainfall rates could even reach 30 to 40 mm. per hour in localised thundery downpours.”*

The same warning included a “heavy rain warning” for parts of Waikato down to inland Taranaki and Taupo (including Waitomo and Taumarunui).

- A severe thunderstorm watch was issued at 09:49 on 15 April for the Northland, Auckland, Great Barrier Island, Coromandel Peninsula, Waikato, Waitomo, Taumarunui, Bay of Plenty, Rotorua and Taupo areas. It stated:

*“A front currently lying over Northland and down to North Taranaki this morning has embedded thunderstorms in the rain band. Over Northland, radar currently indicates some very high rainfall rates with these storms. Scattered severe thunderstorms are expected over Northland this morning and then develop in Auckland, Waikato, Waitomo, Taumarunui, Taupo and northeast to Western Bay of Plenty this afternoon and ease this evening. Rainfall rates up to 40mm per hour possible in some of these thunderstorms. Such thunderstorms can cause flash flooding and slips.”*

- A further severe thunderstorm watch was issued at 11:37 on 15 April. The watch affected regions including Taupo, and stated:

*“A front currently lying over Northland and down to North Taranaki this morning has embedded thunderstorms in the rain band. Over Northland, radar continues to indicate some very high rainfall rates within thunderstorms from about the Bay of Islands southwards. Over the last couple of hours, rainfall reports in Northland, Auckland and Waikato confirm the radar rates with two reports of 40mm per hr and one of 55mm/hr.*

*Scattered severe thunderstorms with similar rainfall rates over these areas are expected to spread into Western Bay of Plenty this afternoon while clearing from Northland.*

*Such high rainfall rates can cause flash flooding and slips.”*

25. Rain radar facility: This provides imagery of rain radar at one hourly intervals for the previous six hours. RADAR stands for radio detection and ranging. A weather radar transmits pulsed beams of microwaves and listens for their echoes from precipitation. A detailed description of this facility appears on the MetService website. Because the radar facility was, as at 15 April 2008, based on four weather radars in New Zealand, and the Tongariro region was at the intersection of two of them, the facility may not have been as useful at that time as it is now, an additional rain radar in Taranaki having become operational on 20 May 2008. However, even as at 15 April 2008, it was possible by reason of the hourly rain radar images to observe any significant changes; the rain radar for 15 April 2008 has been reviewed and the approach from the northwest of rain of heavy intensity during the morning of 15 April 2008 is very apparent.

## Appendix 3 : Print media forecasts

### 1. Print media forecasts indicate:

- 1.1. Sunday Star Times, 13 April 2008: For Tuesday 15 April, in respect of Tongariro National Park:

*“Rain with strong northerlies. Freezing level above 3000 metres.”*

- 1.2. Dominion Post on 14 April, for the following day, in respect of Tongariro National Park:

*“Often cloudy, with outbreaks of rain. Northerly winds, 70 km/h about the top, turning northwest and easing to 40 km/h at all levels. Freezing level above 3000 metres.”*

- 1.3. New Zealand Herald: on 14 April 2008, for Tongariro National Park:

*“Cloud thickening, and outbreaks of rain developing in the afternoon, mainly on northern slopes”*

On 15 April 2008, for Tongariro National Park:

*“Rain about the northern slopes, with some heavy and possibly thundery showers falling during the afternoon and evening. Cloudy elsewhere, with scattered rain ...”*

- 1.4. There was a banner headline on the front page of the Herald on Monday 14 April, and a story referring to rain and strong winds which had hit Northland the previous day; the story stated that this was caused by a tropical trough expected to “... hang over the North Island for much of this week.” It also stated:

