THE CLOCK-WORK LAHAR

Examining issues management in a New Zealand public service context

Mark Dittmer

2008

The Clockwork Lahar:

Examining issues management in a
New Zealand public service context

A thesis presented in partial fulfilment of the requirements for the degree of Masters of Management in Communication Management at Massey University, Palmerston North, New Zealand.

David Mark Dittmer
2008

Abstract

Issues management has been practised over the past 30 years. However, the literature has focused on how corporations manage issues, while public service organisations have been ignored. This study looked at the issues management of a tephra dam-break lahar from 1996-2007 on Mount Ruapehu, New Zealand by a group of public service organisations. 19 interviews were conducted with people involved with the management of the 'lahar issue' to find out how the issue was managed. Further a content analysis of 309 articles from five newspapers, spanning the full eleven year period, was conducted to examine the salience (attention) given to the issue, the frames commonly used to present the issue and the sources who 'drove' the issue.

The data from the content analysis was interpreted to create a five-stage lifecycle of the 'lahar issue'. Further, data from the interviews was compared with a summary process of the issue management process. This comparison showed that five issues management process stages were employed to manage the 'lahar issue' although they were not referred to as such.

Initially, the Department of Conservation consulted stakeholders during the development of options to deal with the lahar (1996-1999). Later in the lahar's management, lahar stakeholders fell into two categories: internal - those involved with the mitigation and response - and external - the public. Internal stakeholders were communicated with through meetings and email. External stakeholders were communicated with through local media, presentations and meetings.

Overall, it was concluded that media gave substantial attention to the lahar issue over the eleven year period. Some of those involved with managing the 'lahar issue' were able to identify the phases of media coverage. Further, this study identified ten frames that media employed when reporting the lahar. The most-frequently used frames were those focusing on the response (lahar response), describing the lahar (diagnosing causes of problem(s)) and discussing the potential impacts from a lahar (definition of problem(s)). Department of Conservation Scientist, Dr Harry Keys, was shown to be a

primary definer – an influential source. The results suggest he defined coverage because of his status as both an official source, due to the organisation he was associated with, and also as an authoritative source due to his role as a scientist. Further, he was regularly drawn upon as a source over the entire period of the ‘lahar issue’ coverage.

Acknowledgements

Writing a thesis is like running a marathon. And no marathon runner can do what they do without support.

Listed on this page are the names of the people who helped make the Clockwork Lahar happen and to who I owe a big "thank you" for their help…

Thank you to my supervisors, **Associate Professor Margie Comrie** and **Dr Heather Kavan**, for their guidance and feedback.

To my interviewees for their generosity with their time and information. They all deserve to be named here…

- **Shane Bayley (Horizons)**
- **Harry Broad (Department of Conservation)**
- **Herb Christophers (Department of Conservation)**
- **Mike Craig (Police)**
- **Johan Cullis (Ruapehu District Council)**
- **Barbara Dempsey (formerly of Ruapehu District Council)**
- **Roland Devine (Opus)**
- **Paul Green (Department of Conservation)**
- **Harry Keys (Department of Conservation)**
- **Murray Marshall (Ontrack)**
- **John Norton (formerly of Civil Defence)**
- **Annie Pedersen (Ruapehu District Council)**
- **Brad Scott (Geological Nuclear Sciences)**
- **Brian Sheppard (Department of Conservation)**
- **Doug Tucker (Genesis)**
- **Dave Wakelin (Department of Conservation)**
- **Grant Webby (Opus)**
- **Paul Wheatcroft (Ruapehu District Council)**
- **Dave White (Police)**

Special thanks to **Herb Christophers**, **Harry Keys** and **Murray Marshall** for the use of their photos.

Thank you to all the librarians who assisted me at various stages of my research. In particular, **Anne Hall** and **Jane Leighton** of Massey University's Document Supply Service whose help saved me time and money. Also, **the librarians at the National Library in Wellington**, who were helpful and patient.

Thank you to **Senate Communications Counsel** for the research grant that assisted in the completion of this study.

Thanks to **Hugh Treadwell** and **Jim (James) Mason** for their interest in this study.

Thanks also to **Nigel Lowe** of Massey University's Department of Communication, Journalism and Marketing for the whiz-bang gadgets.

Thanks you my sister, **Alison**, for the transcribing help. And thank you to **Cheryl McKay** for proofreading.

Thank you **Mum, Dad** and **Nana** for all the little things you did to help out.

And last, but not least, a big thank you to **Luke Anderson** for the company on the Turangi research expedition, content analysis verification, proof reading every chapter and for cheering me on when things were tough.

Table of contents

Figures

Tables

Abbreviations

CIMS	Co-ordinated Incident Management System
DOC	Department of Conservation
EOC	Emergency Operation Centre
ERLAWS	Eastern Ruapehu Lahar Warning System
ICP	Incident Control Point
MCDEM	Ministry of Civil Defence and Emergency Management
RAL	Ruapehu Alpine Lifts
RDC	Ruapehu District Council
SRLPG	Southern Ruapehu Lahar Planning Group
TDC	Taupo District Council

Key Terms

Bund	A rock embankment, built on the flank of Ruapehu during summer 2001/2002. It was designed to prevent a lahar from spilling into the Tongariro River catchment, which flows into Lake Taupo.
Lahar	A mixture of rock, ash and other volcanic debris. Their consistency has been compared to flowing concrete. Lahar's can occur in a variety of situations, but the key ingredient is water.
Tangiwai 1953	The fifth-worst disaster in New Zealand's history. On 24 December 1953, 151 people died when a passenger train bound for Auckland went into the flooded Whangaehu River at Tangiwai after a lahar washed out the rail bridge.
Tephra	A term that describes the products of volcanic eruptions: ash, rock and other material.

Chapter 1:
Introduction

1.1 Introduction

Issues management has been practised for the past 30 years. For today's public relations practitioners, managing issues is a key skill (Peart, 2005). Organisations have realised the value of issues management and some have departments dedicated to managing issues. Most of the literature on issues management has been written from a corporate perspective. This is because issues management was developed primarily for corporate use (Heath, 1997). Examples in the literature have focused on how private companies manage issues (e.g. Arrington & Sawaya, 1984; Gaunt & Ollenburger, 1995; Pursey P. M. A. R. Heugens, 2002; Lauzen & Dozier, 1994; Oomens & van den Bosch, 1999; Plowman, ReVelle, Meirovich, Pien, Stemple, Sheng, & Fay, 1995; Pratt, 2001; Stout, 1990; Taylor, Vasquez, & Doorley, 2003; Thomsen, 1995). However, public service organisations appear to have been overlooked. Public service organisations also face issues. However, public service organisations have different mandates to private companies. The question is, "how do public service organisations conduct issues management?"

1.2 Researching issues management

Gaunt and Ollenburger say that issues management is "a valuable tool for professionals engaged in public affairs and other areas of public relations" (1995, p. 199). However, they say, it has not received the recognition and use it deserves because "examples of successful issues management tend to remain invisible". Further, Wartick & Heugens (2003) suggest that research conducted on how issues are managed legitimises issues management practise.

Another feature of the issues management literature is that New Zealand on the topic is still in the early stages of development. Currently, issues management has been the

focus of two journal articles (Roper & Toledano, 2005; Weaver & Motion, 2002) and a book primarily concerned with crisis management (Galloway & Kwansah-Aidoo, 2005b), which contains three chapters regarding issues management (Comrie, 2005; Galloway & Kwansah-Aidoo, 2005a; Peart, 2005). Wilson (1990) believes that for research into issues management to legitimise its practise requires research into local issues situations. The potential is for more New Zealand issues management research.

1.3 The 'lahar issue'

From 1996-2007, the issue of a dam-break lahar on Mt Ruapehu was discovered, debated, planned-for and resolved. Mt Ruapehu is situated on the Central Plateau of the North Island of New Zealand (see Figure 2) and is one of three active volcanoes that make up Tongariro National Park. Tongariro is one of the world's oldest national parks and is also a World Heritage Park (Keys & Green, 2002). The Department of Conservation (DOC), a central government agency, is responsible for the park's management under the supervision of the Minister of Conservation. Ruapehu District Council is responsible for Civil Defence within its boundaries, which include Mt Ruapehu. Lahars – volcanic mudflows - are a common occurrence on Mt Ruapehu (Keys, 2007). When they occur, they pose a danger to people and infrastructure, including a number of bridges.

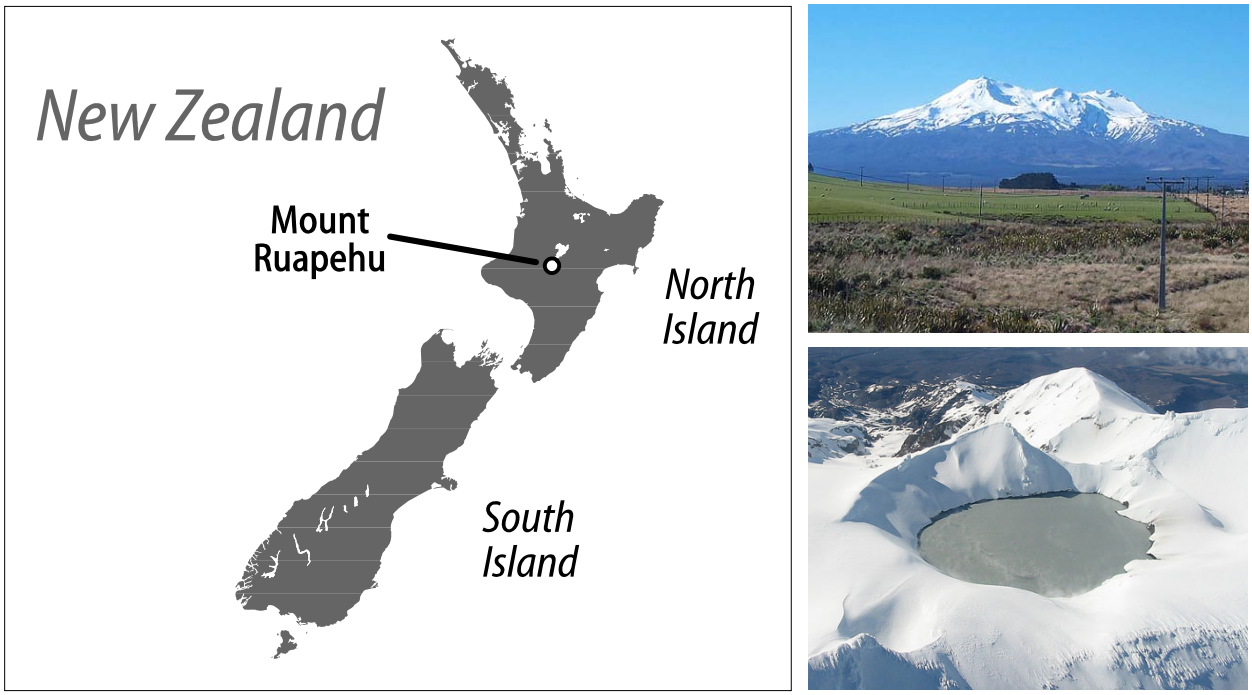
1995 and 1996 saw a series of eruptions on Mt Ruapehu. The debris from the eruptions – referred to as 'tephra' – formed a dam over the outlet to the mountain's Crater Lake. In April 1996, DOC revealed the potential for a dam-break lahar. A year later, in June 1997, the 'lahar issue' was confirmed with the release of a report. The next 11 years saw public service organisations work together to manage the issue of the lahar. After 11 years of waiting, at 11.30 am on March 18, 2007, the lahar flowed down the Whangaehu River that flows down the southern side of Mt Ruapehu. Following a period of heavy rain, water from the Crater Lake broke through the tephra dam. Figure 1 shows the tephra dam as it was before and after the lahar took place. Media reports said the lahar had gone 'like clockwork'. Congratulations were offered by the Ministers of Conservation and Civil Defence for the management of an event that had seen 11 years of planning. It is the management of the 'lahar issue' over those 11 years that is the focus of this thesis.

FIGURE 1:
Mt Ruapehu, New Zealand
Crater Lake Tephra Dam:
Before and After

2 February 2007
PHOTO: HARRY KEYS

23 March 2007
PHOTO: HARRY KEYS

Figure 2: Mount Ruapehu



PHOTOS: HERB CHRISTOPHERS

Left: New Zealand Map displaying Mount Ruapehu's location
Top Right: Mount Ruapehu, April 2000
Right: Mount Ruapehu's Crater Lake looking south, April 2000)

1.4 Research strategy

The lahar provides an example of an issue that was successfully managed by public service organisations in a New Zealand context. This research aims to study how the public service organisations involved communicated about the issue of a dam-break lahar on Mt Ruapehu. The 'lahar issue' has two dimensions: (1) how the issue was managed and (2) how the issue evolved. To examine these two areas, this study used two methodologies: interviews with 19 people involved with planning and responding to the lahar and a content analysis of media coverage of the lahar issue spanning from June 1996 to June 2007. Content analysis has been frequently used for analysing news media coverage (Krippendorff, 2004). Further, the data from content analysises have been used to discuss issue lifecycles (e.g. Durant, Bauer, & Gaskell, 1998; Reynolds, 1997; Trumbo, 1996). Interviews were used to provide insights into the management of the 'lahar issue'.

Many tools have evolved to aid the management of issues. This research draws on two tools that have developed to assist the issues managers. The first tool is issues

management process models, which provide a method for managing issues. The second is the issue lifecycle, which predicts the ways in which issues evolve. This research applies these two tools to data from the interviews and content analysis to give insight into how the lahar issue was managed and how it evolved.

1.4.1 Triangulation

Triangulation refers to studies which combine methods to strengthen the results of the study. Therefore, what triangulation does is provide "several perspectives on the same phenomenon" (Jensen, 2002, p. 272). Patton (2002) identified four basic types of triangulation:

> *(1) data triangulation* – the use of a variety of data sources in a study, for example, interviewing people in different status positions or with different points of view; (2) *investigator triangulation* – the use of several different evaluators or social scientists; (3) *theory triangulation* – the use of multiple perspectives to interpret a single set of data; and (4) *methodological triangulation* – the use of multiple methods to study a single problem or program, such as interviews, observations, questionnaires, and documents (Denzin, 1978 in Patton, 1987, p. 60 original emphasis)

This study used data triangulation by interviewing people from a range of organisations and roles to give a variety of perspectives on the lahar's management. Also, methodological triangulation was used. Jensen (2002) suggests that mixing methodologies can enhance a study's validity. Further, Weber (1985) thought that the best content analysis studies used both quantitative and qualitative methods. This research combined a quantitative method - content analysis - with a qualitative method – interviews - to examine how the 'lahar issue' evolved in the media. The results of the content analysis (Chapter 5) are compared in Chapter 7 with the results of the interviews (Chapter 6).

1.5 Research questions

The overall question guiding this research asks how public service organisations communicated about the issue of a dam-break lahar on Mt Ruapehu. The interviews attempt to answer these questions:

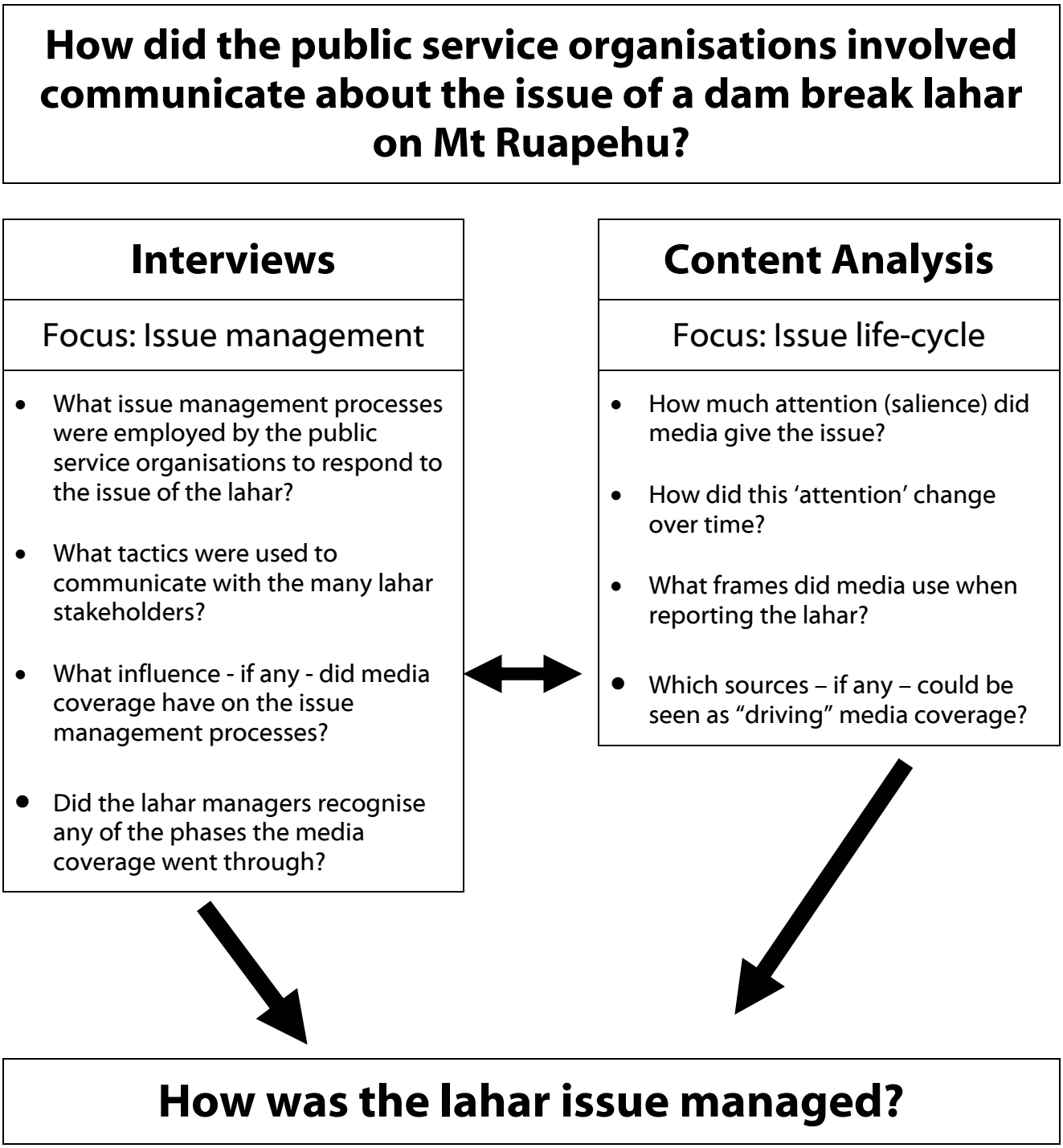
- What process was used to manage the issue of the lahar?
- What tactics were used to communicate with the many lahar stakeholders?
- What influence - if any - did media coverage have on the lahar's management?
- Did the lahar managers recognise any of the phases the media coverage went though?

The content analysis attempts to answer these questions:

- How much attention (salience) did media give the issue?
- How did this 'attention' change over time?
- What frames did media use when reporting the lahar and its management?
- Which sources – if any – could be seen as "driving" media coverage?

Together, these questions provide an answer to the question, how was the lahar issue managed? Further, this research has two objectives: first, to explore how the lahar management process developed over time and, second, to assess how the lahar management aligned with models of issues management. Figure 3 shows how the research questions link with the methodologies and, further, how the methodologies fit together.

Figure 3: Research questions and methodologies



Research Objectives:

1. To explore how the lahar management process developed over time.
2. To assess how the lahar management aligned with models of issues management.

1.6 Explaining the 'Clockwork Lahar'

The title of this thesis is fitting for two reasons. First, it represents the general perception of the lahar managers of how the management went. Second, 'clockwork' conjures up images of multiple parts working together. This is also an accurate description of how the lahar's management worked: multiple organisations working together to ensure the lahar came off 'like clockwork'.

1.7 Thesis Structure

Chapter One, has given a brief overview of the current potential for issues management research into public service organisations in a New Zealand context. Further, it has presented the research questions this study attempts to answer and the associated methodologies. Chapter Two provides the historical background for this thesis. It looks at what lahars are and gives an overview of the key events in the lahar's management including the 1953 Tangiwai Disaster. Chapter Three contains the theoretical background for this study. It begins by examining previous research into the lahar. The chapter then divides into two parts. The first part looks at what issues are and then introduces the concept of issues management and discusses its origins. It then looks at six theoretical perspectives that have emerged on issues management followed by issues management process models and the introduction of the issues lifecycle. The second part of this chapter looks at the three elements of media coverage examined by the content analysis: salience, framing and sources. Chapter Four looks at the two methodologies used for this study. The first part of the chapter looks at how content analysis was used, including how salience, framing and sources were examined. The second part of this chapter looks at how the interviews were used in this research including how the research questions were devised and interviewees selected. Chapter Five covers the results of the content analysis under three sections: (1) salience, (2) framing and (3) sources. Chapter Six presents the results of the interview to give an overview of the lahar's management. Chapter Seven discusses the results of both the content analysis and interviews. It begins with an examination of the lahar issue lifecycle. It then discusses salience, framing and sources. The lahar's management is then compared with a framework summarised from issues management process models. The chapter then concludes with two sections. The first looks at the tactics used to deal

with the many lahar stakeholders. The second discusses the effect media coverage had on the management of the ‘lahar issue’. Finally, Chapter Eight draws together the conclusions from this study and suggests areas for future research.

Chapter 2:
Background - Lahar History

This chapter provides the historical background to this thesis. In order to be able to properly understand and interpret the lahar's management, it is crucial to first have knowledge both of the events that occurred between 1996 and 2007, but also the events of 1953 and earlier. This chapter also examines what a lahar is and why they are dangerous. It then gives an overview of the lahar's management from 1995 to 2007, pieced together from media coverage and other reports from that period.

2.1 Lahars

Lahars are volcanic mudflows. More precisely, a lahar is "a rapidly flowing mixture of rock debris, sand, silt and water" (Neall, Houghton, Cronin, Donoghue, Hodgson, Johnston, Lecointre, & Mitchell, 2001, p. 15). While this definition refers to a lahar's makeup, it does not mention the many scenarios in which lahars can occur. The key ingredient in a lahar is water (Houghton, Neall, & Johnston, 1996; Neall et al., 2001). There are five primary causes of lahars at Mt Ruapehu (see Table 1).