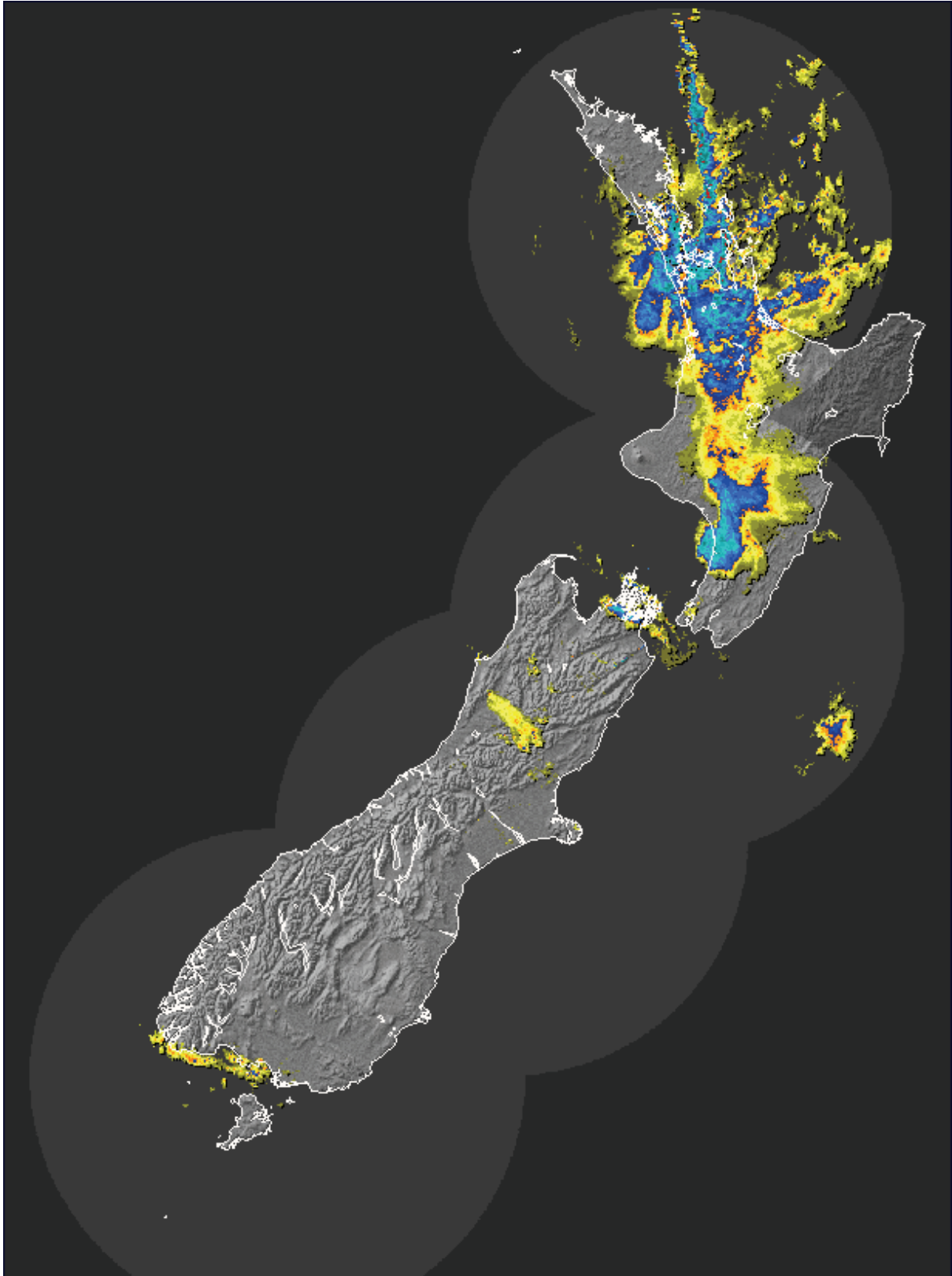
*“The trough, originating near Lord Howe Island, northwest of New Zealand, is expected to bring up to 100 mm of rain a day in some places.*

*“Falls of 15 mm to 25 mm an hour are expected. Northland was last night on heavy rain watch, as the forecast rain was likely to be enough to cause flooding in some areas. Coromandel and the Bay of Plenty were likely to be upgraded to a heavy rain warning – meaning more than 100 mm of rain were expected over a 24 hour period.”*



#### Appendix 4: Rain Radar 13:29 hours, 15 April 2008

The Central North Island area is at the extent of both radar ranges. On this image there is accordingly a gap in the (probable) band of intense rainfall.



## Appendix 5: Other close call / potentially serious incidents with common elements to 15 April incident

1. The Review Team was not contracted to conduct a full study of the OPC accident record, however, the team did review every documented accident, in order to throw some light on any underlying potential for a serious incident in the Mangatepopo Gorge. It considered some incidents from many years ago in order to gain an understanding of any changes that might have taken place over time, but concentrated particularly on the period since 1990 over which the current safety systems have been developed.
2. The Review Team has not listed all relevant incidents, particularly those from many years ago. Where there is a close call this should be treated as a fatal incident, “lessons learned” perspective.
3. The Tongariro Crossing incident 9 July 2004: close call, a student fell 40 metres. The instructor had to choose between staying with the group, or leaving the group with an intern and climbing down to the victim. The instructor was unfamiliar with the route, and not aware of an alternative route.
4. In previous incidents a student had slid 120 m on 26 May 1993 (close call), and a student slid to his death on 11 June 1985. In the 1993 incident the solo instructor had to send a student to obtain assistance.

OPC systems by this stage were well developed, but failed to prevent a serious incident in an AC group led by an inexperienced instructor.

5. 15 January 1980 – close call, river rose rapidly during crossing: group attempting to rejoin main party when river rose rapidly as they crossed was swept away. One student carried 600 m. Solo instructor.

However, there were strong indications that a pattern of accepting a high level of risk was present from the early days of the program.