Table 1: Common causes of lahars on Mt Ruapehu

1.	**Tephra / dam-break**	Volcanic debris from an eruption block the outlet of the Crater Lake. The water in the lake fills behind this dam until it breaks, releasing a lahar.
2.	**Volcanic eruptions**	During volcanic eruptions water from the Crater Lake is thrown out of the crater and onto the volcano's slopes. It then mixes with snow, forming a lahar.
3.	**Rain**	Rain mixes with deposits of ash left on the mountain from eruptions, forming lahars.
4.	**Snow and ice**	As above, snow and ice melt, forming lahars.
5.	**Falling debris in the crater lake**	Rock falls in the crater lake have been known to cause eruptions. These may be caused by steam eruptions.

(summarised from Lecointre, Hodgson, Neall, & Cronin, 2004; Neall et al., 2001)

The first type is the tephra or ‘dam-break’ lahar. This was the type of lahar that took place on 18 March 2007. It was caused by a break in a tephra dam that covered the crater lake’s natural outlet. The dam formed during eruptions in 1995 and 1996. Water in the Crater Lake subsequently rose behind the dam, until, after a period of heavy rain, it broke.

The second type is the eruption lahar. Hot water is blasted out of the Crater Lake and onto the flanks of the mountain during a volcanic eruption. This water mixes with snow, forming a lahar. Volcanic lahars typically carry ash and other debris thrown out of the crater. As these lahars flow down the mountain, they increase in size as they pick up more snow and rock (Houghton et al., 1996). This type of lahar took place during the 1995/1996 eruptions (Cronin, Hodgson, Neall, Palmer, & Lecointre, 1997).
Dam-break and volcanic lahars are the most-widely known types of lahar. The other three scenarios are less well-known. The third type is caused by heavy rain mixing with deposits of ash (Houghton et al., 1996; Neall et al., 2001). The fourth scenario is caused by melting snow and ice, which itself can occur during a variety of scenarios. The fifth lahar scenario, collapsing rocks, potentially caused by steam eruptions, have been known to generate lahars.

2.1.1 Lahar danger

Lahars have many dangerous qualities. First, lahars can arrive without warning: Neall et al. say “lahars may be initiated in minutes, giving little warning of their impending arrival” (2001, p. 16). A feature that makes lahars dangerous is their unusual mobility. Lahars on Mt Ruapehu have been observed at speeds between 10 and 90 kilometres an hour (ibid). Further, lahars can easily carry large, heavy objects due to their density and speed (ibid). The consistency of lahars has been compared to “flowing concrete” (Neall et al., 2001, p. 15). For anyone caught up in a lahar, the prospects are grim. As Galley, Paton, Johnston and Becker say: “Anyone caught in the path of a lahar is unlikely to survive” (2003, p. 1).

2.1.2 Lahars on Mt Ruapehu

The first record of a dam break lahar on Mt Ruapehu dates back to 1859 (Stewart, 2003). Dam break lahars have also taken place in 1925 and 1953 (Stewart, 2003). In 1969, 1975, 1995, 1996 and 2007, lahars have flowed through Mount Ruapehu's ski-fields (Galley et al., 2003; Leonard, Johnston, & Paton, 2004; Neall et al., 2001). These lahars caused damage to buildings, bridges and hydro-electric power generation equipment (Williams, 1996). The 1995/1996 eruptions saw a total of 36 lahars flow down the Whangaehu Valley – more than the total number of lahars for the previous century (Houghton et al., 1996). As shown by Table 2, eruptive lahars have been the most-common type of lahar on Ruapehu. However, the dam-break lahars, in particular the one that occurred in 1953, referred to as 'Tangiwai', have received the most attention.

Table 2: Lahars on Mount Ruapehu 1861 2007

Year	Month	Date (Multiple lahars in brackets)	Cause
1861	February	13	Ice and debris avalanche
1889	May	1	Eruption
1895	March	10	Eruption
1925	January	22	Eruption
	February	3	Unknown*
1953	December	24 (Tangiwai)	Collapse of ice and tephra dam
1966	July	24	Eruption
1968	April	26	Eruption
1969	June	22	Eruption
1971	May	8, 16 (2), 19, 21	Eruption
	July	3, 4	Eruption
1975	April	24	Eruption
1977	November	2	Eruption
1988	December	8	Eruption

1995	September	18, 20, 23, 24 (4), 25 (5), 26 (3), 27 (3), 29 (3)	Eruption
	October	6, 7 (2), 11 (2), 18, 19, 20, 28, 29, 30	Eruption
	November	1, 25	Eruption
	December	17	Eruption
1996	June – September	Specific dates unknown**	Eruption
2007	March	18	Tephra dam collapse
	September	29	Eruption

* Lahar's cause unavailable
** Specific lahar dates unavailable

SOURCE: (Cronin et al., 1997; Smithsonian Institution, 2008)

2.2 The lahar: An overview

The following section gives an overview of the events in the lahar's management from 1995-2007. A timeline of these events can be found in Appendix A.

2.2.1 Tangiwai 1953

At 8.00 pm on the night of December 24, 1953, a breach in a glacier obstructing the outlet to Mt Ruapehu's Crater Lake sent two million cubic litres of water sweeping down the Whangaehu River. Sometime between 10.10 and 10.15 pm, the lahar washed under the rail bridge at Tangiwai, north of Waioru, sweeping away one concrete pillar and weakening others. At 10.21 pm, Ka949 - the Wellington-to-Auckland Express - travelled onto the weakened bridge, which collapsed sending the train and six of its carriages into the swollen river. 151 of the 285 passengers died (Stewart, 2003). Only 113 bodies were recovered (Conly & Stewart, 1986). Testimony to the lahar's power was the fact that most of the bodies were recovered naked as the lahar waters had ripped off their clothes. Of those who died, some drowned while others died of head injuries, but the majority of deaths were the result of asphyxiation from the silt-laden water (for a comprehensive overview of the events and aftermath of Tangiwai 1953, see Stewart, 2003).

Figure 4: The scene at Tangiwai the morning after

SOURCE: Stewart, 2003, page 3.

Appropriately perhaps, Tangiwai translates as ‘weeping waters’ in Maori (Boon, 1999). At that time, Tangiwai was the eighth-worst train disaster in the world, a dubious achievement for a small nation. Today, it is still New Zealand’s fifth-worst disaster (see Table 3). Perhaps, for this reason, over five decades later, Tangiwai still resonates with many New Zealanders. On that night there was no warning system in place to prevent the disaster. A board of enquiry later found that the tragedy was caused solely by the force of the lahar destroying the bridge. However, it has since been suggested that the rail bridge’s piers had been weakened by a previous lahar in 1925 (Stewart, 2003). Questions have also been raised about whether the disaster was preventable as the New Zealand Geological Survey Department had been alerted to the potential for a lahar by two mountaineers, Lewis Vause and Jim Mason, prior to 1953 (Stewart, 2003).

Table 3: New Zealand's top 10 worst disasters

1	1874	*Cospatrick* shipwreck	470 deaths
2	1979	Mount Erebus air crash	257 deaths
3	1931	Hawke's Bay earthquake	256 deaths
4	1863	*HMS Orpheus* shipwreck	189 deaths
5	**1953**	**Tangiwai railway accident**	**151 deaths**
6	1881	*Tararua* shipwreck	131 deaths
7	1894	Wairarapa shipwreck	121 deaths
8	1886	Tarawera eruption	120 deaths
9	1865	*Fiery Star* shipwreck	79 deaths
10	1909	*Penguin* shipwreck	75 deaths

SOURCE: Collated from Ministry for Culture and Heritage (2008)

2.2.2 1995-1996 – Discovery

In 1995 and 1996, Mt Ruapehu erupted. Houghton, Neall and Johnston, commenting on the public interest in those events, say "the eruptions of Ruapehu captured the imagination of the New Zealand public" (1996, p. 7). What was not realised at that time was that for the next 11 years, New Zealand would again be captivated by Mount Ruapehu, but for another reason. In November 1995, it was found that the eruptions had left a 6-7 metre-high tephra dam over the Crater Lake's outlet (Neall et al., 2001). In 1996, the mountain erupted again, adding yet more tephra. The potential for another dam-break lahar, such as the one that caused the Tangiwai disaster, was real. In April 1996, the Department of Conservation DOC) made the presence of the tephra dam public ("Call for study of Ruapehu crater danger," 1996). So began 11 years of planning, consultation and debate to manage the lahar.

2.2.3 1997-2000 – Consultation and developing options

In June 1997, Hancox, Nairn, Otway, Webby, Perrin, and Keys released a stability assessment of the crater rim. The assessment made for alarming reading. While the study showed it was unlikely the main crater rim would collapse, the new tephra dam caused concern. Because the tephra material was permeable and poorly compacted, it was declared highly likely the dam would collapse when the lake filled behind it, causing a lahar. This collapse, they hypothesised, would take place in three to five years (ibid).

However, the scientists warned that this lahar could be even more dangerous than the one responsible for the Tangiwai disaster. In 1953, the water had to travel through an ice tunnel to exit the lake. This tunnel, they suggested, acted as a throttle, slowing the release of the water from the dam. However, this time there was no ice tunnel, therefore the speed of the flow would be increased, in turn increasing the danger to infrastructure and people lower down the mountain.

The report recommended intervention at the crater rim with a bulldozer to cut through the tephra to create a new outflow. The scientists said that if it was decided a trench would not be excavated, danger zones should be identified and contingency plans developed (ibid). Debate about the bulldozing plan began soon after the report was released ("Bulldozer at crater intrusion, say clubs," 1997; "Ruapehu flood plan in iwi hands," 1997; Samson & Guyan, 1997; J. Saunders & NZPA, 1997). National Party Minister of Conservation, Nick Smith announced that he would emphasise public safety when deciding how to deal with the lahar (English, 1997).

Work began on devising a solution to the lahar. In October 1998, DOC released a draft Assessment of Environmental Effects (AEE) for public consultation (Beattie, 1998). The AEE looked at a number of options for dealing with the lahar. Soon after, local tribe, Ngati Rangi, publicly opposed intervention at the crater rim (NZPA, 1998). In April 1999, the final AEE was released (NZPA, 1999). It recommended that the lahar be left to occur naturally. Further, it suggested the installation of a monitoring system at the Crater Lake and lower down the mountain to warn of an impending lahar (Department of Conservation, 1999).

At this time, the country was approaching a general election. It was decided that all major decisions, including the lahar, would be held over for the next Conservation Minister. In October, Labour won the election and the Alliance Party's Sandra Lee became the new Minister of Conservation.

2.2.4 2000-2002 – Evaluating, debating and implementing options

Lee's first decision regarding the lahar was to request a report into the recommendations contained in the AEE. In May 2000, Lee made the AEE public (New Zealand Government, 2000). She also actioned the installation of a lahar warning system and recommended the installation of a bund (stopbank) to divert the lahar's course (Beston, 2000; Venter, 2000).

In April 2001, the lahar gained attention when it was revealed the Crater Lake had filled over the summer at twice the usual rate (Morgan, 2001; NZPA, 2001g; Rendle, 2001). DOC scientist, Harry Keys, predicted the lahar might happen as soon as 2002 (NZPA, 2001g). Suggestions were made that the lahar might spill into the Tongariro River, decimating fish stocks (NZPA, 2001d). Tranz Rail announced it was willing to share data from its warning system with DOC, for a price (NZPA, 2001c, 2001g; "Ruapehu decision risks lives - Smith," 2001). DOC responded, saying that the warning system was not suitable for its purposes ("Lahar warning system not suitable for DOC," 2001). In May, work began on the design for the new warning system ("Work begins on lahar warning system," 2001).

In June, former Conservation Minister, Nick Smith, made the first in a series of attacks on the Government's plans, suggesting the decision not to intervene resulted from 'political correctness' (New Zealand National Party, 2001). His comments were widely-reported (NZPA, 2001a; "Ruapehu decision risks lives - Smith," 2001; Tracey Watkins, 2001). Sandra Lee responded, branding Smith's comments 'recklessly alarmist' and defending DOC's decision, saying it had consulted with many groups before coming to a decision (New Zealand Government, 2001c; NZPA, 2001b). Soon after, Ruapehu District Council Mayor, Weston Kirton, announced that he too opposed DOC's decision and that a trench should be bulldozed through the crater rim (Birch & Watkins, 2001).

Horizons Regional Council Chairman, Chris Lester, waded into the debate, stating that Horizons would seek protection from liability for the lahar, if a trench was not bulldozed (Wallis, 2001c).

From June-October, the debate about the lahar's management continued intermittently (NZPA, 2001e; "Support for lahar stance," 2001; Wallis, 2001b). The building of a stopbank or 'bund' was discussed to prevent the lahar from flowing into the Tongariro River (Wallis, 2001d). In November, it was announced that a ministerial committee had been set up to work with the Minister of Conservation to coordinate the response (New Zealand Government, 2001a; NZPA, 2001f, 2001h). Later that month, it was announced that DOC had been granted permission to build the bund (Wallis, 2001a, 2001b).

In December, after reviewing the decisions made up until that point, Sandra Lee announced that the warning system and bund were sufficient to deal with the risk posed by the lahar ("Lee happy with plans to lower lahar risks," 2001; New Zealand Government, 2001b; NZPA, 2001a). Horizons Regional Council Chairman, Chris Lester, was "disappointed" by her decision (Campbell & NZPA, 2001, p. 1). Spring/summer, 2001/2002 saw the installation of the lahar warning system and the bund (Adams, 2002; "Bund in place in time for lahar action," 2002; Corry, 2002). It was suggested that the lahar would occur sometime during 2004/2005 (NZPA, 2002b).

In October 2001, the Ministry of Civil Defence and Emergency Management (MCDEM) became involved in the lahar's management. MCDEM Director, John Norton, commissioned a report by UK-based risk management expert, Tony Taig. The report, released internally in October 2002, looked at the options to reduce risk and assessed the effectiveness and reliability of the warning systems being implemented (Taig, 2002). Taig put the risk to human life at 10%. He also found that when the dam failed, it would fail quickly. Further, he suggested, the Crater Lake would reach a high level before the dam failed. Media coverage suggested that the report had found the risk to public life to be higher than first thought (Kavanagh, 2002) and an editorial in the Manawatu Standard called for it to be made public ("Slower filling of crater lake," 2002). In late November, the report was released ("Lahar risk reduced," 2002; New Zealand Government, 2002; NZPA, 2002a).

2.2.5 2002-2004 - Council opposition and implementation of a response system

In December 2002, the Ruapehu District Council rejected the emergency response plan it had developed to respond to the lahar (NZPA, 2002c; "RDC turns down lahar plan," 2002). The council's CEO, Chris Ryan, said the lahar was a national issue and the district council did not have the resources to cope. The first half of 2003 saw the Ruapehu District Council and Horizons lobbying the Government to again consider intervening at the crater rim and also to provide more resources (Brown, 2003b; "Experts are saying it's a matter of 'when' not 'if' with the lahar," 2003; "What does the future hold for the lahar?," 2003). In late May, RDC Mayor, Sue Morris and Horizons Chairman, Chris Lester, met with Conservation Minister, Chris Carter in Wellington. The meeting lasted half-an-hour and the pair's suggestion for intervention was rejected (Brown, 2003a; Sargent, 2003b). Lester later declared that his council would not be to blame for any death resulting from the lahar and that the Government should pay the bill when the lahar finally occurred (Eames, 2003). In September, he sought protection from any lawsuits that might result if anyone was killed (Brown, 2003c). That month, Chris Carter announced that RDC would receive financial support to help with their costs resulting from the lahar ("Lahar gains support," 2003).

In October, a second meeting between Morris, Lester and Carter was cancelled. This angered Morris, who claimed that she and Lester had been "fobbed off" (Pickering, 2003a, p. 3). Carter denied Morris's claims and accused her of "politicking" due to upcoming local body elections in 2004 (ibid, p. 3). Harry Keys also countered Morris's claims, saying that contrary to what Morris believed, the installation of the warning system and bund had reduced the risk to the public ("Scientist not convinced about mayor's comments on dam," 2003). In November, Horizons CEO, Peter Davies, claimed that the 2003-2004 summer was the last chance to use a bulldozer for a "quick, cheap fix" (Myers, 2003, p. 3; NZPA, 2003). Soon after, another meeting was arranged with the two councils ("Lahar meeting rescheduled," 2003). Minister Carter, Civil Defence Minister George Hawkins and local MP, Defence Minister Mark Burton met with Morris and Lester on November 24. The two councils again put forward their view that "doing nothing is not an option" ("Councils air lahar concerns to Govt," 2003, p. 2).

Meanwhile, the lahar's management was progressing. In January 2003, Harry Keys predicted the lahar would take place during 2005 (Brown, 2003d). In April, he announced that surveying and monitoring work had predicted the lahar would be smaller then first thought (Kitchin, 2003; "Take the chance to experience the lahar for yourself," 2003). In late October, Genesis agreed to provide lahar warnings to the Taupo District Council from its sensors located in the Whangaehu River, Waikato Stream and Managatoeteonui River ("Lahar warning," 2003).

24 December 2003 marked the 50th anniversary of the Tangiwai disaster. The disaster received widespread coverage in the lead up to the commemorations ("50 years on... we remember Tangiwai," 2003; Pickering, 2003b; Quirke, 2003; Symes, 2003). The anniversary was commemorated with a ceremony at the disaster site on 21 December. Steam trains from Hamilton and Palmerston North carried people to the site (Sargent, 2003a). Governor General, Dame Silvia Cartwright and Prime Minister, Helen Clark, spoke at the event (Manson, 2003). In the days afterwards, opposition MPs accused the Government of 'putting political correctness ahead of lives' (ACT New Zealand, 2003; Patterson, 2003; Young, 2003). Editorials in the Manawatu Standard (Kitchin, 2003) and NZ Herald (Kitchin, 2003) called on the Government to intervene at the crater.

In March 2004, the water in the Crater Lake reached the first warning level ("First lahar level," 2004). Harry Keys said the lahar was not expected until April 2005 at the earliest (Nash & NZPA, 2004). Half-way through March, Keys released a report saying that the lake was 96% full and had risen to 1.9 metres from the hard rock rim. Further, he said it might be 'anywhere from two weeks to eight months' until the lake reached the rim (Ruscoe, 2004b). Renewed calls from Nick Smith (New Zealand National Party, 2004b) and Chris Lester for the Government to intervene at the crater and also to offer protection from legal liability to the council were rejected by Chris Carter (Brown, 2004; Tracy Watkins, 2004). DOC "lahar issue manager", Brian Sheppard defended the decision not to intervene, saying that it was impossible to eliminate all risk (Andrew, 2004a, p. A4). At the end of March, Keys revised his earlier predictions, saying that the lahar was likely to occur in 2005 (Ruscoe, 2004c).

In April, a decision was made to raise and reinforce the Tangiwai road bridge (Ruscoe, 2004a). In May, the first test of the ERLAWS warning system was declared a success

(Allen, 2004). That month, funding was approved for the bridge work ("Funding approved for Tangiwai bridge," 2004; Transfund, 2004). Nick Smith raised questions about the $4.5 million price tag for raising the bridge when, he claimed, earth-moving work at the crater rim would cost $60,000 (New Zealand National Party, 2004a; Patterson, 2004). In June, the Ruapehu District Council demanded that Government pay for more of the costs of implementing a lahar response plan, saying that by 2006-2007, it would have spent $132,000 ("Govt lahar reply angers council," 2004).

In July, a leaflet was planned to inform the public about the risk from the lahar and the response in place ("Brochure aims to address public concerns about Mt Ruapehu lahar," 2004). A week later, the Government announced it would reimburse the Ruapehu District Council for some of the costs it had incurred developing an emergency response plan (Hopkins, 2004). When the cheque for $64,000 was handed over to the council by Taupo MP, Mark Burton, Nick Smith branded it “guilt money” and accused the Government of “wasting millions of dollars by putting political correctness ahead of public safety” (Andrew, 2004b, p. A2).

In September, the lahar response was tested in full for the first time in an exercise, which saw all the agencies involved enact their roles ("Lahar warning tested," 2004). Chris Carter declared the results of the test “very positive” ("Lahar warning working," 2004, p. 2). In November, Harry Keys said the Crater Lake had not yet reached the bottom of the tephra dam and that he expected the lahar to take place sometime during 2005 (Heffield, 2004a). At the end of the month, it was announced that Police numbers would be boosted from the following February in response to the lahar risk (Tunnah, 2004). In December, in a *Dominion Post* article, Harry Keys stated that a colder summer, brought on by the El Nino weather patterns, could delay the lahar by one or two years (Watson, 2004). Two days later, a *NZ Herald* article, which also quoted Keys, said that the Crater Lake was expected to be 100% full within two to six weeks and the lahar could be expected to take place soon after (NZPA, 2004). On the same day, the *Waikato Times* reported that the upgrade to the Tangiwai road bridge was nearing completion (Heffield, 2004b).

2.2.6 2005-2007 – Waiting for the lahar

January 2005 began with Harry Keys stating that the lake warning level was “low to normal” and that the rate of filling was actually below average for that time of year ("Ruapehu crater lake level 'low to normal'," 2005, p. A9). Half-way through the month, Keys announced that the Crater Lake had reached the tephra dam for the first time, but he did not expect the lahar to take place until 2006 (Watson, 2005a). Lake measurements, taken from the end of January through February, indicated low risk of a lahar ("Checks on lahar risk," 2005; Heffield, 2005a).

In March, the lahar pamphlet was published and made available through police stations, council offices and visitor information centres in the Ruapehu, Taupo, Wanganui and Rangitikei districts ("Lahar pamphlet," 2005). On March 4, Mark Burton reopened the newly strengthened and raised Tangiwai road bridge (Watson, 2005c). Meanwhile, the police emergency response team based in Waiouru to respond to a lahar had been busy issuing tickets on the Desert Road (A. Saunders, 2005). Police Deputy Commissioner, Steve Long, was forced to defend the officers ("Chief defends using lahar patrol on road," 2005) after Nick Smith criticised their use (New Zealand National Party, 2005). In May, the ‘lahar cops’ were stood down after the lahar risk dropped due to cooler temperatures (Heffield, 2005c; Watson, 2005b).