6. 8 August 1991 – potentially serious incident, solo instructor: solo instructor struggled to manage 3 capsizes in open water with an off-shore wind and strong tail-race current. Noted that winter gear makes poor swimmers.
7. 26 May 1995 – close call, 120m slide: solo inexperienced<sup>128</sup> instructor with inadequate knowledge, skill, and group management procedures (OPC analysis), under time pressure, icy conditions. Student slipped, lost ice-axe, slid 120 m.
8. 16 March 1998 – potentially serious incident: an “inexperienced instructor” (according to OPC incident analysis) tied canoes together after an incident in which a canoe had been blow offshore into open water, and the solo instructor

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<sup>128</sup> Required to check in with “longer term staff members” after the incident.

had to leave the group to chase the craft in difficulty, which he then towed back. The instructor was verbally warned about acting outside policy.

9. 29 April 1998 – potentially serious incident, insufficient local knowledge, solo instructor: instructor with insufficient local knowledge pushed an AC group to get back to OPC to meet a deadline. A student slipped and fell “about 15m”, include going over a steep bank. OPC noted 6 previous incidents, and recorded “contract not renewed”.
10. 12 January 1998 – weather checks inadequate, employment discontinued: serious incident, sea-kayaking, details not on file. Employment of instructor discontinued (unclear if the instructor was dismissed, or contract not renewed, or resigned).
11. 7 July 1998 – weather forecast checks inadequate: sea kayaking equipment was lost – fax machine was not working, and group failed to use a transistor radio to check the weather.
12. 22 July 1998 – potentially serious incident, inexperienced solo instructor, high water flow: an “instructor inexperienced in river crossing decisions” attempted to take a group cross the Whanganui River at high flow. A student attempted to cross back while the solo instructor’s back was turned. Swept away, pendulumed to safety using throw rope. Next four students unable to cross, so instructor had to dive in and swim across in order to pendulum the group in. OPC analysis noted “unfamiliar terrain to instructor” as a causal factor.
13. 11 November 1999 – potentially serious incident, solo instructor: a student was dropped a canoe being portaged and was dragged into canal by the rope attaching him to the canoe. Solo instructor was out of sight below a weir.
14. 2 March 2000 – close call, instructor supervising two groups at once: close call. Instructor supervising 3 groups (pairs) of polytech students at once. (Another instructor was supervising a second group of 4 students). A student fell 9 m, seriously injured while out of sight of instructor. OPC review recognised that “OPC may need to nominate the number of groups of students that can be safely supervised in this form of activity rather than the number of students”.
15. 17 October 2000 – potentially serious incident, high flow, entrapments: tube rafting on the first day of an AC course. Water day was designated, and torrents were taken. River at 34 cumecs. Raft wrapped on a branch. One girl trapped with her boots caught between two tubes. A second student was also entangled. Group split with four sitting in the tree and five clinging to the raft and drifting downstream. A second instructor (intern?) allowed the group to be split, with the instructor taking the five the rest of the way down the river.
16. February 2002 – potentially serious incident, river rose rapidly, solo instructor: tube rafting on the Tongariro River. River rose dramatically while the group was on the river. Instructor did not notice, eddy that was expected to allow exit instead had a strong turbulent recirculation. Nine students,

paddles, raft, and instructor washed in circles. One student in an ill-fitting life jacket became very distressed.

17. 21 May 2003 – close call, solo instructor, flooded stream: instructor, “caught up in the competition” of the Hillary challenge took a group across a flooded stream that entailed grabbing a branch and entering the current, which would then swing the person to the other bank. The first girl to attempt the crossing was swept away, and rescued by the instructor, who stated there was “one shot” at rescue, otherwise likely death. Weather conditions had been entirely expected.
18. 16 June 2003 – potentially serious incident, FM absent, high flow, inexperienced solo instructor: instructor could not find a senior manager to ask for advice after overnight rain and Tongariro Flow @ 24 cumecs.
 

“Rob on FM didn’t have a clue. Bev could only suggest flat water session on Lake O. I asked Mark Lewis about options and he suggested single tube trip and Neil suggested trip from Mangatepopo Bridge to Dangerous Bridge. I was little wary not having done a family. trip but Neil said he’d never done one and it was fine if managed properly”
19. The instructor, working solo, having left instructions with the group to follow her down one by one was knocked off her tube by an unexpected bridge and swept down a rapid. The first student floated down beside her as she tried to exit the water. Instructor had students in different eddies, student (and parent) left up the top (on the other side) and an injured student to deal with. Was not able to call of the plan for the group to follow her down until the last two.
20. 23 February 2004 – a very non-confident swimmer (1 on a scale of 1 to 5) was buddied with a confident swimmer and kept close to the instructor. As in the April 15 incident, the “group had been working really well together”. The student became hysterical and refused to continue. The group bush-bashed out.
21. 8 March 2005 – solo instructor, moving water: close call when a student fell off a tube raft and was pinned on a tree branch that was under the water. Solo instructor had to get the raft to the bottom of the rapid and run back upstream to affect a rescue.