In October 2005, another full lahar response exercise was conducted (Latz, 2005). At the end of the month, the warning alarm was set off when workers were connecting a new battery ("Workers trip lahar alarm," 2005). Another false alert took place in January 2006 when the alarm system was activated by high winds ("Lahar alert," 2006).

In October 2006, a volcanic earthquake triggered a small eruption setting off another false alarm (Patterson & NZPA, 2006; Watson & Williams, 2006). At the end of the month, the Southern Ruapehu Lahar Planning Group held its annual exercise (Patterson & NZPA, 2006). Ruapehu District Council spokesman, Paul Wheatcroft, declared the exercise a success (Ruapehu District Council, 2006; Watson, 2006). In December, as the Crater Lake rose 3.8 metres above the hard rock rim, the alert level was raised to risk level two ("Lahar alert rises," 2006). The probability of a lahar was estimated to be 1-2%, although no lahar was expected at that time ("Lahar alert rises," 2006).

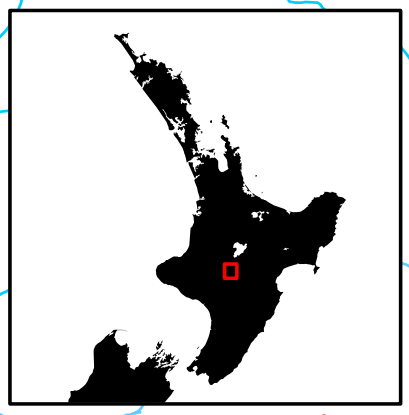
In January 2007, it was announced that the tephra dam had begun to erode (Watt, 2007). Harry Keys announced that a “sizeable lahar” was expected to take place sometime during February or March (Cheng, 2007, p. A5). At that point, the water in the Crater Lake was 2.8 metres below the top of the tephra dam (ibid). A few days later it was announced that water was seeping out of the dam, gradually eroding the tephra (Watson, 2007a). Fresh questions were raised about the lahar’s management. Auckland barrister, James ‘Jim’ Mason (quoted in the stories as ‘David Mason’), said that allowing the lahar to occur naturally amounted to “criminal negligence” (Watson, 2007d, p. A2). Another lawyer, Rob Moodie, suggested that all that was needed to solve the problem was “a bit of Kiwi ingenuity”, “a couple of cockies and Helipro” (ibid, p. A2).

On January 18, Conservation Minister, Chris Carter, Civil Defence Minister, Rick Barker along with Ruapehu District Mayor, Sue Morris, and Civil Defence and Emergency Management Director, John Hamilton, visited the Crater Lake to inspect the dam (Watson, 2007e). On January 24, it was suggested that media reporting about the lahar had been ‘scaring’ tourists away from the Ruapehu region (Watson, 2007b).

On January 27, a text message system was announced. OPTN, in conjunction with the Ruapehu District Council, would provide free emergency texts to alert subscribers to the service when the lahar occurred ("New lahar txts," 2007; Staff Reporters, 2007; Watson, 2007c). On January 29, the warning level was upgraded from two to three as the water reached 1.5 metres below the top of the tephra dam (Rowan & Johnston, 2007).

On February 3, Harry Keys said there was a 30-40% chance of the lahar occurring during the next two months. However, he thought there was a “better chance” that it would take place during the next summer (O'Rourke, 2007b, p. A6). Two weeks later on February 14, the water was still 1.5 metres below the top of the dam (Schouten, 2007). Soon after it was revealed TVNZ and TV3 were competing for the right to install a camera at the crater rim to capture footage of the lahar when it took place (Field, 2007).

FIGURE 5:
Map of Central Plateau, North Island, New Zealand showing lahar flow path and infrastructure



Whakapapa Skifield
TONGARIRO NATIONAL PARK
Crater Lake
NZ Alpine Club Hut
Tukino Skifield
Areas of overflow into Waikato Stream
SH1 Bridge
WAIKATO STREAM
SH1 Culvert
1 ERLAWS Sensor 1
ERLAWS Sensor 2
ERLAWS Sensor 3
2 Footbridge
3 Bund
4
Turoa Skifield
Mt Ruapehu
WHANGAEHU FAN
NATIONAL PARK BOUNDARY
Wahianoa Aquaduct Crossing
Pylons at risk from lahar
5 Ontrack Lahar Warning Tower
Lake Moawhango
WHANGAEHEU RIVER
SH1 - DESERT ROAD
6 Tangiwai Rail Bridge
Pulp Mill
Substation
7 Tangiwai Road Bridge
8
Waiouru
Strachen's Road Bridge
9
Tirorangi Marae Bridge
POWER TRANSMISSION LINE
NORTH

Yellow shows where a lahar might flow.

0 1 2 3 4 5km
SCALE

Bridge or other construction in lahar path
State Highway
Traffic Lights
Railway line
Road
River/Stream

FIGURE 6:

Photos of the lahar flowpath and infrastructure

(corresponds with numbers on map)

1. Tephra Dam / ERLAWS Sensor 1

ERLAWS (Eastern Ruapehu Lahar Warning System) was installed over summer 2001/2002 (Dec/Jan). The system consisted of three warning sensors placed along the lahar's flowpath. The first was located at the crater rim (bottom right in this photo). Reports suggest ERLAWS cost $370,000.

PHOTO: HARRY KEYS

2. ERLAWS Sensor 3

The third ERLAWS sensor was located near the Tukino Skifield. In these photos, Department of Conservation Scientist, Harry Keys, shows journalists the inside of the sensor as part of a media briefing in April 2000.

PHOTOS: HERB CHRISTOPHERS

3. The Bund

The bund (outlined in red) is an embankment constructed to prevent a 'worst-case scenario' lahar flowing into the Waikato Stream. If a lahar had flowed into the stream, which flows into the Tongariro River and then into Lake Taupo, it would have had a devastating effect on wildlife, in particular, trout. The bund's construction took place during summer 2001/2002 (Dec/Jan). The bund is 285 metres long, 4.2 metres high and 20 metres wide and it was designed to blend into the volcanic landscape. Its reported cost was $200,000. When the lahar took place, the bund was "barely touched."

PHOTOS: HERB CHRISTOPHERS

4. Desert Road - Road Barriers, Lights and Signs

Lights, signs and automatic gates were installed on State Highway 1 (Desert Road) to stop traffic if a lahar had flowed over the bund and into the Waikato Stream.

PHOTOS: HERB CHRISTOPHERS

5. Ontrack Lahar Warning Tower

The Ontrack river alarm is 11 kilometres – 30 minutes – upstream from the Tangiwai rail bridge. The pole was installed on the recommendation of the commission of inquiry investigating the Tangiwai disaster. Early versions of the alarm measured the sulphur content of the water. Currently, the pole is fitted with a Doppler Radar, which continuously measures the height of the river.

PHOTO: MURRAY MARSHALL

6. Tangiwai Rail Bridge

The current Tangiwai Rail Bridge was designed to withstand a lahar twice as big as that caused the 1953 disaster. Prior to the lahar in March 2007, debris in the river bed was cleared to ensure it did not block the bridge.

PHOTO: MARK DITTMER

7. Tangiwai Road Bridge

The Tangiwai Road bridge is located 200 metres downstream from the rail bridge. In 2004, it was raised and reinforced to ensure it could survive a lahar. The reported cost of the work was $4.41 million.

PHOTO: HARRY KEYS

8. Tangiwai - Road Barriers, Lights and Signs

Automatic barriers were installed on either side of the Tangiwai Road Bridge. These barriers are linked to the ERLAWS warning system and close automatically if a lahar is detected.

PHOTOS: MARK DITTMER / HERB CHRISTOPHERS

9. Strachen's Road Bridge

It was thought Strachen's Bridge (pronounced 'Strawns') might be swept away when the lahar took place. Even though the bridge was submerged when the lahar took place, it withstood the lahar. As can be seen in this photo, a digger was needed to clear the silt and other debris that was left on the bridge.

PHOTO: HARRY KEYS

2.2.7 March 18, 2007 – The waiting ends

On March 18, the lahar finally occurred. At 11.22 am, after a period of heavy rain, the Crater Lake breached the dam. The lahar reached the Tangiwai road bridge at approximately 1 pm. No one was injured or killed. The only noted property damage was a toilet block at the Tangiwai memorial, which the lahar swept away. Figure 5 and Figure 6 illustrate the lahar's flow path including key infrastructure.

The lahar received front-page coverage from newspapers throughout New Zealand and headed the TV news bulletins on *TV One* and *TV3*. The *Waikato Times* and *Dominion Post* reported "trees and car-sized boulders" were swept down the river (Waikato Times reporters & NZPA, 2007b, p. 1). The *Manawatu Standard* ran a story headlined "Drama, but little danger" (N. Wilson, 2007b).

The lahar's management was said to have gone "like clockwork" (Kiong, 2007, p. A3). Ruapehu District Deputy Mayor, Warren Furner, said the warning system had worked (Nichols, 2007). Chris Carter said he was "delighted with the way things [went]" (New Zealand Government, 2007, n.p.). On March 20, Harry Keys confirmed the tephra dam had been cleared from the crater outlet. He also said it was unlikely that a similar lahar would occur for another 10-30 years (Watson & Torbit, 2007). A few days later, GNS scientist, Vern Manville, said that the lahar had been larger than Tangiwai 1953, but lacked the force as it had carried less debris (O'Rourke, 2007a).

2.3 Conclusion

This chapter has given an overview of the lahar's management from 1995-2007 and in doing so has provided both an overview and context for this study. The following chapter, Chapter 3, examines the academic literature relevant to this study. Some of the events described in this chapter are revisited in Chapter 6 – the results of the interviews with people involved with the lahar's management - and in Chapter 7 – the discussion of the results of the content analysis and interviews.

Chapter 3:
Literature Review

3.1 Introduction

This chapter provides the theoretical grounding for this thesis. The chapter begins with an overview of previous 'lahar issue' research. The chapter then divides into two parts. The focus of the first part is issues management. It begins by looking at how issues have been defined. It then introduces the concept of issues management and discusses its origins. The review then covers the six theoretical perspectives that have emerged on issues management. Public policy development is then briefly discussed along with two areas of communication closely related to issues management: stakeholder communication and risk communication. Issue process models are then introduced and a summary model posed for use in the discussion in Chapter 7. This section ends with the introduction of issue lifecycle models. The second part of this chapter covers the three elements of the media coverage examined in the content analysis in Chapter 5: framing, salience and sources. These are also discussed again in the methodology (Chapter 4) and in the discussion (Chapter 7).

3.2 Other writing about the lahar

This is not the first study to examine the management of the tephra dam break lahar on Mt Ruapehu from 1996-2007. However, it is the first to examine the topic from a communication/media/issues management standpoint. Much of the writing on the lahar's management has focused on the risk response. Galley, Leonard, Johnston, Balm, & Paton (2004) examined the lahar's management from an emergency response perspective. They focused in particular on the development of the lahar Emergency Response Plan (ERP).

DOC Scientist, Harry Keys (2007), wrote an overview of the lahar 'mitigation' a few months prior to the lahar taking place. He examined the lahar's management sequentially, starting with its discovery, before moving on to discussing the risk to the

public, how the risk was assessed, and then looked at the response mechanisms put in place. This article, although written before the lahar took place, was published in the second half of 2007. Keys also co-authored an earlier article with Tongariro Conservator, Paul Green (2002, p. 118) which gave an overview of the "management dilemma" posed by the "Crater Lake issue". The article looks at the lahar's management from DOC's perspective and talks about the Department's responsibilities and related legislation. The final part of the article gives an overview of the actions taken to mitigate the risk, which, at that time, included creating the bund and installing the ERLAWS warning system. Updated versions of this article were published on DOC's website (Keys & Green, 2004). Other perspectives on the lahar's management have been offered by Civil Defence Director, John Norton (2002), who, when he wrote the article (June 2002), had commissioned a report into the risks associated with the lahar. Ruapehu District Council Group Manager of Emergency Management, Barbara Dempsey (2002) wrote about planning for the lahar, which discusses the sections of the Civil Defence Act (1983) that made the council responsible for the lahar. The focus on risk and development of the emergency response in the current writing on the lahar leaves a gap for a communication/issues management perspective on the lahar's management.

3.3 Part 1: Issues management

3.3.1 Defining issues

Issues management centres on the identification and management of issues. Before issues management can be discussed, the term 'issue' must first be understood. Theorists have put forward many definitions of the term 'issue'. Moore (1979, p. 43) defined an 'issue' as a "trend or condition, internal or external, that, if continued, would have a significant effect on how a company is operated over the period of its business plan". He also distinguished between 'strategic issues' – issues which in the business environment "determine how a company does business" - and 'public policy issues' – issues that emerge in the public domain, which require an organisation to "take a stand" (p. 43). Moore notes that the term 'issue' needs to be defined in order to be a useful concept.

Other theorists have also put forward their own 'issue' definitions. Ansoff (1980, p. 133) defined an issue as "a forthcoming development, either inside or outside of the organisation, which is likely to have an important impact on the ability of the enterprise to meet its objectives". Jones and Chase (1979, p. 11) described an issue as an "unsettled matter which is ready for decision". Crable and Vibbert (1985, p. 5) wrote that "an issue is created when one or more human agents attaches significance to a situation or a perceived 'problem'". Culbertson, Jeffers, Stone and Terrell (1993, p. 13) explained an issue as "an ongoing public policy dispute affecting organi[s]ational performance, such as any continuing trend, event, or condition that affects an organi[s]ation". More recently, Heath (2006, p. 81) has suggested that "an emerging public policy issue attracts significant attention to the way an organi[s]ation plans and operates".

Wartick and Mahon (1994) found three major themes in definitions of issues. The first theme they found was *impact* – the idea that an issue will have significant influence over the way an organisation conducts its business. This theme has the three underlying ideas that (a) the issue is organisation-centred, (b) the future is considered important as well as the present and (c) the issue may result in both internal and external changes for the organisation. The second theme they found was *controversy* – the idea that issues arise from conflict between an organisation and one or more of its stakeholder groups. The third theme they found was *expectational gaps* – the idea that issues arise from differences between expectations and reality. Wartick and Mahon point out that according to this third definitional theme, an issue can arise with the involvement of only one entity if that entity experiences tensions with their environment. Further, they suggest that expectation gaps can exist without an issue developing. They summed up their findings by providing their own definition of corporate issues:

> (a) a controversial inconsistency based on one or more expectational gaps (b) involving management perceptions of changing legitimacy and other stakeholder perceptions of changing cost/benefit positions (c) that occur within or between views of what is and/or what ought to be corporate performance or stakeholder perceptions of corporate performance and (d) imply an actual or anticipated resolution that creates significant, identifiable present or future impact on the organi[s]ation (p. 309).

3.3.2 Origins of issues management

Issues management existed for many decades before Chase coined the term. As Heath (1997, p. 1) states: "the term issues management is relatively new, but its practice and study are old". Issues management practices have been acknowledged to have been used as far back as practitioners like Ivy Lee during the early 1900s (Ewing, 1997) and John W. Hill, founding partner of Hill and Knowlton, during the 1960s onwards (Heath & Bowen, 2002). Heath (1997) suggested that issues management developed to help organisations to maintain monopolistic practices. Its roots stem from the 60s, a time which was also marked by a rise in activism and a decrease in public confidence in organisations (Post, Murray, Dickie, & Mahon, 1982). Activists began pressing government for policy and regulation to control the way businesses operated. Organisations needed ways to "define, defend, and champion" the ways they conducted their affairs (Heath, 1997, p. 1). Issues management developed to fulfil these needs. Much writing on issues management focuses on how organisations can use it to influence public policy for their own interests. As Ewing offers this summary of the origins of issues management:

> Issues management grew out of the recognition by corporations and other institutions that they take account of and participate in, when appropriate, the public policy process – the process by which major issues and problems are resolved by public debate, legislative enactments and regulatory enforcement (1979, p. 15)

3.3.3 Defining issues management

The term 'issue management' was coined by Chase in 1977. Three decades later, there are many definitions of issues management, but not one that has been agreed upon to define the discipline. This section presents some of these definitions. Chase, speaking at the conference of the Issues Management Association of America, defined issues management as:

> the capacity to understand, mobili[s]e, coordinate and direct all strategic and policy planning functions, and all public affairs/public relations skills, toward the achievement of one objective: meaningful participation in creation of public policy that affects personal and institutional destiny (1982b, p. 1).

Arrington and Sawaya (1984, p. 17) described issues management as "a process to organi[s]e a company's expertise to enable it to participate effectively in the shaping and resolution of public issues that critically impinge upon its operations". Wilson (1990, p. 41) said that issues management:

> could be best understood as an action-oriented management function which seeks to identify potential or emerging issues (legislative, regulatory, political, or social) that may impact the organisation, and then mobili[s]es and coordinates organi[s]ational resources to strategically influence the development of those issues.

Logsdon and Palmer (1988, p. 191) classified issues management as a "technique to identify, analy[s]e, and respond to social issues". Minnis (2001, p. 991) described issues management as "a strategic systematic approach to monitoring, understanding and shaping the social environment in ways favourable to the [organisation's] mission". Tucker and Broom (1993, p. 38) said that "issues management is the management process whose goal is to preserve markets, reduce risk, create opportunities and manage image (corporate reputation) as organisational assets for the benefit of both an organisation and its shareholders". Palese and Crane (2002, p. 284) believed "issues management is a leadership process that defines the strategic common ground between a company and its key audiences". Bowen (2002, p. 270) thought that "issues management is the executive function that deals with problem solving, organisational policy, long-range planning, and management strategy as well as communication of that strategy both internally and externally". Taylor, Vasquez and Doorley (2003, p. 257) stated that issues management is a tool "that helps organi[s]ations to identify trends, select courses of action, and guide external communication with a variety of publics".

Common themes that emerge from these definitions including monitoring and identifying trends and issues, the development of strategy and/or policy to deal with issues, communicating around issues, and the coordination of resources. The lack of a shared definition is a point of contention that has been pointed by many writers (e.g. Bowen, 2002; Gaunt & Ollenburger, 1995; Hainsworth & Meng, 1988; Heath, 1997; Jaques, 2002). However, this has not stopped the development of the field.

3.3.3 Theoretical perspectives on issues management

In general terms, the first decade (1978-1988) of issues management literature focused on establishing issues management as a practise (e.g. Ansoff, 1980; Arrington & Sawaya, 1984; Crable & Vibbert, 1985; Dansker, Hansen, Loftin, & Veldwisch, 1987; Ehling & Hesse, 1983; Ewing, 1979; Fox, 1983), the second decade (1989-1999) focused on justifying issues management as a legitimate practise (Coombs, 1992; Gaunt & Ollenburger, 1995; Hainsworth, 1990b; Hainsworth & Meng, 1988; Heath, 1990; Heath & Cousino, 1990; Kitto, 1999; Miller, 1999; Nelson, 1990; Ramsey, 1993; S.L. Wartick & Mahon, 1994; L. J. Wilson, 1990), and the third decade (2000- current) has attempted to refine issues management and to apply it to various organisations and issues situations to strengthen its practise (e.g. Bronn & Bronn, 2002; Coombs, 2002; Heath, 1998, 2002b; Pursey P M A R Heugens, 2006; Ihlen, 2002; Illia, Schmid, Fischbach, Hangartner, & Rivola, 2004; Jaques, 2002, 2004a, 2005; Minnis, 2001; Oomens & van den Bosch, 1999; Palese & Crane, 2002; Saiia & Cyphert, 2003; Steven L Wartick & Heugens, 2003).

Bridges (2004) has identified six theoretical frameworks which have been applied to issues management over the past three decades. The first theoretical framework is *systems theory*. The basis for this theory is that the organisation is itself a system and also part of a larger system. According to this perspective, organisations must adapt to the larger systems of social, political and economic contexts. Systems theory states that organisations conduct issues management to respond to changes in their environment to achieve “a state of balance” (p. 53).

The second theoretical framework is *powerful stakeholders theory*. According to this theory, organisations have an interdependent relationship with their stakeholders. Therefore, ‘powerful’ stakeholders must be identified if issues are to be managed. Further, this theory suggests that the issues management strategies employed by an organisation are influenced by these ‘powerful’ groups. According to Bridges, “prioriti[s]ing issue campaign behaviour because of the influence a group or finite public has on the organisation is the foundation of powerful stakeholder theory” (p. 55).

The third theoretical framework is *legitimacy gap theory*. This theory is primarily the work of Sethi (1979) who coined the term 'legitimacy gap' to describe differences between the way an organisation conducts its affairs and the way members of the community expect it to conduct its affairs. Therefore, 'legitimacy' gaps are really 'expectation gaps'. Sethi suggests that legitimacy gaps arise in two situations: (1) When an organisation changes the way it does business or is found to have acted inappropriately and (2) when society norms change. The underlying expectation behind this theory is that when an organisation achieves its economic and legal responsibilities it should then seek to give back to the community.

The fourth theoretical framework is *issues life-cycle theory* which gives an overview of the issue development process. Downs' (1972) issue lifecycle model was the first to categorise the phases social issues go through. Bridges summarises the lifecycle models into three stages: (1) preissue, (2) awareness and (3) final. This perspective recognises the role media play in how issues develop. According to this theory, when an issue is publicised, it becomes politicised. Further, media are attracted to issues covered by other media. Bridges says media coverage of issues has four effects. First, media coverage gives an issue legitimacy, thereby setting the public agenda. Second, media coverage provides a frame of issue for the issue (referred to in mass communication literature as 'framing'). Third, media coverage of an issue attracts an opposing group, which then generates more coverage for the issue due to the resulting conflict. Fourth, media coverage keeps an issue on the public agenda. However, issues eventually lose momentum as new issues take their place (Downs, 1972). Bridges suggests that pressure from activists attracted to the issue may change the issues management tactics employed by an organisation.

The fifth theoretical framework is *rhetorical analysis*. Heath (1997; 2006) has been the driving force behind the development of this theory. Rhetorical analysis theory is based on two assumptions. First, when organisations and stakeholders engage in dialogue, the words (or other symbolic communication) and events (or other organisational behaviour) have different meanings to the different participants. Second, dialogue between the groups creates an understanding of the meaning the various groups attach to the events and, eventually, the solutions to an issue.

The sixth theoretical framework is *social exchange theory*. According to this theory organisations and stakeholders enter into a negotiation in which one thing is negotiated for another. Bridges suggests that social exchange theory can be applied by issues managers to manage an organisation's relationships with its stakeholders and also for maintaining a positive corporate identity.

The six perspectives that have emerged describe different aspects of how issues emerge and how they are managed. Systems theory and powerful stakeholders theory deal with how organisations select and prioritise issues. Legitimacy gap theory and issue life-cycle theory deal with how issues develop. Rhetorical analysis and social exchange theory deal with how issues management is practiced and is useful for those implementing issue management campaigns.

3.3.4 Issues management and public policy development

While issues management theory has many perspectives, the uniting focus of issues management is on the development of public policy, an emphasis that is evident in the following definition offered by Heath:

> Issues management is the strategic use of issues analysis and strategic responses to help organi[s]ations make adaptations needed to achieve harmony and foster mutual interests with the communities in which they operate (1997, p. 3).

Pratt (2001, p. 340) says that issues management is a "public policy-driven process". Chase (1982a) explained that the public policy process was at the heart of his and Jones' issues management process model. "Public policy", he said, "is created only in the intersecting and interacting of three majors forces: citizens, government and business" (p. 106). Buchholz (1988, p. 53) defined public policy as "a specific course of action taken collectively by society or by a legitimate representative of society, addressing a specific problem of public concern, that reflects the interests of society or particular segments of society". From this definition, it can be assumed that certain segments of society can influence organisations in their decision making.

3.3.5 Stakeholder communication

Two areas of communication are closely-associated with issues management. The first is stakeholder communication. Any study of the way an organisation manages issues is also a study of how that organisation communicates with its stakeholders, for issues cannot exist without concerned parties. Tymson, Lazar and Lazar (2002, p. 398) define stakeholders as "people who in some manner have a stake in the way in which the company behaves and performs, and whose support, tolerance or hostility can be important to the company's success". Nasi, Nasi, Phillips and Zyglidopoulos (1997, p. 303) say that "any issue without a stakeholder group is, therefore, really no issue at all". Nasi et al. found that the term 'stakeholder' has come to have two definitions. First, everything (e.g. people, animals, fish and inanimate objects) is a stakeholder and, second, the more conventional view that stakeholders are people or groups who have a "mutually dependent relationship" that might impact on an organisation if it is not dealt with (p. 302). Nasi et al. (1997, p. 303) define issues management as the "management of stakeholder relations and involves a process of negotiation and communication to satisfy critical stakeholder groups".

Galloway and Kwansah-Aidoo say that the heart of all stakeholders is 'ownership': "people having a real (as in a financial) ownership or a sense that in some way they 'won' what an organisation does and therefore [has] a responsibility to take their views into account" (Galloway & Kwansah-Aidoo, 2005a, p. 7). Further, they say that say that communication plays an important role in how an issue develops: "Publics emerge around issues and are defined by how they respond to communications according to what they know (cognitive) and what they think about what they know (attitudinal factors)" (p. 7).

Heath (2002b, p. 210) believes that issues management "is stewardship for building, maintaining and repairing relationships with stakeholders and stakeseekers". Further, Heath (1990) believes that issues management help organisations achieve responsibility. The organisations cannot *choose* whether to consider stakeholder concerns, they *must* engage with stakeholder concerns. Issues management ensures that an organisation makes the necessary efforts to engage with its stakeholders and that these efforts are sustained. Heath says that providing information to "key external stakeholders"

generates understanding between the organisation and these groups (p. 30). The ultimate result from communicating, Heath says, is that stakeholders come to a better understanding of the organisation. Further, the understanding is mutual because the organisation has a better understanding of its stakeholders, their concerns and interests.

3.3.6 Risk communication

The second area of communication closely-associated with issues management is risk communication. Heath (1997, p. 323) says, "few issues management challenges loom as ominously as those that arise from risks people fear they suffer in their places of work, neighbourhoods and daily activities". Risk is primarily about uncertainty. This uncertainty results from predictions about the level of risk, the possible effects and the response (Heath, 1997). Heath (1997, p. 327) says that uncertainty is "central" to risk because "people experience doubt as they decide whether a risk exists and whether it is tolerable". Further, Heath suggests that conducting issues management requires an understanding of how to control and gain acceptance for risk:

> The challenge of issues management has many aspects: ascertaining the degree to which a risk exists, learning to manage that risk within tolerable limits, ascertaining those limits and communicating with key publics about those risks (1997, p. 326).

Heath says that risk communication becomes part of issues management when groups in the community become concerned about the actions an organisation is taking:

> Risk communication and issues management merge at the point where key publics feel deep concern that companies and governmental organi[s]ations create or allow risks to occur that will affect the health, safety, environmental quality, and economic well-being of community residents and users of products (1997, p. 326).

Further, Heath says an issues management approach to risk emphasises giving stakeholder groups access, involvement and control. Therefore, an issues management method of risk assessment and communication allows stakeholders access to technical information. Stakeholders are also involved in the risk management process as well as deciding upon the actions taken to manage the risk.

> An issues management approach to risk assessment, management and communication aims to empower the person in a community rather than to deny them access to information and processes that they do not have the technical knowledge to understand and evaluate (p. 358).

3.3.7 Issues management process models

Issues process models have emerged as a way of integrating the many functions of issues management (Gaunt & Ollenburger, 1995). Further, Jaques (2006, p. 69) says issues management processes were put forward to "crystalli[s]e and set out the process", allowing easy distribution of processes and optimisation of their effectiveness. Many authors have put forward models to describe the parts/stages of the 'process'. This section presents seven issues management process models.

3.3.7.1 Chase and Jones (1977) - Issues Management Process Model

The 'issues management' process model was introduced in 1977. In an article, titled "Public Issue Management: The New Science", W. Howard Chase outlined a four-step issues management process: (1) issue identification – issues are identified and grouped by type (e.g. environmental, regulatory), (2) issue analysis, (3) issue priority setting, and (4) task force issue management (Chase, 1977). In the 1977 article, Chase mentioned he was working on describing and charting the process with the help of Barrie L. Jones. In 1979, the Chase-Jones Issues Management Process Model was published in *Public Relations Review* - a refined and expanded version of the one published in the 1977 article. The five stages in the new model were: (1) issue identification – trends, which may become issues, are identified using a variety of methods (e.g. polls, models, statistical analysis), (2) issue analysis – the identified trend are analysed further through methods such as media content analysis to determine their societal importance, (3) issue change strategy options – strategies are developed so that the organisation can still achieve is objectives despite the issues it faces, (4) issue action program – senior management choose an issue change strategy from those developed in the third stage and (5) evaluation – management evaluates whether the issues management process has achieved its goals and make adjustments accordingly.

3.3.7.2 Public Affairs Council (1978) – Standard Issues Management Model

In 1978, the Public Affairs Council published its own model. The 'Standard Issues Management Model' is comprised of six steps: (1) monitoring, (2) identifying, (3) analysing, (4) prioritising and establishing policy, (5) responding and (6) implementing (Public Affairs Council, 1978 cited in Heath, 1997). The first step - monitoring - involves observing a company's environment to identify trends that may become issues. The second step – identifying - focuses on identifying the issues with the greatest importance to the organisation and, consequently, those that will require the most resources. The third step – analysing – assesses the issue's impact operationally and financially on the organisation. The fourth step – prioritising and establishing policy – involves senior management creating organisational policy to deal with the issue. The fifth step – responding – is creation of organisation's response to the issue. This response is created from "a range of issue-change strategy options" (Heath, 1997, p. 8). The sixth step – implementing – sees the organisation implement the response decided upon in step five.

Heath says the Public Affairs Council model has become the "standard issues management model" (Heath, 1997, p. 8). The model shares similarities to Chase and Jones. However, there are two key differences. First, the addition of the first step - monitoring. This suggests that efforts to monitor issues are ongoing, whereas Chase and Jones do not indicate how often their process should be initiated. Second, the model does not include an evaluation stage. This could perhaps be because evaluation is regarded as a standard feature of public relations process and, as such, was omitted. What the standard model does is provide clear steps that clarify the issue management process. Subsequent issues management process models have usually repeated the steps in the standard model, while making only minor additions or changes. These models are described briefly in the following sections.

3.3.7.3 Renfro (1987) – Issues Management Process "Four Essential Stages"

Renfro (1987) posed an issues management process model with "four essential stages": (1) identifying potential issues by scanning the organisation's operating environment, (2) researching the issues – their background, future and potential impacts, (3) evaluating the various issues that are 'competing' for organisational resources, (4) developing strategies to deal with the issues. This model, and many of those that have come after the 'standard' model, vary in the number of stages, but are essentially the same or very similar steps.

3.3.7.4 Tucker and Broom (1993) – 5 Stage Model

In describing the issues management process, Tucker and Broom (1993) proposed a 5-stage model: (1) anticipating, researching and prioritising issues, (2) assessing the impact of issues on the organisation, (3) recommending policies and strategies to minimise risk and seize opportunities, (4) participating and implementing strategy and (5) evaluating program impact. This model offers no further description of its implementation and is very similar to the Public Affairs Council's 'Standard' model.

3.3.7.5 Tucker and Trumpfheller (1993) - Issues Management Five-Step Plan

Tucker and Trumpfheller (1993) proposed a five-step plan as a guideline for those wanting to establish an issues management programme: (1) anticipate issues and establish priorities, (2) analyse issues, (3) establish an organisational position on the issue, (4) identify publics/opinion leaders who can help advance your position and (5) identify desired behaviours of publics/opinion leaders. The way this model differs from the other models already discussed is in the last two stages. However, this identification of publics/opinion leaders and of desired behaviours would perhaps fit under issue analysis and the development of policy.

3.3.7.6 Ewing (1997) - Seven Step Issues Management Process

Ewing's (1997) issues management process has seven steps. First, issue identification – Ewing says this is done through scanning of the "sociopolitical environment, seeking emerging issues" (p. 181). Second, issue analysis – the issue's relevance to the corporation is defined and its long-term impact established. Ewing says that this second stage usually takes the form of written reports. Third, the development of corporate policy on the issue. Ewing says this policy is aligned with the organisation's plans and goals and usually requires senior management approval. Fourth, the development of specific action plans (tactics) – a time frame for dealing with the issue is set along with the budget, and the people charged with managing the issue are decided upon. Fifth, the action plans decided upon in the fourth step are implemented along with communication of the company's position on the issue. Sixth, evaluating, adjusting and repeating – the issues management program is evaluated and changes made. During this step the company's position and supporting arguments for that position are repeated. Seventh, keeping management and staff focused until the issue is no longer current. The seventh stage is unique to this model, although it can also be seen as helpful advice that might fit under the implementation and evaluation stages.

3.3.7.7 Jaques (2000) - Don't Just Stand There Model

Jaques is both an issues manager for Australia's Dow Chemical Company and an academic. In the past decade he has written a number of articles with the aim of strengthening issues management practise (see Jaques, 2002; 2004a, 2004b, 2005, 2006, 2007). In his book "Don't Just Stand There: The Do-it Plan for Effective Issues Management" (2000), Jaques proposed a four-step model of issues management. Jacques says he designed the model to simplify the issues management process to make it easy to implement. The model is based on the acronym 'DO-IT' standing for: definition, objective setting, intended outcomes and tactics. In the first stage - definition - an issue is identified. Jaques defines issues as "any development – usually in the public arena – which, if it continues, could have a significant impact on the operation or future interests of the organisation" (p. 19). Issue identification is followed by an assessment of the issues impacts on the organisation and the establishment of a worst-case scenario if the issue is left unmanaged. In the second stage – objective setting – the

organisation decides on one overarching objective for the issue. This objective may be aligned to the organisation's corporate strategy. Further, Jaques emphasises that this objective must be achievable. In the third stage – intended outcomes – the objective is divided into outcomes, which, when achieved will obtain the objective. In the fourth stage – tactics – the organisation decides on the actions that must be taken to achieve each intended outcome as well as the people who will take these actions.

The above seven models can be summarised into the following five stages: 1. identifying and/or monitoring for issues, (2) evaluating/analysing the issue, (3) developing an organisational response - choosing tactics, setting objectives, issue policy development (4) implementing the response and (5) evaluating. This observation is confirmed by Wartick and Rude (1986) who summed up issues management processes models as emphasising three phases (1) identification – the organisation finds or predicts the emergence of an issue, (2) evaluation – interpreting the issue to understand its origins and how it impacts on the organisation and (3) response development – formulating and implementing a course of action to deal with the issue. These three phases have since been endorsed by other writers (Pursey P M A R Heugens, 2006; Logsdon & Palmer, 1988). The two further phases found by this study's comparison of the models emphasise the implementation of the issue response and the evaluation of this response. This five step summary model is applied to the management of the lahar in Chapter 7.

3.3.8 The issue lifecycle

Issue process models are one tool issues managers can use, issues lifecycle models are another. Much work has been done on modelling the lifecycle – or stages - that issues go through. The value in developing models of the issue lifecycle is that they can be used to identify where an issue is at a point in time (Mahon & Waddock, 1992). Knowing where an issue is in the cycle can be useful for developing an organisational response to "the movements of public attention", for example, by implementing new issue-related policy (Newig, 2004, p. 150). Issue lifecycle models have been applied to issues as diverse as climate change (Trumbo, 1996), air pollution (Henry & Gordon, 2001), the environmental effects of paper mills run by four major Canadian and Finnish forestry companies (Nasi et al., 1997), a United States tax on married couples (Gerde &

White, 2001) and the debate in Australia around gun control (Reynolds, 1997). Henry and Gordon (2001) summarised issue lifecycle models as following three distinct phases: (1) developing or rising interest, (2) declining interest and (3) stable interest with occasional mild fluctuations. While the issue models share general similarities, each approaches the lifecycle from a different perspective.

The first, and most influential, issue lifecycle model is Downs' (1972) 'Issue Attention Cycle". It has endured for the four decades since its creation and has been seminal in the issue lifecycle literature. Downs' model has five stages. The first stage is the 'pre-problem state'. During this phase, the issue already exists, but the general public is unaware of its existence, although some experts and special interest groups may already be aware. Downs comments that the problem during the pre-problem stage may be "far worse" than when the public eventually find out about it (p. 39). The second phase is the 'alarmed discovery and euphoric enthusiasm' stage. In this stage, the public discovers an issue exists and excitedly decides that society will be able to solve it. Downs comments that this phase works on the assumption that society has the ability to solve all problems without much effort. The third stage is 'realising the cost of significant progress'. This is when society gradually comes to terms with the fact that dealing with the issue will take considerable resources, in particular, money and sacrifices by societal groups. The fourth stage is 'gradual decline of public interest'. Downs says that after society realises the cost of dealing with the issue, some people will feel threatened, others will be discouraged and some may be bored by the issue. Further, people may experience a combination of the three aforementioned states. Attention in the issue wanes and other issues receive attention instead. The fifth stage is the 'post-problem state'. This is when the issue is 'dormant', but not solved. The issue receives little attention, although, occasionally stories may focus on the topic. Downs says that issues that have gone through the cycle are more likely to "sporadically recapture public interest" or become attached to or mentioned in terms of another issue (p. 41).

Since Downs proposed the 'attention cycle' model, other writers have evaluated his work. The primary issue that has been raised with Downs and the other issues lifecycle models is that they suggest issues go through, as Nasi et al. put it, "a predictable evolutionary trajectory" (1997, p. 298). As Lamertz, Martens, and Heugens point out, "issues often fail to progress along predictable lines, and deviate frequently from the

linear, sequential path suggested by evolutionary frameworks" (2003, p. 83). Downs did acknowledge that the stages might occur out of order, but suggested that they "almost always occur" in the sequence he listed them (1972, p. 39). Trumbo was still able to apply Downs' model to climate change, but noted that "it is unlikely that the stages of Downs' cycle operate independently or in any strict linear sense" (1996, p. 275). Recently, Henry and Gordon (2001) and Newig (2004) have confirmed, from their observations from quantitative analysis of issues, that issues cycles do exist. This seemingly supports the idea that issue lifecycle models do describe how issues evolve.

Peters and Hogwood (1985) too went 'in search of the issue-attention cycle'. They questioned Downs' reliance on perception over quantitative analysis. Further, they found that the decline in interest – the fifth stage in Downs' model – could be explained by lulls in issue-related activities. They also pointed out that Downs' model is primarily focused on social issues (for example, AIDS, environmental pollution) rather than Government response to issues. This focus, therefore, does not take into account Government legislation to deal with an issue and attempts to implement it. These actions, Peters and Hogwood suggest, may sustain interest in an issue for longer. They also thought that issue attention would have a relationship with issue-related activity: the more activity, the more attention. However, Peters and Hogwood agreed with Downs' proposition that issues receive more attention after their peak, rather than before. They also suggested that there are two types of issues cycles: (1) those that are initiated in response to events (e.g. wars, energy crises) and (2) those that reflect political priorities (e.g. issues during election campaigns). Newig and Hesselmann (2004) agreed with Peters and Hogwood that visibility was a key factor in the attention an issue received. They also agreed with Downs, saying that the ability to 'solve' the problem aided its continued coverage. Further, they suggested a third factor, acuteness, as being another important factor in issue attention.

A further problem with Downs' model not suggested by Peters and Hogwood or Newig and Hesselmann is that while the 'Issue Attention Cycle' can offer insights into the phases of social issues, its value is limited when dealing with issues that were not caused by people (as in the case of a naturally-forming dam-break lahar). Further, social issues seldom have a set timeline within which they must be dealt with while naturally-occurring issues may need to be dealt with immediately (a crisis) or over a longer

period. However Downs' and other theorists have put forward their own models which have offered new perspectives on issue evolution.

Buchholz's (1992) 'Public Issues Life Cycle' has four stages. First is the 'changing expectations' stage. This is when a gap exists between how an organisation behaves and the public's expectations of how they should behave. Buchholz explains that issues arise because of value changes in wider society. These value changes may be driven by technological advances, an increasingly-educated public or changes in "basic institutions" such as the family or church (p. 3). Second is the 'political stage'. The issue gains media coverage and is picked up by interest groups. At this stage politicians may then become involved and start developing policy, which in turn may involve public consultation. Third is the 'legislative stage'. Legislation and regulations to handle the issue are introduced. Fourth is the 'litigation stage'. The newly-implemented legislation may be debated. Changes to the legislation or litigation may be pursued. Buchholz's model addresses one of Peters and Hogwood's primary concerns about Downs' model. The focus of the 'Public Issues Life Cycle' is on the development of public policy from an organisational or Governmental perspective. However, this perspective assumes that public policy is developed for all issues. Further, like Downs', Buchholz's model is primarily concerned with social issues.

Another model that shares similarities to Buchholz's model is Hainsworth's (1990a) 'Issue Process Model'. Hainsworth's also discusses the development of public policy. According to this model, issues go through four stages. The first stage is 'Origin' – when "an organisation or public attaches significance to a perceived problem" (p. 84). The second stage is 'Mediation and Amplification' – the interested groups take sides on an issue and start debating the issue. At this point, media pick up on the debate. The third stage is 'Organisation' – when the positions on the issue held by the various groups solidify. This stage also sees the beginning of resolution between groups to find a solution for the issue that either benefits all groups or minimises damage. The issue's visibility continues increasing, which results in the involvement of Government officials. The fourth stage is 'Resolution' – public policy is developed around an issue by Government officials. At this point the issue may be resolved or enter into a prolonged stage of conflict and litigation.

The last issues lifecycle model discussed in this section is Meng's (1992) 'Five Stage Issues Lifecycle'. First stage, potential issue. Second stage, emerging issue. Third stage, current issue. Fourth stage, crisis issue. Fifth stage, dormant issue. However, Coombs (2002) points out that this model is actually based on the work of Crable and Vibbert (1985). According to Crable and Vibbert, issues go through four status levels. When a person or group identifies an issue as being important, it has *potential status*. While an issue may have *potential status*, it still must get the support of the wider public to gain traction: "people must see how the issue relates to or affects them and their concerns" (Crable & Vibbert, 1985, p. 6). If an issue's 'potential' receives the endorsement of the wider public, the issue then has *imminent status*. Crable and Vibbert suggest that this 'endorsement' may come from a person or group. The endorsement of groups and individuals give an issue *legitimacy* (Crable & Vibbert, 1985). While an issue has *imminent status* it is "coming together" or "picking up steam". "People [begin] to see connections between themselves and others" (Crable & Vibbert, 1985, p. 6). This leads onto the third level of status, *current status*. At this level of status, the issue has two qualities. First, the issue has "current or present interest" (Crable & Vibbert, 1985, p. 6). Second, the issue has reached acceptance as a topic of discussion in wider society. During this status, three things occur that shape the evolution of the issue. First, media pick up on the issue, giving it widespread coverage. Second, media coverage of the issue creates 'sides' of those for and against. Third, individuals are selected to play roles in the 'drama'. Once the issue is widely known, it is given a fourth level of status: *critical status*. Issues become critical "at a moment of decision – a crisis, in the sense that something is willed (and predicted) to happen" (Crable & Vibbert, 1985, p. 6). At this stage, people choose an argument with which they are comfortable. People want a resolution to the issue. They are "actively concerned" (Crable & Vibbert, 1985, p. 6). Further, they hope their preferred solution will be chosen. However, even if a solution is implemented the issue does not 'end'. Crable and Vibbert say, "issues may be 'resolved' – in the sense of a temporary 'answer' – but they are never 'solved' in the sense of a final answer" (1985, p. 5). Meng referred to this issue status level as 'dormant'.

3.4 Part 2: Literature review - content analysis

This study used a content analysis of newspaper coverage from 1996-2007 to examine how the lahar issue was presented. This analysis examined three aspects of the issue coverage: (1) salience, (2) framing and (3) sourcing. The method for this analysis can be found in Chapter 4 and the results can be found in Chapter 5. The following section of the literature review provides the theoretical background for this examination.

3.4.1 Salience

Salience was the first element of the 'lahar issue' coverage examined by the content analysis in this study. Salience refers to the degree of attention given to a subject. This study set out to answer two questions about the salience of the 'lahar issue': (1) 'How much attention (salience) did media give the issue?' and (2) 'How did this 'attention' change over time?'. Attention and salience are closely-related concepts. Newig and Hesselmann define attention as "the resources people dedicate towards an issue". Further, they say that attention "often signifies considerable political pressure" (2004, p. 2). Attention research is primarily about the level of salience. Salience, therefore, refers to issues that are regarded worthy of attention, while attention refers to the level of exposure that issue receives.

Salience research brings together elements of communication, political science and psychology (Kiousis, 2004). Soroka (2002) says that salience research is primarily agenda-setting research. Carroll and McCombs explain the underlying interest in agenda-setting as being about "the prominence of elements in the news influence[ing] the prominence of these elements among the public" (2003, p. 36). Specifically, Carroll and McCombs suggest that the public agenda is directly influenced by the amount of attention an issue receives:

> Over time, the set of priorities visible on the agenda of the news media becomes, to a considerable degree, the agenda of the public. In other words, the news media set the public agenda. Establishing this salience among the public – placing an issue or other object on the public agenda so that it becomes the focus of public attention and thought – is the initial stage in the formation of public opinion (Carroll & McCombs, 2003, p. 37).

Salience research also reveals the perceived significance of a subject by news editors for their readers. Soroka says that "increased issue salience for the media leads to increased issue salience for the public… the media agenda has an impact on the public agenda" (2002, p. 265). However, as Newig (2004) points out, it is important not to confuse 'public agenda' with 'public opinion. When an issue is considered salient it does not indicate what people think, but rather what they think is important. Newig (2004) suggests that salience research is better at discerning an issue's perceived importance than polls or interviews. Newig says this is because polls and interviews are conducted at a specific point in time and only cover a limited range of issues supplied by the researcher. This range of issues may be limited further if the poll/interview relies on the issues the respondent/interviewee can recall. Because salience research is conducted later using archived news stories, it is better able to discern the issues that were important at a point in time and how important they were considered to be. Further, Newig believes that salience research studies have less bias than poll or interview research. This is because the interviewee and poll results rely on the honesty of their respondents. However, Newig points out that polls and interviews may be better at discerning the 'public agenda' while salience research really discerns 'media agenda'.

Salience research examines how issues are presented in media coverage. As McQuail says, an event's significance can be gleaned from the way it is presented: "The news form provides indications of the relative significance of events and of the types of content. Significance is mainly indicated by the sequencing of content and by the relative amount of space or time allocated" (McQuail, 2005, p. 380). Carroll and McCombs (2003) say salience can be measured through the analysis of salience cues. These cues include whether the lead story is on the front page versus the inside pages, the size of the story's headline and the length of the story. Further, Carroll and McCombs say the public use these cues to "organise their own agendas to decide which issues, persons or other objects are the most important" (2003, p. 37).

Another writer, Kiousis, has suggested that salience has three dimensions: (1) attention, (2) prominence and (3) valence. These dimensions, like Carroll and McCombs 'cues' are useful for measuring salience. The first dimension of salience, attention, is, according to Kiousis, the most-common method used to measure salience. Attention is indicated by the volume of stories and space allocated by media outlets about a topic.

The second dimension of salience, prominence, refers to how a story is positioned in a media text to "communicate its importance" (p. 74). Kiousis cites Ghanem's (1997) framing mechanisms – placement, size, pictures, pull quotes and other aesthetic devices – as best defining this category of salience. The third dimension of salience, valence, refers to second-level agenda setting. Carroll and McCoombs (2003) say salience's role in agenda setting has two levels. The first level is the salience of objects – the people, organisations and things regarded as salient. The second level is the salience of attributes of those objects – how those people, organisations and things are presented in the media coverage. The "evaluative dimension" of the second level of agenda-setting recognises that "feeling and tone" play a role in news coverage (p. 39). Valence, therefore, refers to this second "affective (emotional)" level of salience (Kiousis, 2004, p. 76). Stories with higher levels of emotion, for example, conflict, have high valence. Salience, as examined in this study, is discussed in the method for the content analysis (see 4.3.6.1).

3.4.2 Framing

Framing was the second element of the 'lahar issue' coverage examined by the content analysis in this study. This study examined news lahar issue coverage from 1996-2007 to answer the question, 'What frames did media use when reporting the lahar?'. Framing is an integral part of news. Tuchman (1978) says that frames are necessary to give meaning to events. "Frames," she says, "turn nonrecogni[s]able happenings… into a discernible event" (1978, p. 192). Framing is also a much-researched area of news media communication. In past research, frames have been referred to as 'frame of reference', 'context', 'theme' and 'news angle' (McQuail, 2005). Framing research has been reinvigorated since Entman's 1993 article, *Framing: Toward clarification of a fractured paradigm*. In his article, Entman said that while framing had been frequently examined in social science and humanities, no common definition existed as to what frames were or how they operated. In unifying the 'fractured paradigm', Entman offered the following definition:

> Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described [original emphasis] (1993b, p. 52).

Framing, therefore, is the process by which journalists emphasise some elements of a story, while deemphasising others. Further, frames have specific roles (e.g. define problems, interpret causes, make moral evaluations, and recommend remedies). In explaining how frames operate, Entman suggests that examining frames may provide clues as to the guiding influences that caused the journalist to write the story as they did:

> *Communicators* make conscious or unconscious framing judgements in deciding what to say, guided by frames (often called schemata) that organise their belief systems [original emphasis] (Entman, 1993b, p. 52).

McQuail states that framing research has focused on two areas: first, how news is "shaped and contextualised" according to predetermined frames and, second, the agenda settings effect (2005, p. 555). This second area of framing focuses on whether audiences adopt the same frames the journalists use. Tilley says that "once 'newsworthy' topics make the agenda, there is a second level of agenda setting where the media emphasise certain attributes of those topics and cue audiences to 'read' them in certain ways" (2005, p. 149). Further, Tankard says, "much of the power of framing comes from its ability to define the terms of a debate without the audience reali[s]ing it is taking place" (2001, p. 97). Tankard takes Entman's ideas of 'selection' and 'salience' further. He says frames are used in news coverage in three ways. First, they isolate material and draw attention to it. Second, they set the tone for an event or issue. Third, they may be used as a organisation device, an "idea on which a story is built" (2001, p. 99). Therefore, the way journalists frame an issue can influence how that issue is dealt with by the public:

> News framing can eliminate voices and weaken arguments… Media can frame issues in ways that favour a particular side without showing an explicit bias, and that defining the terms of a debate takes one a long way toward winning it (Tankard, 2001, p. 96).

A discussion of the way frames were examined in this study along with a description of how the frames were identified can be found in Chapter 4 - 4.3.6.3.

3.4.3 Sources

Sources were the third element of the 'lahar issue' coverage examined by the content analysis in this study – who was sourced and how they were sourced. This part of the analysis aimed to answer the question, 'Which sources – if any – could be seen as "driving" media coverage?'. Sources play an important role in defining issues. McQuail says that news sources frame stories:

> When information is supplied to news media by sources (as much often is), then it arrives with a built-in frame that suits the purpose of the source and is unlikely to be purely objective (2005, p. 379).

However, Gans says sources are not wholly responsible for framing news stories, "but they do go a long way in focusing the journalists' attention" (1979, p. 145). Although, he also notes that, "generally, reporters usually go to the same kind of sources and are managed by them as a result of their own transience and lack of knowledge" (1979, p. 144). This repeated sourcing of some individuals and organisations over others, suggests that some have more opportunity to define issues than others.

Hall, Critcher, Jefferson, Clarke, and Robert (1978) called these frequently-cited sources 'primary definers'. The authors identified these sources as being official and authoritative sources, for example, Government agencies, large organisations and scientific bodies. However, these sources were more than just frequently-cited. Hall et al. found that media acted as secondary definers to these primary definers. Further, primary definers set the boundaries for the discussion of an issue through framing of the issue, which set limits on the debate. The authors suggested that primary definition is defined by four attributes. First, media go to primary definers for comment. Second, media translate the comments of the primary definers into a format their audiences can understand. Third, the opinions of primary definers are presented as public opinion. Fourth, media would emphasise the sensational aspects of a story to justify its newsworthiness. The authors reasoned that primary definers emerged for two reasons:

> Two aspects of news production - the practical pressures of constantly working against the clock and the professional demands of impartiality and objectivity – combine to produce a systematically structured over-accessing to the media of those in powerful and privileged institutional positions (1978, p. 58).

The existence of ‘primary definers’ has been regularly acknowledged (e.g. Anderson, 1997; Ashwell, 1998; Cottle, 2003; Critcher, 2003; Lawrence, 2000). Since the work of Hall et al., other authors have offered evidence to support the existence of such definers. For example, Gans, in his study of the way news was reported, mentioned that public officials would often become regular sources because of their “availability and suitability” (1979, p. 144). Lawrence (2000) also talked about this phenomenon, naming it the ‘official dominance model of news’. According to this model, journalists “rely heavily” on officials and institutionalised sources for news as they are viewed as “legitimate” sources of news (p. 5). Further, Lawrence, suggested that non officials are often marginalised when they appear in the news. Another author, Anderson, provides further insight into why journalists consider some sources to have more credibility than others:

> Media practitioners have their own values and personal commitments which, to a degree, inevitably impact upon their coverage of environment and risk. Conscious and unconscious value positions influence the kind of judgements that are made concerning the credibility of news sources. For example, official news sources, such as Government officials, are more likely to be viewed as “objective” than are pressure groups. Moreover, these official sources tend to gain advantaged access to the news media on a routine basis as “primary definers” because of their claims to expert knowledge, representative status and their powerful social position. Such news sources engage in various information-management techniques in an attempt to control public opinion (1997, p. 72).

Chapter 5 lays out the sources results from the content analysis (see 5.4). Chapter 7 includes a discussion of the sources who drove the ‘lahar issue’ coverage.

3.5 Conclusion

This chapter began by looking at the previous writings on the tephra dam-break lahar’s management. It then introduced the concept of issues management and the related areas of stakeholder communication and risk communication. It then examined the theoretical perspectives on issues management that have emerged in the literature’s 30-year development. Afterwards, it looked at the issues management process models that have developed. The section ended with an examination of the issue lifecycle. The second section of this chapter looked at the three elements examined by the content analysis: salience, framing and sources. These elements are discussed again in the next chapter – Chapter 4 – in terms of how they were analysed as part of the content analysis. The

theory contained in this chapter is again discussed in Chapter 7 in terms of how the lahar issue was managed.

Chapter 4:
Methodology
- Content Analysis
- Interviews

4.1 Introduction

This thesis used two methods to examine the management of the lahar issue. A content analysis of news media coverage spanning the period 1996-2007 examined how the lahar issue evolved in the media reporting over the course of 11 years. Further, interviews explored the issues management processes used by the people and organisations responsible for managing the lahar.

The previous chapter introduced theory relating to framing, salience and sources. The first part of this chapter picks up on those theories again and looks at how they were integrated into the content analysis. It examines how the research questions guided the creation of a content analysis schedule. Further, it talks about how the sample news articles were selected and obtained. Finally, it discusses how the content analysis was conducted. The second part of the chapter gives an overview of interviews as they were used in this study. In particular, it looks at why interviews were chosen as a method, how the interviewees were selected, how interview questions were devised and how the interviews were conducted.

4.2 Content analysis

Content analysis is a quantitative research tool commonly used in news media analysis. Its main use is to analyse ‘texts’. ‘Texts’ are cultural products and come in many forms (Shapiro & Markoff, 1997). Content analysises have been conducted on books, diary entries, images, ballet performances and – as in the case of this study - news articles (Shapiro & Markoff, 1997). Content analysis has a long history as a media research tool. Kaid and Waidsworth (1989) suggest that modern content analysis evolved

primarily as a method for analysing mass media coverage. Shapiro and Markoff (1997) believe that the 'value' of content analysis is that it allows social science researchers to be scientific when analysing media texts, as opposed to simply offering interpretation. Content analysis as a 'scientific' tool is a common theme throughout the literature. Berelson, one of the earliest content analysis practitioners, defined content analysis as "a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (1952, cited in Kaid & Wadsworth, 1989, p. 197).

4.2.1 Strengths

As a research tool, content analysis has a number of advantages. First, it allows a researcher to examine texts in their original context (Krippendorff, 2004). Krippendorff suggests that contexts are "always someone's construction, the conceptual environment of a text, the situation in which it plays a role" (2004, p. 33). Content analysis allows researchers to examine those constructions. Context plays an important role in understanding the issue of the lahar. This study examined the context of the stories, in particular, their salience. Without content analysis, it would be difficult to establish this due to the large number of newspaper articles analysed for this study.

Second, content analysis is useful for drawing inferences from large numbers of texts (Krippendorff, 2004). This study took into account 309 news articles. When researchers are dealing with large samples, it is easy to lose track of the relevant details (ibid). Analysis of the texts may be applied unevenly. Because content analysis uses a coding questionnaire, it makes it possible to apply the analysis in the same way to all the texts. This use of structure is another of its strengths.

Third, content analysis offers a way to analyse information that is unstructured (United States General Accounting Office, 1982). When the data from the analysis is compiled, the researcher can then comment on what the data may mean and what may have caused the results (ibid).

Fourth, content analysis is an unobtrusive research tool (Berger, 2000). The researcher does not influence or intrude on the text in any way, therefore they do not affect the research results (ibid).

4.2.2 Reliability

Krippendorff (2004) says content analysis relies on three types of reliability: accuracy, stability, reproducibility. These types of reliability also suggest the ways in which content analysis is limited. Accuracy refers to how closely a study aligns with the original plan for its execution (Krippendorff, 2004). Ultimately, content analysis relies upon the accuracy of the coders. This is a primary concern during the coding process. Coders may subtly change the way they code stories as the coding progresses (Krippendorff, 2004).

Stability, Krippendorff believes, is the weakest type of reliability. It refers to how a coder's coding of text may change over the course of the study. As Krippendorff says, this is because "a text does not exist without a reader, a message does not exist without an interpreter, and a date does not exist without an observer" (2004, p. 22). Another factor is that coders may interpret and, therefore, code a story in different ways (Riffe, Lacy, & Fico, 2005). The accuracy and stability of this study was improved by providing definitions for categories and detailed coding instructions for coders to ensure the coding process was being applied evenly.

Reproducibility is the third type of reliability. An indicator of a study's reproducibility can be found by using an independent coder. The second coder recodes some of the articles. This coding is then compared to that of the primary coder. Kaid and Wadsworth's (1989) recommend when conducting large studies that 5-7% of the total is recoded. For this study, the second coder recoded 10% of the articles (N=31). As recommended by Riffe et al. (2005), the recoded articles were selected at random. Each paper was given a number during the initial coding. After all the articles had been coded, a calculator was used to generate a list of random numbers to select the articles to be recoded. Riffe et al. (2005) state that intercoder reliability should be at least 80%. Berger (2000) believes that 90% or higher is acceptable. Reliability for this study was found to be 93% (0.93).

4.2.3 Other issues studies that use content analysis

This study was guided by three studies of media coverage of public issues, which also used content analysis to examine aspects of salience, framing and the issue lifecycle.

Reynolds (1997) examined media coverage in the month following the Bryant massacre in Tasmania, Australia in 1996, when 35 people were killed and 13 others were injured. The issue at that time was gun control. Reynolds measured the salience of the issue by counting the number of lines in the stories reporting the issue in two newspapers: the *Sydney Morning Herald* and the *Gold Coast Bulletin*. The analysis spanned a period of 30 days. While this method did give a basic indication of the salience given to a story, it missed important variables such as the placement on the page, the number of stories published at different times in the issue's lifecycle and whether they were accompanied by a photo or other image.

Biotechnology in the Public Sphere: A European Sourcebook (1998), edited by Durant, Bauer, and Gaskell, comprised a study of 13 European countries examining the introduction of biotechnology in terms of biotechnology policy, media coverage and public perception. For each country, a profile was compiled discussing the three categories. The profiles were constructed by research teams from the country being discussed (e.g. Greece, Germany, Italy, United Kingdom). A content analysis of media coverage dealing with biotechnology was conducted for each country. The time period for the analysis was 1973-1996. The aim of the content analysis was to allow for international comparison for three aspects of biotechnology coverage in newspapers in magazines: (1) identifying debates about biotechnology, (2) pinpointing the timing of these debates in each of the countries, and (3) examining the arguments (frames) presented during the debates. To ensure even application of the content analysis by the research teams, Durant, Bauer and Gaskell wrote a list of instructions covering media selection, sampling and article selection. They also provided the content analysis schedule. The media outlets analysed in the study were selected for their "opinion-lead[ing] function" (p. 276). Articles were selected through the use of a newspaper database searching for the keyword 'biotech*'. In their analysis, the teams did not refer to the issues lifecycle. However, they did categorise the coverage into phases during

which various argument (frames) were given particular emphasis in the debate over the introduction of biotechnology (e.g. safety, regulation, ethics).

Trumbo (1996) conducted a content analysis of the coverage of climate change in five national US newspapers. The study examined two aspects of the coverage: (1) identifying the sources who gained media coverage (Trumbo called these 'claim makers') and (2) examining the themes (frames) that emerged in the climate change coverage. Sources were classed according to their professional role (e.g. university scientist, Government scientist, Member of Congress etc.). In providing framing definitions, Trumbo adapted the 'frame functions' provided by Entman (1993a). As discussed later, some of these frames were adapted for use in this study. The results of the study were discussed in terms of Downs (1972) issues lifecycle. Further, Trumbo identified three phases of the media coverage according to the frames used during each of the periods.

4.2.4 Research questions

The primary question being answered by this content analysis is: How did the public service organisations involved communicate about the issue of a dam-break lahar on Mt Ruapehu?

To answer this broader question, the design of this analysis was guided by four sub-questions:

- How much attention (salience) did media give the issue?
- Did this 'attention' change over time?
- What frames did media use when reporting the lahar and its management?
- Which sources – if any – could be seen as "driving" media coverage?

4.2.5 Sample selection

Sampling is important both for focusing a study and ensuring its validity. As Krippendorff says: “The universe of available texts is too large to be examined as a whole, so content analysts need to limit their research to a manageable body of texts” (2004, p. 111). This section discusses how sampling was used in this study.

4.2.5.1 Newspaper selection

This study focused on newspapers. A total of seven newspapers were analysed in this study (see Table 4). The papers were selected for their geographical proximity to Mt Ruapehu and therefore to the lahar. The concept of ‘news values’ suggest that the media regard local events as news as opposed to events that take place far away (Galtung & Ruge, 1973). Therefore, the lahar had more newsworthiness for the Wellington-based *Dominion Post* than its Fairfax sister publication, the Christchurch-based *The Press*. For this reason, this content analysis looked only at stories appearing in North Island-based newspapers.

This study examined four metropolitan dailies (*Dominion, Evening Post, Dominion Post* and the *NZ Herald*), two regional dailies (*Waikato Times* and *Manawatu Standard)* and one local weekly (*Ruapehu Press)*. The coverage from *The Dominion* and *The Evening Post* covers the period from 1996 to 2002. This is because in 2002 the *Dominion* and *The Evening Post* merged to form the *Dominion Post*. Riffe et al. (2005) believe that a weakness in many content analysis’s that analyse newspaper coverage is that they ignore weekly papers. The selection of the *Ruapehu Press*, a community paper distributed in the Ohakune-Taumaranui region acknowledges the importance of weekly papers. It was also selected for its role as a local source of news in the Ruapehu area. It was decided that analysing the lahar coverage printed in a local paper would be useful for understanding how people in the Ruapehu region received messages about the lahar in their local paper.

Table 4: Newspapers sampled in the content analysis

Type of newspaper	Newspapers
Metropolitan daily	• Dominion (1996 – 2002) • Evening Post (1996 – 2002) • Dominion Post (2002 – 2007) • NZ Herald
Provincial daily	• Manawatu Standard • Waikato Times
Community weekly	• Ruapehu Press

NB: Newspapers were sampled from June 1996- June 2007 unless otherwise noted.

4.2.5.2 Article Selection

The articles analysed in this study were identified using two sampling methods. Kaid and Wadsworth (1989) suggest that content analysis samples follow two guidelines: (1) that they are representative of the texts being sampled and (2) that they are of sufficient size to accurately represent those texts. In following these guidelines, this study used two sampling processes Krippendorff (2004) refers to as 'relevance sampling' and 'census sampling'. Relevance sampling involves a process by which the texts to be analysed are selected through a set of limits designed to narrow the sample. In this study, the keywords "Ruapehu" and "lahar" were used to find the relevant texts. It was decided that these were the fundamental keywords as it is difficult to discuss any lahar stemming from Mt Ruapehu without using those words.

Census sampling was the second type of sampling used in this study. A census sample contains all the texts relating to a particular subject. Krippendorff describes the census sampling process thus: "If content analysts want to know something about the press coverage of a given event and collect all newspaper articles pertaining to the event, that complete set of texts constitutes a census" (2004, p. 120). This content analysis covers the period from June 1, 1996 to June 30, 2007. Conveniently, the lahar provided a natural census sample. The lahar risk was announced in 1996. Twelve years later, on March 18, 2007, it broke through the crater rim. The result was the 11 year time period

– June 1996 to June 2007 - used in this study. The study period continued until June 2007 to include any recurring coverage of the lahar for analysis of the lahar's lifecycle.

4.2.5.3 Locating the news articles

The Newztext Plus database was used to create an index of lahar articles. As described in the last section, the keywords 'lahar' and 'Ruapehu' were chosen as the search terms. The initial search focused on finding all the articles for each year from 1996 to 2007. Parameters were set for each search restricting them to the period 01 January XXXX to 31 December XXXX for the year being searched. These limits meant that all the news articles relating to the lahar for that year would be found. When all the articles available on Newztext Plus had been obtained, these results were then cross-checked with the results from two other databases, Factiva and Index New Zealand (INNZ). The additional results from these databases were then added to the lists compiled from Newztext.

4.2.5.4 Accessing copies of newspapers for analysis

After the lists were cross-checked, the 'news indexes' for the years were divided into lists sorted by publication. While the three news databases provided a copy of the text of the article, they did not show how the article was represented in the original text in terms of placement, size of story and accompanying visuals. Obtaining 'physical' copies of the articles was critical for assessing the salience of the stories by story size and placement (see 4.2.6.1 for explanation of how salience was measured in this study).

Microfilm versions of the newspapers were sourced from the Massey University library (*Dominion*, *Dominion Post* and *New Zealand Herald*), National Library (*Evening Post*, *Waikato Times*) and Palmerston North City Library (*Manawatu Standard*). Physical copies from National Library archives were used to obtain the articles from the *Ruapehu Press*.

The publication lists were used to identify the dates on which the stories were published. From these dates, the corresponding microfilm was obtained and two photocopies of each story were taken. The first photocopy showed the entire layout of

the page. This copy was used for examining the amount of space the article took up on the page and its placement. The second copy, a more-readable close-up, was used to analyse the frames and sources in the article.

To ensure that articles not included in the database were found, microfilm copies of the NZ Herald were checked at key dates in the lahar's management. These 'key dates' were identified due to coverage in other publications (e.g. *Dominion, Evening Post, Manawatu Standard, Waikato Times*) during those times. This method was successful in locating many of the early articles, which were not indexed by the online databases. It was also discovered that the database search had missed a large number of articles from the *Ruapehu Press*. Further, while the articles returned by the database were printed in the paper, in print they had different titles. For this reason, every issue of the *Ruapehu Press* was examined from 1996 to 2007.

4.2.6 Creating the coding schedule

Once copies of the newspapers articles were obtained, a content analysis questionnaire or 'schedule' was created (a copy of two schedules used in this study can be found in Appendixes B and C). A content analysis questionnaire is made up of categories that 'code' the aspects of the story being examined (e.g. placement, story date, headline etc.). Categories on a coding schedule are guided by the overall research questions for a study (Krippendorff, 2004). To decide what categories to use, first, a decision must be made as to which variables of a text will answer the research questions being asked. Variables are usually referred to as units of measurement. Content analysis requires that the units of measurement be defined (Berger, 2000). Table 5 shows the questions being answered in this study, the aspect of the coverage that question examined (e.g. salience, framing or source), the variables related to those aspects and, finally, the numbers of the corresponding questions on the content analysis schedule.

Table 5: Content analysis research questions and variables

Research question	Aspect of coverage	Variables / Units of measurement	Corresponding questions on the coding schedule
1. How much attention (salience) did media give the issue?	Salience	• Which newspaper? • Number of lahar-related stories • Size of story on page • Size of visual • Positioning	Questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
2. Did this 'attention' change over time?	Salience	• Same as above • Year / Month / Day	Questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
3. What frames did media use when reporting the lahar and its management?	Framing	• Number of frames • Frame 1 • Frame 2 • Is Tangiwai mentioned?	Questions 12, 13, 14, 18
4. Which sources – if any – could be seen as "driving" media coverage?	Sources	• How many individuals are used as sources in the story? • DOC sources - Where cited/quoted? • DOC sources – Who else is cited (if any)? • Who is the source? • Which organisation are they from? • Where are they cited? • How frequently are they cited?	Questions 15, 16, 17, 20, 21, 23

4.2.6.1 Salience

As discussed in the literature review (see Chapter 3) salience is about the importance – or attention – a particular issue is given. As Eley and Lee (1996, p. 1) state, "stories and photographs do not appear on a page at random. They are given headlines and captions and arranged in order of newsworthiness". Therefore, placement in newspapers is important. Story placement is a key indicator to the stories a newspaper's editorial team think are important. Stories printed 'above the fold' occupy prime newspaper real estate. Harrower (2002) explains this is because most broadsheet newspapers are folded in half, so readers see those stories first. Further, when it comes to story placement, "the strongest story goes at the top of the page" (p. 74). 'Strong' refers to "news value, impact or appeal" (p. 74). Harrower goes on to say that "as you move down the page, stories become less significant" (p. 74).

Placement was one element of salience examined by this content analysis. Question 5 and 6 in the content analysis schedule recorded on which page the story was printed. Further, question 9 looked at where the story was printed on the page. Newspaper design follows eyetracking studies which indicate that readers look first at the top left of a page. Readers read newspages in a 'Z' pattern (Sevilla, 2002). After entering the page at the top left, the reader's gaze then shifts to the top right of the page, followed by the bottom left and then the bottom right. Therefore, salient stories – those which will keep reader attention - are given space in the top left or top right of the page, while less salient stories are allocated space in the bottom left or bottom right. The space allocated to a story also gives an idea of an issue's salience. Logically, the more space allocated, the greater a story's importance. Question 8 noted the percentage of the page each story took up (for more on sizing measures used in this study, see 4.2.6.2).

Photos are also important in today's newspapers: "our culture has become overwhelmingly visual. In today's media, images are strong; text, by comparison, is weak" (Harrower, 2002, p. 99). Newspapers choose images that attract readers (Hutt & James, 1989). From an editorial point of view, Hutt and James say newspapers choose photos for their 'stopping power': "a reader glancing through the pages of a newspaper may see a picture without noticing it. It takes what some call 'stopping power' to halt a reader long enough to take in everything" (p. 123). Similar to news stories, images too

have newsworthiness (Eley & Lee, 1996). When a large picture is printed in a newspaper, it suggests that the picture must have substantial 'newsworthiness' for it to have been given such prominence (ibid). The use of visuals and their sizing was recorded under questions 10 and 11 of the content analysis schedule.

4.2.6.2 Sizing

The standard measurement for size is centimetres (Krippendorff, 2004). However, because this study relied upon copies of articles obtained from microfilm, the sizes for copies vary from both the original size of the story as it was published. Further, the copies also varied from the size of the other articles in the study. This size difference is due to two factors: first, the size of the newspaper as recorded on the microfilm and, second, the microfilm projector used to view the microfilm. This variation is because some microfilm readers have greater zoom capabilities than others. For these reasons, there will always be some variations in the size of the copies. Due to the varying sizes of the articles, it was decided that percentages be used as the measurement figure in that the size of the story is divided over the total size of the page to establish the total percentage the story takes up (see Questions 8 and 11 of the content analysis schedule).

4.2.6.3 Framing

The frames used to present 'lahar issues stories' were another element of the coverage examined by this content analysis. The concept of framing was introduced in Chapter 3. Questions 12, 13, 14 and 18 on the content analysis schedule deal with frames. Up to two frames were identified for each story. Before coding commenced, a list of possible frames was compiled.

Table 6 contains the frames examined in this study, along with a description and examples of the frame's use. When defining variables, Riffe et al. (2005) suggest using existing classification systems if they exist. Further, category definitions must be descriptive to allow for replicable coding (ibid). Berger (2000) recommends that categories be given 'operational definitions', which explain how a concept should be understood and interpreted, to assist coders to apply the category.

In drawing up a list of possible news frames, this study drew upon the frames used by Trumbo (1996) who based his work on the frame functions suggested by Entman (1993a). Entman's functions defined how frames are used in news stories. The original four functions are (1) defining problems, (2) diagnosing causes, (3) making moral judgements and (4) suggesting remedies. However, on cross-checking Trumbo's definitions of the functions with Entman's originals it was discovered that Trumbo had altered the third function slightly. While the category was still referred to as 'making moral judgements', the definition had changed from Entman's "evaluating casual agents and their effects" (1993a, p. 52) to "action statements - stories [which] present general statements calling for action or reporting action taken, arguing against action or reporting action blocked or present[ing] the argument that a course of action is not clear" (Trumbo, 1996, p. 273). This study used Trumbo's definition, but instead dropped the original title in favour of "action statements", which the researcher felt was a more accurate label. Further, category four – suggesting remedies - was also altered for use in this study. The original definition included "solutions that have been proposed or implemented" (Trumbo, 1996, p. 273). However, the researcher thought it important for this study to distinguish between solutions that were proposed and those that were implemented. Therefore, the word "implemented" was removed from the definition and given its own category: lahar response – stories that covered the solutions put in place.

Once the five frames had been decided upon, they were tested on a preliminary sample of fifteen stories. However, it was found that more frames needed to be added to the list. Frame 6 - reflecting on Tangiwai - was added to record those stories, which did not always specifically deal with the lahar's management, but talked about the Tangiwai disaster, in particular in the lead up to the 50th anniversary commemorations in December 2003. Frame 7 – implying disaster – was added for those stories, which implied that deaths, injury or property damage would result from the lahar. Frame 8 -

assessing lahar risk in the context of volcanic eruptions – was found primarily in those stories in mid-1996 during that period of eruption activity on Mount Ruapehu. Frame 9 – conflict – was deemed important to investigate whether conflict framed the coverage. Frame 10 – after the event – incorporated those stories that were printed after the lahar took place in March 2007.

Table 6: Framing categories used in the study

Frame	Description	Examples
1. Defining problem(s)	**Deals with the consequences of lahar.** The impacts may be negative, positive, or debated (adapted from Trumbo, 1996).	• Descriptions of what might happen when the lahar takes place (e.g. bridges destroyed, people killed etc.) • Impacts on local tourism
2. Diagnosing causes of problem(s)	**Provides evidence as to the reality that the problem exists.** There are typically presentations of scientific findings that support the idea that there is a problem, refute the idea that there is a problem, or present the argument that the nature of the problem is unknown (Trumbo, 1996).	• Stories that provide specific details about the tephra dam – its formation and impact • Updates on the crater lake level
3. Action statements	**Stories that present general statements calling for action or reporting action blocked, or present an argument that a course of action is not clear** (adapted from Trumbo, 1996).	• Calls from opposition groups for intervention at the crater lake • Statements that DOC must act to deal with the lahar, without going into detail what that action might be
4. Suggesting remedies	**Provide specific information about how solutions should be implemented.** These stories report specific solutions that have been proposed, solutions that have been rejected or deemed inadequate, or present a debate about a specific solution or solutions. *Note that the specificity of the solution – a statement of exactly how the solution should be carried out – is an important distinction between an action statement and a solution statement* (Trumbo, 1996).	• Suggestions to build a bund to divert the lahar's flow • Discussions about the decision to install an alarm system
5. Lahar	**These stories cover the remedies**	• The raising and reinforcing of

response	**implanted by the various authorities to respond to the lahar threat.** These responses include false warning alarms, the building of infrastructure and the "lahar cops".	the Tangiwai bridge • Installation of the ERLAWS warning system • False warning alarms • Training exercises
6. Reflecting on Tangiwai	**These stories focus on the 1953 disaster.** Tangiwai survivors/rescuers/witnesses may be used as sources.	• Coverage from the memorial service commemorating the 50th anniversary of the Tangiwai disaster
7. Implying disaster	**These stories imply that death(s)/injury/infrastructure damage may occur as a result of the lahar.** Comparisons may be made between the 1953 disaster and the current situation.	• Suggestions that people may be killed as a result of a lahar and/or wide spread destruction of infrastructure
8. Assessing lahar risk in the context of volcanic eruptions	**A common frame in stories before the discovery of the tephra dam.** These stories deal with lahars that occurred in a volcanic context.	• Reports of volcanic lahars, which took place during the 1996 eruptions • Alarm testing on the Whakapapa Skifield
9. Conflict	**When problems are represented as disagreements or clashes between individuals, groups, institutions etc** (Edelstein, Ito, & Kepplinger, 1989).	• Tension between Local Government and Central Government over the lahar solution
10. After the event	**These stories cover both what happened when the lahar went and the period after.** They may comment on the outcome of the lahar's management and planning.	• Descriptions of how the lahar occurred on the day • The clean-up operation • Discovery of Tangiwai wreckage

4.2.6.4 Sources

Sources were the third aspect of the 'lahar issue' coverage examined by this content analysis. Chapter 3 introduced the idea of primary definers. Such definers are distinguished by their frequent use as sources and their role as frequent initiators of stories (Hall et al., 1978). To examine the impact of primary definers, this study first

examined the number of sources per story. If a story has only one source then it is likely that person is a primary definer. To examine who the definers were, this study recorded the individual, their associated organisation (if any) and their role (e.g. scientist, politician). This study also took into account where the sources were used in the stories. If the source is cited in the lead paragraph of a story, it is likely that person is a primary definer – either a regularly-sourced person asked to comment or the source of the story. This is also likely if the person is cited in the first half (but not the lead) of the story. However, if a person is sourced in the second-half, they are more likely to be commenting on, rather than defining, the story. Questions 15, 16, 17, 20, 21 and 23 examined the sources used in the stories.

4.2.7 The coding process

Pre-testing of the content analysis schedule is important to ensure it fits the requirements of the study and to show whether it is clear to follow (United States General Accounting Office, 1982). Six versions of the main content analysis schedule used in this study were created before it was finalised. The fifth version of the schedule was tested on 15 news articles. From that test, the schedule was adjusted and finalised. Coding of all the news articles was conducted by the researcher. The data on the coding schedules was then entered into a SPSS database for analysis. The results of the content analysis are contained in Chapter 5.

4.2.8 Content analysis limitations

Content analysis has a number of limitations. First, content analysis can only be conducted on material that has been published, broadcast or recorded in some way (Kaid & Wadsworth, 1989). If there is no record of the content, then no analysis can take place. Second, due to the "rigidity imposed by careful category selection and definition", novel or unusual aspects of coverage can be overlooked by researchers (ibid, p. 213). This study attempted to lessen the impact of this factor by contextualising the results of the content analysis with material from the analysed documents (see Chapter 7). Third, this study focused on newspaper coverage only. Radio, television and the internet are all important news sources. Therefore, it would have been useful to have conducted an analysis that considered those mediums. However, gaining access to this

material, particularly since this study covered an eleven year period, would have proved difficult and expensive. Fourth, content analysis can only comment on content, it does not reveal the intentions of the message's, authors or sources (Gunter, 2002; Kaid & Wadsworth, 1989). Fifth, coders assign their own meaning to a text, which introduces an element of subjectivity to the coding process (Krippendorff, 2004). Further, coders may also code in different ways to each other. The effects of coder bias can be lessened by testing the reliability of the coding. As mentioned in 4.2.2, 10% of the articles analysed in this study were randomly selected and coded again by another coder trained to use the schedule. The results of this test found 93% agreement between the coders – a satisfactory level of reliability.

4.3 Interviews

Between September 2007 and March 2008 I interviewed 19 people. Interviews were used in this study to explore the issues management processes used to manage the lahar. Interviews allow researchers to "understand experiences and reconstruct events in which [they] did not participate" (Rubin & Rubin, 2005, p. 3). Further, qualitative interviews allow a researcher to explore the experiences and actions of an interviewee (Kvale, 2007). According to Kvale (2007), qualitative interviews place particular emphasis on context in building an understanding of a subject. I decided interviews were the correct method for this study as context – Tangiwai and the controversy surrounding the various decisions - played a significant role in the lahar's management. Another method that could have been used was mail questionnaires. However, such questionnaires can take time to complete or they may not be returned at all (Gunter, 2002). Also, interviews have been shown to have a better response rate than questionnaires and allow the research to probe for more detailed responses (Gunter, 2002). Further, Because 19 people participated in this study, I decided it was feasible to interview each one.

4.3.1 Other issues studies that use interviews

Few pieces of research exist that involve interviews regarding issues management. Plowman, ReVelle, Meirovich, Pien, Stemple, Sheng, and Fay (1995) used interviews to analyse the situation of Walgreens, an American pharmaceutical retailer. The company was facing public pressure due to new legislature introduced in 1992 to regulate drug

pricing. From their interviews, Plowman et al. prescribed actions the company could take to manage the issue in the future.

Julia Becker, a social science researcher with GNS, conducted her own study on the lahar's management, but from an organisational psychology perspective. The GNS study focused on response planning. Key people from the various organisations involved with the lahar's management were asked what they thought about the options for the management of the lahar and how they got their information. Interviews were conducted before and after the lahar took place. The pre-interviews were conducted during April-May 2006. The follow up interviews were conducted in April-June 2007. The identity of the people interviewed for the study is confidential. However, some of my interviewees did indicate they had been involved with the study. The research is expected to be published mid-2008.

4.3.2 Ethical considerations

An information sheet and a consent form were drawn up according to the guidelines provided by Massey University's ethics committee. The interviews began by reviewing the information sheet to ensure the interviewee understood their rights for the interview. For the face-to-face interviewees, written consent forms were signed by all interviewees once they had read the information sheet. For the telephone interviews, the information sheets were sent prior to the interview via email and the consent process was completed verbally after the information sheet had been reviewed.

4.3.3 Interviewee selection

Interviewees selected for this study were sought out for their involvement with the lahar's management. This type of sampling is referred to as the a priori method (Warren, 2002). Using this method, interviewees are selected logically according to research question being answered. In terms of this study, the initial selection process was aided by the completion of the newspaper content analysis. Through this method, 12 individuals were identified early on as having substantial involvement in the lahar's management. The individuals were then contacted. Through these conversations, the list of interviewees was refined further to just those involved with the lahar's management.

This study also engaged a second sampling method: snowball sampling. According to this methodology, an interviewee or interviewees assist the researcher to contact other relevant participants by utilising their social networks (Warren, 2002). These people increase the mass of interviewees, hence the name 'snowballing'. In the context of this study, various interviewees suggested the names of other individuals who they believed would be worth interviewing. These individuals were then approached and, in most cases, interviewed.

Johnson and Weller recommend that interviewees be selected for their experience in the area of study: "the more experience an informant has, the better" (2002, p. 497). They also suggest that the informant should be involved in the area of study and that they should not have retired or withdrawn. In this study, only one participant was not involved with the lahar's management at the time it took place. This was Barbara Dempsey, formerly the Group Manager of Emergency Management at Ruapehu District Council. She was involved with the lahar's management from the early stages up until January 2007, two months before the lahar took place, when she changed jobs. As a long-serving council employee, Dempsey could offer a perspective on the early stages of the lahar's management, which her newer-RDC colleagues could not. For this reason, and the fact she had only recently left her job, she was deemed an important interviewee.

4.3.4 Setting up the interviews

Seventeen of the nineteen interviewees were contacted prior to the interview by telephone. The other two were contacted initially by email. Two potential interviewees were unable to be interviewed. One was too busy and the other was not contactable. Once the initial contact had been made, a time, date and place for the interview were then agreed upon. The information sheet and consent form, along with a copy of the interview questions, were then sent to the interviewee via email. As Warren states "it is not uncommon for respondents to forget, simply not show up, or in other ways delay or prevent the action [and] completion of the interview" (2002, p. 90). For this reason, the interviews were arranged three weeks in advance and the information sheet, consent

form and questions sent a couple of days before the interview. Doing this allowed the participants to prepare (if they wished) and gave them a timely reminder.

Most of the interviewees were keen to be involved with this study, especially those who had not already been interviewed by Becker (see 4.3.1). Many were interested to see the results of this research. Face-to-face interviews were conducted at the interviewee's workplace, usually in a meeting room or the participant's office. One interview was conducted at the interviewee's home and one interview was conducted at my house. The decision on the location for both these interviews was decided according to convenience for the interviewee (and in the second case, my convenience too).

4.3.5 Interview questions

I drew up a list of questions before the interviews took place (see Table 7). Following Warren's (2002) suggestion, the questions were guided by the literature on issues management. In particular, I referred to the issues management process referred to by Jaques (2000) who divides the process into four broad steps: (1) definition, (2) objective setting, (3) intended outcomes and (4) tactics. I kept the questions broad so as to not impose an issues management structure on the interviewees. Further, the set questions were kept the same for all interviewees to allow for comparison between their responses. According to Rubin and Rubin, the goal of interviewing is "to work out a coherent explanation by piecing together what different people have said, while recogni[s]ing that each person might have his or her own construction of events" (2005, p. 11). Having a set list of questions allows for the responses of the interviewees to be compared (J. C. Johnson & Weller, 2002). For this reason, I asked each interviewee the same base questions.

The set questions helped structure the interview while still giving the flexibility to ask follow up questions. These questions were not pre-prepared, but evolved out of an interviewee's answers. Sometimes interviewees could not answer a question. For example, 'What role do you think media coverage played in influencing perceptions of the lahar issue?'. Some interviewees were not involved with the media management of the lahar. For this reason, questions that did not apply were not asked to some of the interviewees.

Table 7: Interview questions

About you
• What was your role in the lahar management?
Identifying the issue
• At which point was the lahar identified as an issue? • How did you identify it as an issue?
Objectives
• What objectives did you have for the lahar's management?
Tactics
• How did you 'manage' the issue? How did you work with the various stakeholders? • What role do you think media coverage played in influencing perceptions of the lahar issue?
Outcomes
Reflecting on the lahar's management and how it went on the day... • What do you think worked well? • What do you think could be done better?

4.3.6 Telephone and face-to-face interviews

An interviewee's responses depend on the rapport they have with the researcher. The rapport established between the researcher and the interviewee influences how forthcoming the interviewee will be when answering questions (Kvale, 2007). Also, to an extent, the responses given in an interview depend on the skill of the researcher as an interviewer.

Two communication channels were used to conduct the interviews: face-to-face and over the telephone. Of these two methods, face-to-face was preferred. The main benefit of face-to-face interviews, in regard to this study, is that they are better than telephone interviews for discussing complex topics (Shuy, 2002). Further, Shuy suggests the answers given in face-to-face interviews have been said to be more natural and considered. Face-to-face interviews have also been shown to have a better response rate to interview questions (Shuy, 2002). However, face-to-face interviews can be time

consuming. Also, the researcher must find a way to meet the interviewee in person, which, in the case of the interviews conducted for this study, required travel.

It was deemed important that the interviews with those most-involved with the lahar's management be conducted face-to-face. This resulted in a fieldtrip to Taumaranui and Turangi. However, if it was possible to interview someone face-to-face, it would be conducted that way. If not, then the interview was conducted over the phone. In total, 12 interviews were conducted face-to-face and 7 were conducted over the phone.

Telephone interviews have the advantage that they can save the researcher time and money (Shuy, 2002). However, telephone interviews have many disadvantages too. Interviews conducted over the phone lack the body language component of face-to-face interviews. The researcher cannot see the interviewee, so it is impossible for them to interpret their body language and, therefore, respond accordingly. Telephone interviews have also been shown to change how interviewees respond. Interviewees have also been shown to be more evasive, agreeable and extreme in telephone interviews than in face-to-face interviews (Jordan, Marcus, and Reeder, 1980 cited in Shuy, 2002).

4.3.7 Recording the interviews

All interviews conducted for this study were recorded using a digital recorder. Recording the interviews allowed me to accurately interpret the interviewees statements. As Johnson says, "obtaining a verbatim record is ideal if the subsequent analysis is to be valid and meaningful" (2002, p. 112). The use of the recorder also allowed me to focus on the interviewee rather than on note-taking (I did, however, take occasional notes). Under the ethical guidelines set down by Massey University's ethics committee, participants could ask for the tape recorder to be turned off at any stage of the interview. Interviewees could also ask for a copy of the interview and transcripts (if applicable). Three interviewees requested a copy of their interviews. At the start of each interview, I made sure to place the recorder close to the interviewee for good sound quality. This also meant that I did not have to move the recorder, which would have been distracting for the interviewee. The recorder's presence did not seem to influence responses. Although one interviewee did say that he would have to be careful what he said due to the recorder. Otherwise, the recorder was not mentioned.

4.3.8 Number, length and format of interviews

In total, 19 interviews were conducted for this study. The length of the interviews ranged from 15 minutes to just over 2 hours. While it was suggested to the interviewees that the interview would last "approximately an hour", the actual length of the interview was determined by what the interviewee had to say and, in the case of the longer interviews, participants being happy to continue past the agreed time frame. Overall, the interviews were open-ended. While the set questions were used to guide and focus the interview, spontaneous follow up questions were used to delve further and played a large role in directing the interviews.

4.3.9 The preliminary interview

Johnson and Weller (2002) say that the initial interview(s) a researcher conducts about a subject are generally open-ended and unstructured because the researcher is learning about the topic being studied. This type of 'learning' interview occurred for the first interview completed for this study. The interview was with Herb Christophers, a DOC Issues Manager on 13 September 2007. This initial interview answered questions about how issues management was conducted and provided an understanding of how all the organisations fitted together. While a list of questions was used for this initial interview, these questions were discarded for the subsequent interviews, and new questions drawn up, with a greater focus on issues management (see 4.3.5).

4.3.10 Analysing the interviews

The results of the interviews are explored in Chapter 6. In this chapter, the results are combined and presented chronologically, using the contributions of the interviewees to build a picture of how the lahar issue was communicated. In this way, as Rubin and Rubin (2005, p. 11) state, topical researchers "[select] details and [create] an image from them". This picture was compiled with the knowledge that interviewee's responses were filtered through their individual and organisational perspectives. Rubin and Rubin suggest that "qualitative research is not simply learning about a topic, but also learning what is important to those being studied" (p. 15). Daymon & Holloway state that

qualitative interviews allow you to "understand the topic from your informants' point of view" (2002, p. 185). For example, the interviews conducted with the Department of Conservation staff, can be considered to be representative of both that organisation's perspective and the interviewee's personal perspective on the subject of the management of the lahar.

4.3.11 Interview limitations

Interviews, as used in this study, have a number of limitations. First, interviewers may introduce bias to interviews (Kvale, 2007). Interviewers may come to an interview with preconceived ideas and project these onto the participants both during the interview and when interpreting the results. Second, the results obtained from interviews depend on the skill and experience of the interviewer. Interviewees with limited experience, such as myself, may be less adroit at interviewing than an experienced interviewer (J. C. Johnson & Weller, 2002; Kvale, 2007). Third, interviews are limited by the interview participants. This relates to the number of interviews and the knowledge the participants can offer. I did not interview everyone involved in the lahar's management. However, I attempted to include participants from the two 'lead' organisations: Department of Conservation and Ruapehu District Council. I also attempted to include people from other organisations who were involved in order to get an overall view of how the 'lahar issue' was managed. Participants were all involved to varying degrees. Some had been intensely involved for the full 11 years, while others had only been involved for a few years. Fourth, the accuracy of interviews is reliant on the participants' recall. Many of the participants found it difficult to remember back to the earlier years, in particular, 1996-2001, when the lahar's management began. For this reason, I used secondary sources, such as news stories and journal articles, to verify dates and facts.

4.4 Conclusion

This chapter has looked at the two methods used in this study: content analysis and interviews. The first part of this chapter introduced content analysis as a research tool and explained how the process was used in this study from sampling methods, data collection, content analysis schedule preparation and, finally, execution. In the second part of this chapter, interviews were presented as a research tool and their use in terms

of this study was described. Chapter 5 examines the results of the content analysis. Chapter 6 explores the results of the interviews. Chapter 7 discusses the results of both methods with reference to issues management theory and the issues lifecycle.

Chapter 5:
Content Analysis Results

5.1 Introduction

This chapter explores the results of a content analysis that examined coverage of the lahar issue from June 1996 – June 2007. Chapter 4 describes how the sample was selected and how the content analysis was conducted. The results contained in this chapter, along with the results of the interviews in Chapter 6, are discussed in Chapter 7. Appendix D references the newspaper stories analysed in this study. The specific questions addressed in this chapter are:

- How much attention (salience) did media give the issue?
- How did this 'attention' change over time?
- What frames did media use when reporting the lahar?
- Which sources – if any – could be seen as "driving" media coverage?

This chapter is structured into sections that collate the appropriate data from the content analysis to answer the above questions. The first section of this chapter deals with the first two questions – 'How much attention (salience) did media give the issue?' and 'How did this 'attention' change over time?'. This section gathers together salience data. In particular it looks at the number of 'lahar issue' stories published, when those stories were published, where those stories were printed on the page, on what page the stories were printed, the percentage of the page the story took up and the use of visuals. The second section of this chapter deals with the third question – 'What frames did media use when reporting the lahar?'. This section lays out the frames present in the news coverage and examines the 1953 Tangiwai Disaster's (see 2.2.1) use as a framing element. Finally, the third section of this chapter deals with the fourth question – 'Which sources – if any – could be seen as "driving" media coverage?'. This section scrutinises the frequently-cited sources in 'lahar issue' stories and the frames they were commonly-associated with.

5.2 Salience

This section assesses the salience (attention) given to the lahar as indicated by news coverage. This assessment takes into account the number of stories printed, where these stories were printed on the page, which page the stories were printed on, and the use of visual material.

5.2.1 Number of 'lahar issue' stories printed

The first and most basic indicator of salience is the number of stories printed about a topic. The more stories that are printed about a topic, the greater that topic's salience. A total of 309 stories related to the 'lahar issue' were published in the five newspapers during the sample period. Table 8 reports the number of stories each newspaper published by year. Of the papers analysed in this study, the weekly local paper, the Ruapehu Press, published the most stories dealing with the lahar issue, printing a total of 75 stories. The daily newspaper that published the most lahar stories was The Dominion Post (established 2002) (57). The Evening Post published the least stories about the lahar issue (11). However, this also relates to the fact that the Dominion and Evening Post merged in 2002 to form the Dominion Post, meaning that none of these papers existed for the entire sample period. Together, the Dominion and Evening Post printed a total of 32 'lahar issue' stories between 1996 and 2002. When added to the Dominion Post's total (57) this gives a total of 89 stories. Therefore, because the Dominion Post is an amalgamation of the Dominion and Evening Post, this suggests that it is the Dominion Post that printed the most stories of all the newspapers. The Dominion Post's interest in the story is also represented in the fact that it was the publication which printed the most stories dealing with the lahar issue in one year - 23 in 2007.

Table 8: Number of stories printed by newspaper / year

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Dominion	3	2	3	0	1	10	2	0	0	0	0	0	21
Dominion Post	0	0	0	0	0	0	2	4	10	10	8	23	57
Evening Post	1	2	2	0	0	6	0	0	0	0	0	0	11
Manawatu Standard	6	1	1	0	0	12	4	7	2	0	3	3	39
NZ Herald	0	1	0	0	1	4	2	11	10	0	6	17	52
Ruapehu Press	3	4	2	2	0	9	5	14	14	4	6	12	75
Waikato Times	2	4	1	1	0	7	6	4	7	5	3	14	54
Total	15	14	9	3	2	48	21	40	43	19	26	69	309

News coverage totals for each year indicate that attention for the lahar issue peaked in 2007 during which 69 news stories were published (see Figure 7). This can be easily explained as 2007 was the year the lahar took place. Other notable peaks include 2001 (48 stories), a year which saw Opposition MPs and the Regional and Local Councils debating with the Government over its decision to install an alarm system instead of 'intervention'. As shown by the yearly totals, the debate around the lahar solution continued into 2003 (40 stories) and 2004 (43 stories). By 2005 (19 stories), the Councils had accepted the Government's plans and the attention had shifted to the implementation of the lahar response. The years that the lahar issue received the least attention were 1999 (3 stories) – the year of the release of the Department of Conservation's final Assessment of Environmental Effects, which laid-out the options for dealing with the lahar - and 2000 (2 stories) – the year that Sandra Lee approved the installation of an alarm system and the development of emergency response plans.

Figure 7: Overall 'lahar issue' stories totals by year (1996-2007)

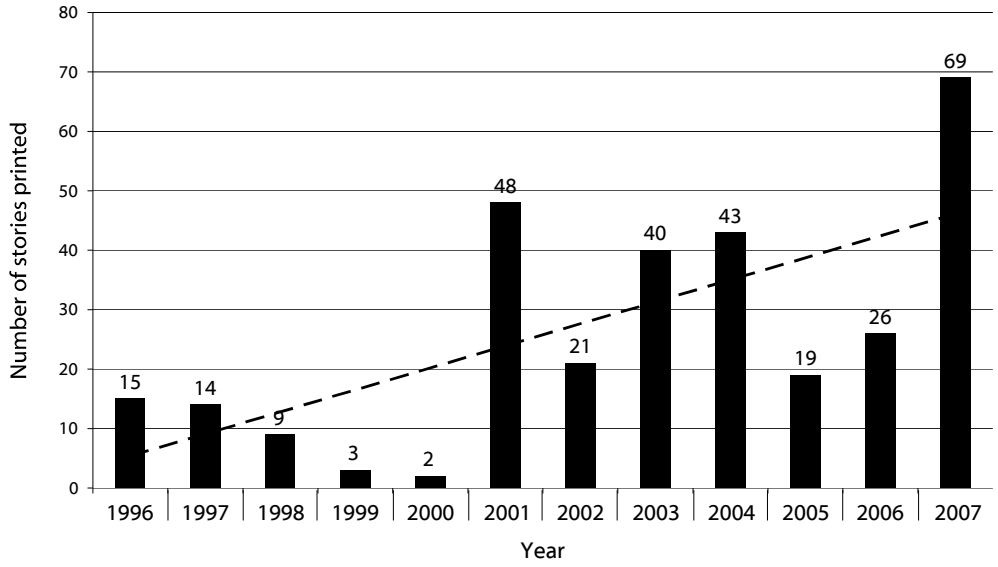


Figure 8 gives an overview of the number of stories printed each month and indicates the events, which occurred at various points on the graph. The month that saw the most lahar issue stories printed was March 2007 (38 stories) – the month the lahar took place. Other notable peaks include January 2007 (18 stories) – a month with frequent updates on the crater lake's level and also a visit to the crater by Government Ministers and Council staff. June 2001 (16 stories) saw Opposition MP, Nick Smith, attacking the Government for its decision to not intervene at the crater. October 2006 (16 stories) was the month a small eruption occurred at Ruapehu, setting off the ERLAWS warning system. The most stories printed on a single date was March 19, 2007 (14 stories) – the day following the lahar. March 20, 2007 (9 stories) – again, covering the after effects of the lahar. March 19 and 20 are notable as most media outlets ran multiple 'lahar issue' stories on these dates, hence the number of stories printed. Other dates which had large amounts of coverage include December 22, 2003 (5 stories) – reporting of the 1953 Tangiwai Disaster commemorations, December 24, 2003 (4 stories) – more reporting of the Tangiwai commemorations, June 16, 1997 (4 stories) – the release of a report confirming the likelihood of a big lahar occurring, and June 17, 1997 (4 stories) – the response from Politicians and locals to the news of the impending lahar.

Overall, Figure 8 shows a slight upward trend in salience of the ‘lahar issue’ (represented by the dashed line). This suggests that the more probable the lahar became, the more attention it received. However, the spread of the lahar coverage makes it clear that media coverage was inconsistent over the entire period. Figure 8 shows that during 2001-2004, media frequently reported on the ‘lahar issue’ while the ‘solutions’ were being debated. However, from 1996-2000 and from mid-2005 to September 2006, the issue received little or no coverage. A spike in news coverage can be seen starting from October 2006 and lasting until March 2007. This period began with a small eruption that set off the ERLAWS warning system and was followed by the DOC’s announcement (December 2006) that the lahar was likely to take place in the following months, the updates on the lake’s level (January/February 2007) and then the month the lahar occurred (March 2007).

Figure 8: 'Lahar issue' news coverage 1996-2007

(total number of media articles printed each month)

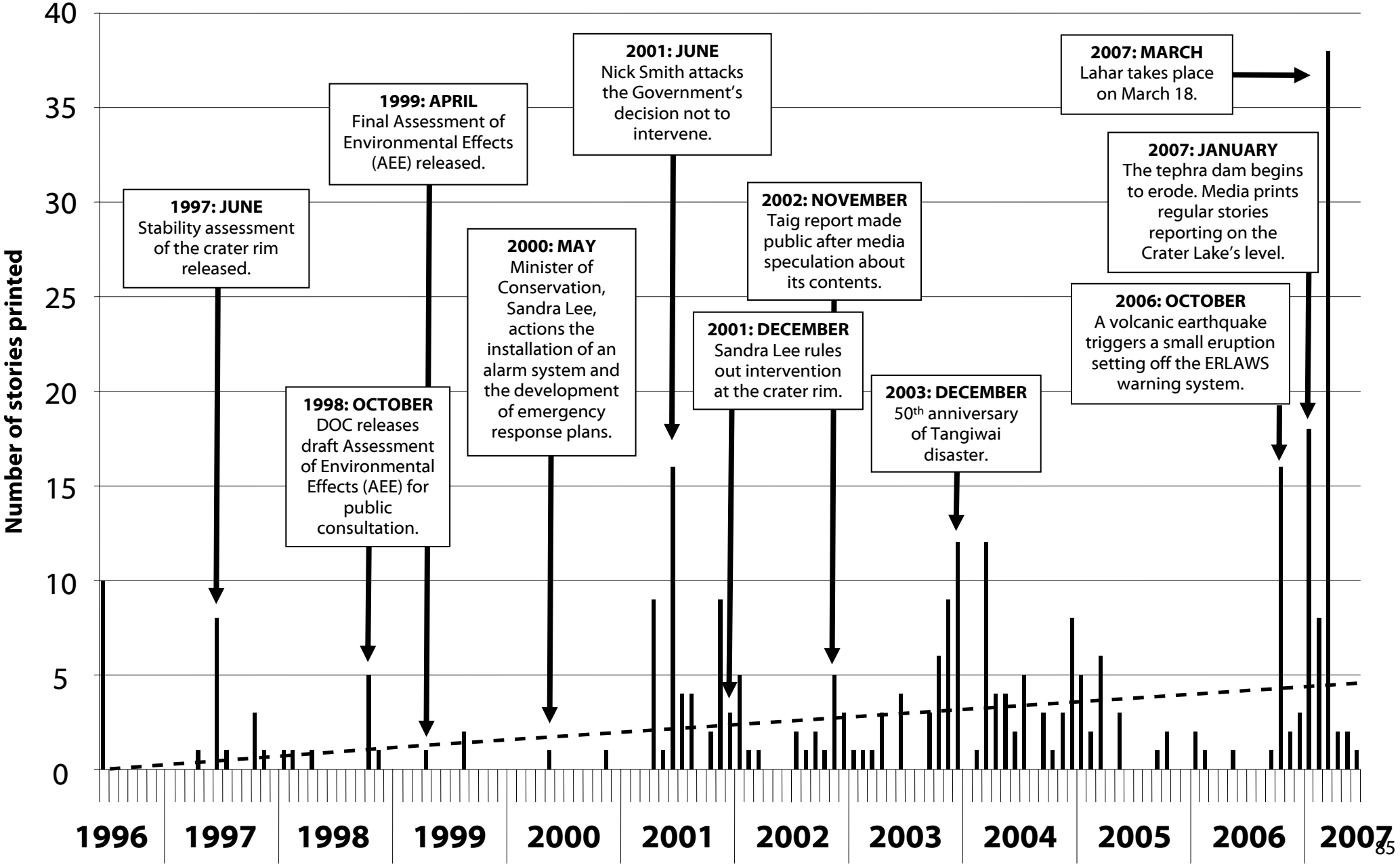
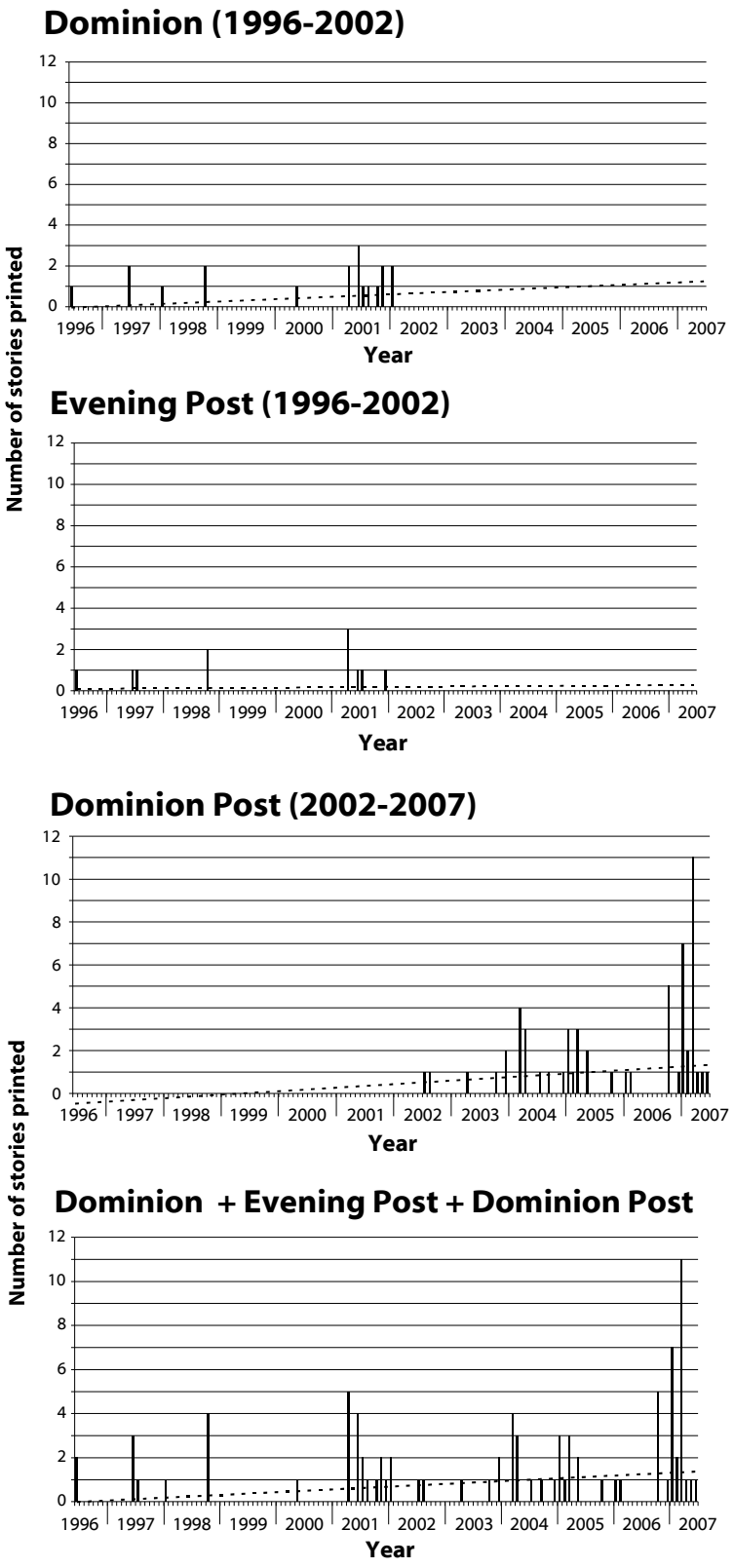


Figure 9: 'Lahar issue' news coverage by newspaper (1996-2007) – Part 1

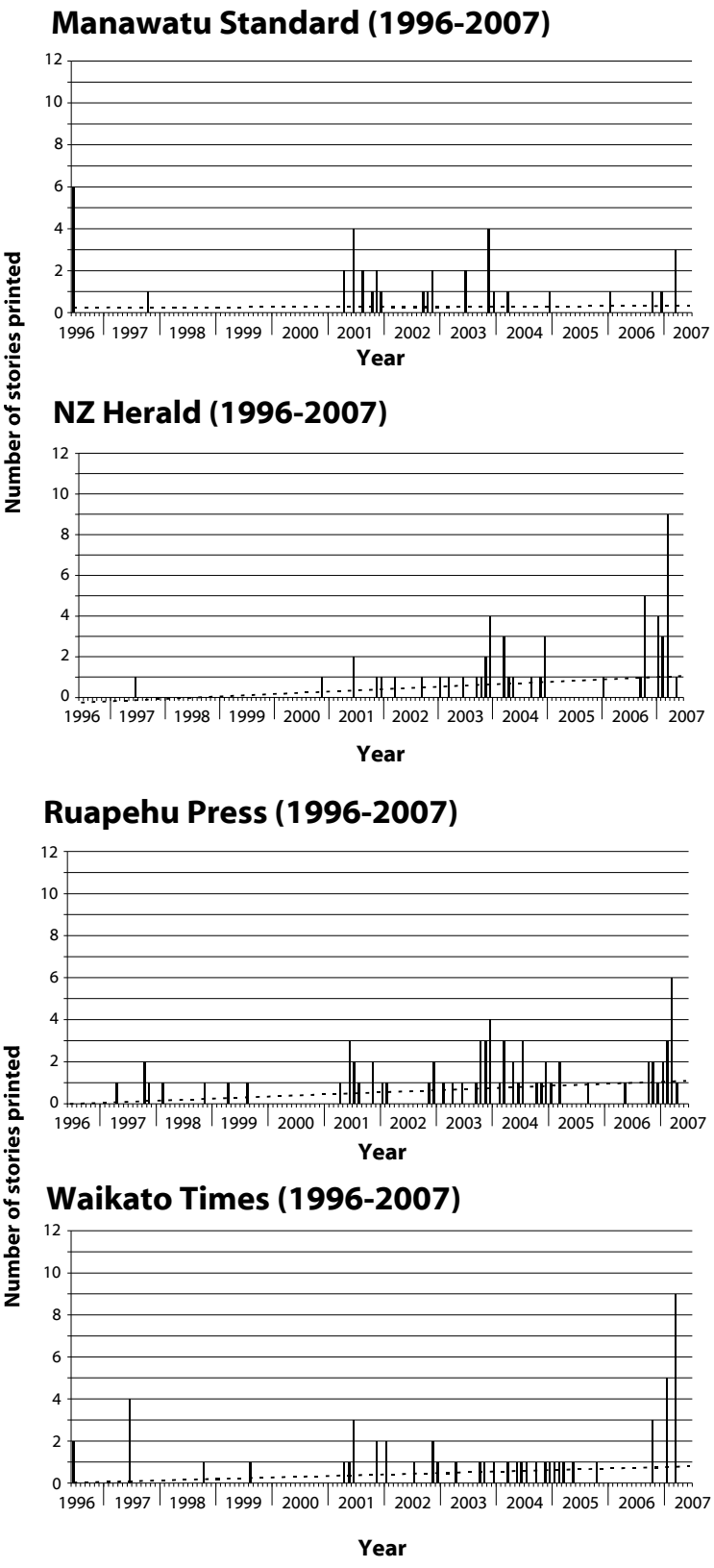


What is difficult to establish from the trend line of the overall coverage is whether the degree of salience of the 'lahar issue' remained stable or increased over time. What can be said is that when 'lahar issue' related-events occurred, in general, the news outlets in this study published stories about them. This continued coverage suggests that the lahar had enough salience to receive continued coverage. To explore this further, Figure 9 and Figure 10 show the 'lahar issue' coverage for the eight papers included in this study. Figure 9 focuses in particular on the coverage of the three Wellington-based newspapers, the Dominion, Evening Post and Dominion Post. The first three graphs show the coverage for these papers individually. The fourth graph combines the stories printed by all three publications. This graph works on the assumption

that the Dominion and Evening Post – which later merged in 2002 to become the Dominion Post –would have had a similar editorial direction as the two other papers. Therefore, combining the story figures from the three publications gives an idea of what the coverage would have looked like had the Dominion Post existed for the entire 11 year period. What this combined graph shows is that coverage of the 'lahar issue' was consistent over the entire period. This is also the most-consistent coverage of issue of all the newspapers in this study. There is a slight upward trend in the overall coverage (represented by the dashed line), which is similar to that of the combined coverage for all the newspapers (see Figure 8).

Figure 10 graphs the news coverage of the four remaining papers in this study. The Manawatu Standard covered the 'lahar

Figure 10: 'Lahar issue' news coverage by newspaper (1996-2007) – Part 2



issue' intermittently. Of particular note is the fact that the paper ran only two stories during March 2007 when the lahar occurred, while for all the other papers this was the month they printed the most stories over the entire period. However, the Manawatu Standard had three other months when it printed more stories (June 1996, eruptions on Mt Ruapehu – 6 stories, June 2001, Nick Smith and the Councils attack the decision not to intervene – 4 stories and November 2003, the Tangiwai commemorations – 4 stories).

The graph of the New Zealand Herald's coverage shows that it was slightly more consistent, than the Manawatu Standard, in its coverage of the lahar issue. The paper was slow to start its coverage of the lahar issue and printed only one story (in 1997) about the topic before 2000. 2001-2004 shows continued coverage of the debate between the Councils, Opposition MPs and the Government over the decision not to intervene. Notably, the NZ Herald did not print any stories during 2005. The coverage again picked up in October 2006 (5 stories) following the false alarm/mini eruption and continued through January (4 stories) and February (3 stories) 2007, until the lahar took place in March (9 stories).

Figure 10 shows that the Ruapehu Press was the most consistent in its coverage over the 11 year period. However there were some periods when few (2005-2006) or no stories were printed (2000). The number of months during which the paper printed multiple stories is notable due to the fact that the paper is only published four or five times monthly (depending on the month).

The Waikato Times coverage also showed consistency in its coverage. A feature of its coverage that distinguishes it from that of the other papers in this study is that while its coverage was consistent, the paper did not publish many multiple stories in a single month like its counterparts did. Instead it consistently published single stories about the issue (see, for example mid-2003 to early-2005).

5.2.2 Story placement on page

As discussed in Chapter 4, a story's position on a page indicates its salience (see 4.3.6.1). The top left of a page is considered the most-desirable position as it is the first place newspaper readers look. Top right is the next most-coveted position, followed by bottom left and bottom right. Therefore, stories printed in the top left corner of a newspaper page have the greatest salience (importance), while those stories printed in the bottom right have the least. Table 9 shows that 48.2% of the lahar stories in the sample were printed in the top left hand corner, while another 21.7% were printed in the top right. A combined total of 69.9% of stories relating to the lahar were printed 'above the fold' – the most prominent place on a newspaper page. This indicates that editorial staff considered the lahar to be interesting to their readers and this is reflected in where those stories were placed on the newspaper page.

Table 9: Placement on the page (where?)

	Frequency	Percent	Cumulative Percent
Top Left	149	48.2	48.2
Top Right	67	21.7	69.9
Bottom Left	55	17.8	87.7
Bottom Right	38	12.3	100.0
Total	309	100.0	

5.2.3 Placement in the newspaper (which page?)

Another basic indicator of salience is the number of the page on which a story is printed (see 4.3.6.1). Editors run stories they think will attract readers. The most important stories are those that run on the front page, because they are the first stories readers see when they pick up a newspaper. Page 3 is the second, followed by the 2nd page, 3rd, 4th and so on. The closer to the front of a newspaper a news story is printed, the greater salience (importance) it has. The results of the content analysis show that the most-frequent page lahar issue stories ran on was the front page (69) (see Table 10). A further 56 stories ran on page three and 57 ran on page two. The combined figures for the first three pages show that 182 or 58.9% of stories about the lahar issue ran on these pages. In total, 88% of stories ran within the first ten pages.

Table 10: Stories grouped by the page they were printed on

Page No.	Frequency	Frequency	Cumulative Percent	Page No.	Frequency	Percent	Cumulative Percent
1	69	22.3	22.3	**14**	2	.6	91.6
2	57	18.4	40.8	**15**	3	1.0	92.6
3	56	18.1	58.9	**16**	6	1.9	94.5
4	16	5.2	64.1	**17**	1	.3	94.8
5	23	7.4	71.5	**18**	3	1.0	95.8
6	11	3.6	75.1	**19**	2	.6	96.4
7	18	5.8	80.9	**20**	2	.6	97.1
8	7	2.3	83.2	**21**	2	.6	97.7
9	6	1.9	85.1	**23**	3	1.0	98.7
10	9	2.9	88.0	**24**	1	.3	99.0
11	5	1.6	89.6	**25**	1	.3	99.4
12	1	.3	90.0	**26**	1	.3	99.7
13	3	1.0	90.9	**28**	1	.3	100.0
------				**Total**	309	100.0	

5.2.4 Percentage of page taken up by news story

Another indicator of salience is the percentage of a page allocated to a news story. The most common page allocation for lahar stories was 0-5% (27%) (see Table 11). A further 26% of stories were allocated between 6-10% of the page. Of the entire sample, 75% of stories (239) were allocated between 0-20% of the page on which they were printed. This shows that most stories were of a small size. This can also be seen in the cumulative percentage of the 0-5% and 6-10% categories, which when combined totalled 53% of the stories published.

Table 11: Percentage of page taken up by news story

	N	Percent	Cumulative Percent
0-5 %	85	27%	27
6-10 %	83	26%	53
11-15 %	36	11%	64
16-20 %	35	11%	75
21-25 %	15	5%	80
26-30 %	15	5%	85
31-35 %	8	3%	88
36-40 %	10	3%	91
41-45 %	10	3%	94
46-50 %	2	1%	95
51-55 %	8	3%	98
56-60 %	4	1%	99
61-65 %	1	0%	99
66-70 %	3	1%	100
86-90 %	1	0%	0
91-95 %	1	0%	0
96-100 %	2	1%	101
Total	319*	100%	101*

* Total includes 10 stories which were printed over two pages, hence the cumulative percentage total of 101%.

5.2.5 Visual material

Table 12: Visual material

	Frequency	Percent	Cumulative Percent
Photo(s)	112	36.2%	36.2
Cartoon(s)	1	.3%	36.6
Map/Diagram	19	6.1%	42.7
Combination	7	2.3%	45.0
No visual	170	55.0%	100.0
Total	309	100.0	

Visuals are yet another indicator of a story's salience. As discussed in Chapter 4, editors use visuals to attract reader attention to a story (see 4.3.6.1). For this research the visuals accompanying the story were noted and their sizes calculated. 45% of stories included a visual of some kind (see Table 12). This figure is comprised of photos, cartoons, maps/diagrams and combination (a mixture of the aforementioned visual types). A total of 32 visuals were printed on the front page – just under half of the 69 front page stories (see Table 10). Of these 32 visuals, 24 were photos, 1 was a cartoon, 4 were maps or diagrams, and 3 were a combination. Pages two and three also featured a large number of visuals. Of the 57 page two stories, 26 included visuals and of the 56 page three stories, 16 included a visual. In total, 75.5% of visuals printed took up 0-20% of the page (see Table 13). As shown by Table 12, photos were the most-frequently used visual type (86% of all visuals). In total, 112 stories featured photos.

Most of the photos printed were of the crater lake – either an aerial shot, or up close (e.g. Tracey Watkins, 2001). Sometimes these pictures included scientists measuring the lake level, while other photos were of the 1995/1996 eruptions (e.g. Samson, 1998) or of previous lahars (e.g. Kitchin, 2003). The photos printed depended on the topic of the story. For example, stories printed about the Tangiwai disaster or the 50th Anniversary commemorations featured pictures of Tangiwai survivors (e.g. Manson, 2003; Quirke, 2003) or photos from the commemoration ceremony. Stories printed on March 19 – the day after the lahar occurred – included photos of the swollen Whangaehu River and of the debris left behind. All of the maps included with news stories illustrated the lahar's probable path (e.g. Bell, 1997; Corry, 2002; Patterson, 2003). All the combinations were comprised of a photo and a map/diagram. The one cartoon accompanied a front page story about the 'lahar police'. It featured a police officer on a podium telling two seated police officers, "the first sign of a lahar is when the speeding tickets stop" (A. Saunders, 2005, p. 1). Disregarding the visual types, the fact that visuals accompanied lahar issue stories, in particular front page stories, suggests that the issue had significant interest for newspaper readers.

Table 13: Visual material size on page

	Frequency	Percentage	Cumulative Percent
0-5 %	51	36%	36.7
6-10 %	26	18%	54.7
11-15 %	18	13%	67.6
16-20 %	11	8%	75.5
21-25 %	11	8%	82.7
26-30 %	7	5%	87.1
31-35 %	7	5%	92.1
36-40 %	5	3%	95.7
41-45 %	3	2%	97.8
46-50 %	1	1%	99.3
51-55 %	2	1%	100.0
86-90 %	1	1%	101.0
Total with visuals	143	45%	
No visual	170	55%	
Total	309	100%	

5.3 Framing

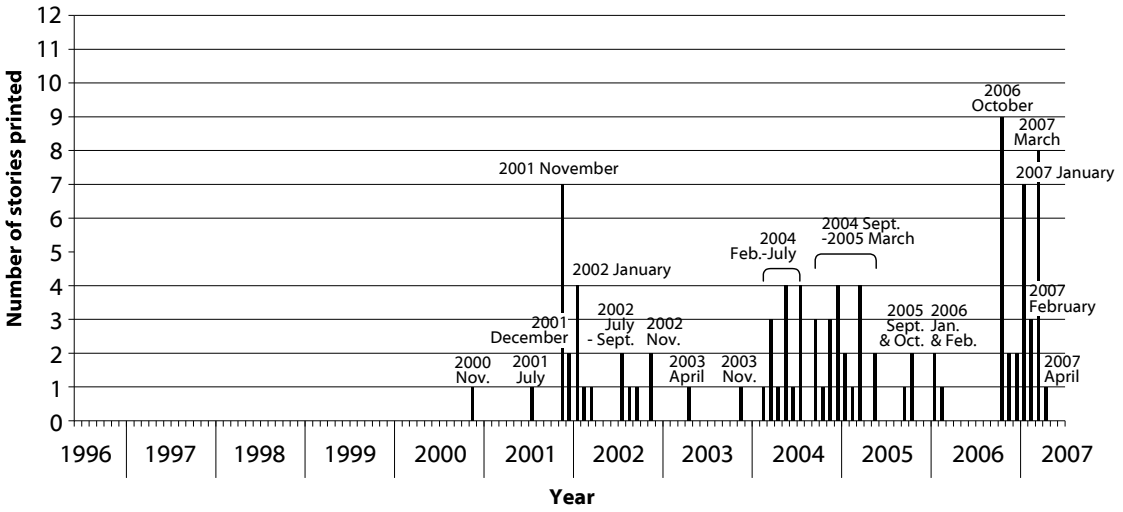
This study examined 11 frames that were used to present the lahar issue (see 4.3.6.3 for a full description of the 11 frames and how they were identified). This section examines the frequency of each of the frames in order of rank from the most-used frame (lahar response) to the least (implying disaster). In total, 439 frames were identified in the news coverage (see Table 14). 130 stories were found to contain more than one frame (a minimum of one frame was identified for each story). Table 14 also examines the frames printed by each of the newspapers in this study. These results are incorporated into the results of the individual frames. This section on framing concludes with the results of how Tangiwai was used as a framing element in lahar issue stories.

Table 14: Frames used to present 'lahar issue' news stories

Rank		Dominion	Dominion Post	Evening Post	Manawatu Standard	NZ Herald	Ruapehu Press	Waikato Times	Total	% of total
1	**Lahar response**	3	22	2	5	13	29	23	97	22%
2	**Diagnosing causes of problem(s)**	5	22	1	5	21	8	12	74	17%
3	**Definition of problem(s)**	4	9	4	7	11	12	10	57	13%
4	**Action statements**	3	3	1	10	7	19	7	50	11%
5	**After the event**	0	14	0	3	9	7	9	42	10%
6	**Suggesting remedies**	9	3	1	7	2	6	3	31	7%
7	**Conflict**	2	2	2	5	4	10	2	27	6%
8=	**Assessing lahar risk in the context of volcanic eruptions**	2	1	2	6	0	7	3	21	5%
8=	**Reflecting on Tangiwai**	0	2	0	3	6	5	5	21	5%
10	**Implying disaster**	4	3	1	5	3	2	1	19	4%
	Total	32	81	14	56	76	105	75	439	100%

5.3.1 Frame #1: Lahar response

Figure 11: Frame #1 - Lahar response

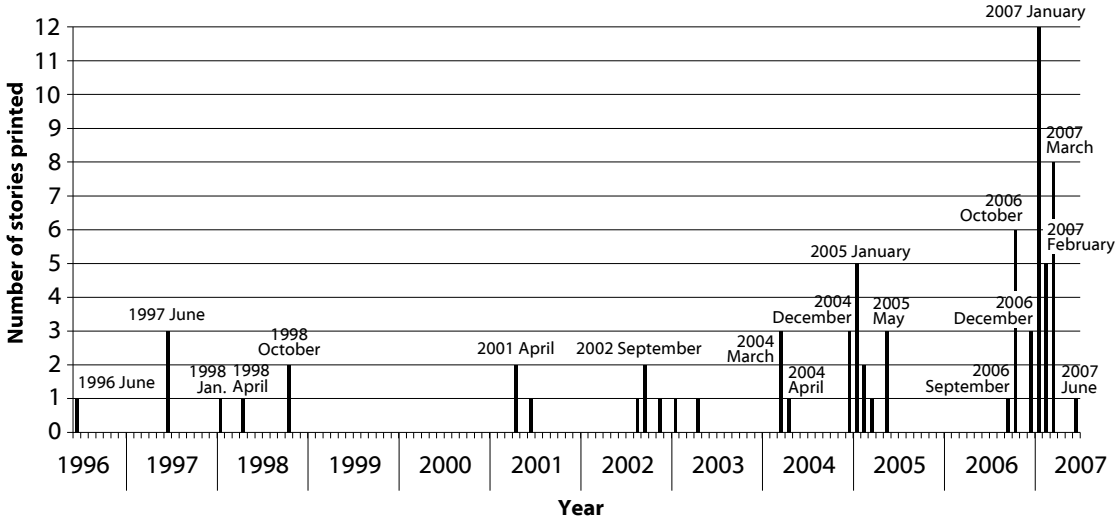


The most common frame present in news coverage was lahar response (22% = 97) - stories that focused on the things being done to manage the lahar (see Figure 11). Stories presented using this kind of frame appeared from November 2000, after Conservation Minister Sandra Lee endorsed the installation of a warning system and the development of emergency response plans. Notable peaks in 'lahar response' stories include November 2001, during which a Ministerial committee was set up to respond to the lahar and DOC was granted permission to build the bund (stopbank) to divert the lahar. During October 2006 (9 stories) the ERLAWS warning system was set off by a minor eruption and the Emergency Response Plan was tested in an exercise involving all the responsible organisations. The lahar response frame appeared consistently in stories from October 2006 to March 2007, a period which saw substantial coverage of the impending lahar. Another period of consistent coverage was from February 2004 to March 2005. During this period a decision was made to raise and reinforce the road bridge at Tangiwai (April 2004) and the funding was approved (May 2004). A lahar brochure to warn of the risk was drafted (July 2004). The Emergency response plan was tested (September 2004) and it was announced that extra police would be stationed on the Desert Road (November 2004). Finally, in March 2005, the road bridge was reopened, the lahar brochure was published and the Police Commissioner had to defend the lahar police officers who were criticised for issuing speeding tickets to motorists on the Desert Road. These events give some explanation for this sustained period of coverage which can be seen on the graph. Of the newspapers in this study, the Ruapehu

Press printed the most ‘lahar response’ stories (29) followed by the Waikato Times (23) and the Dominion Post (22). The Evening Post (2) and The Dominion (3) printed the least, followed by the Manawatu Standard (5).

5.3.2 Frame #2: Diagnosing causes of problem(s)

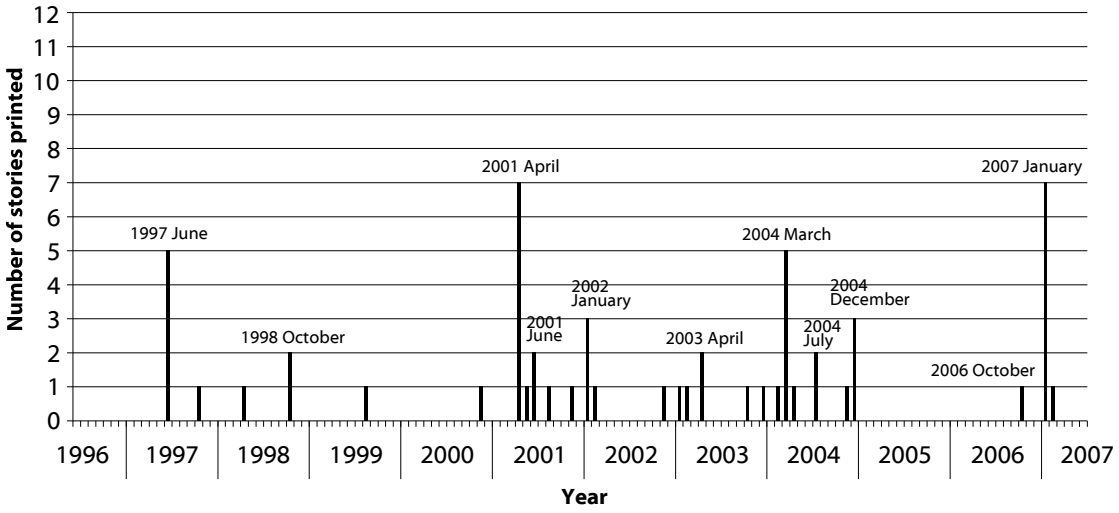
Figure 12: Frame #2 - Diagnosing causes of problem(s)



The second most-common frame was diagnosing causes of problem(s) (17% = 74) (see Figure 12) – stories that focused on providing evidence to show the problem exists or that presented an argument that the nature of the problem was unknown. Its application in news stories was sporadic. Notably, many stories which featured this frame were printed in the latter-half of the news coverage, in particular during the final months leading up to the lahar (September 2006 – March 2007). This frame incorporated updates from DOC on the Crater Lake’s level. These updates can be seen in January 2005 (5 stories), January 2007 (12 stories) and February 2007 (5 stories). The Dominion Post (22) printed the most stories that used this frame, followed closely by the NZ Herald (21). The Evening Post printed the least ‘diagnosing causes of problem(s)’ stories (1). Other papers with low usage of this frame included The Dominion (5) and the Manawatu Standard (5).

5.3.3 Frame #3: Definition of problem(s)

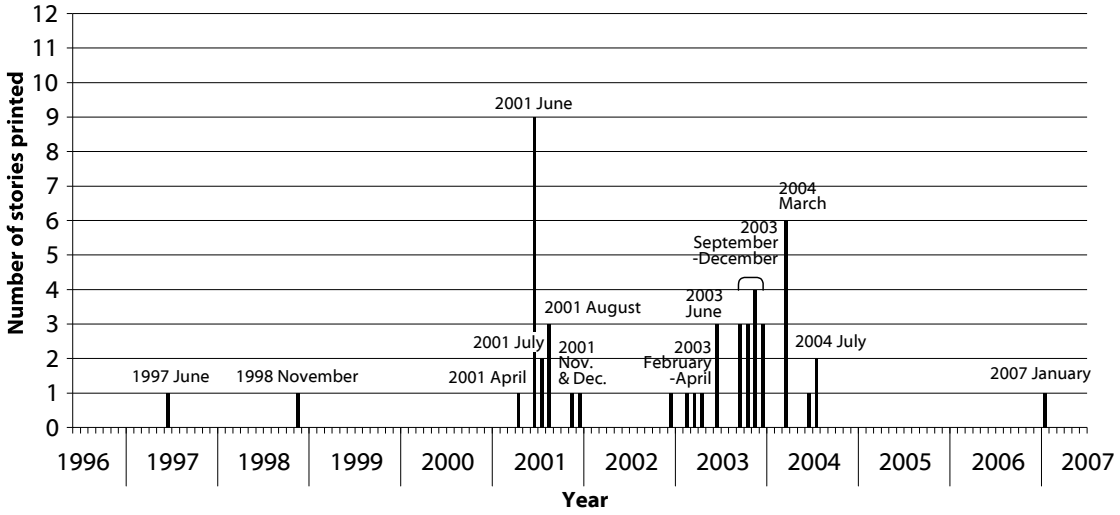
Figure 13: Frame #3 - Definition of problem(s)



The third most-common frame was the definition of problem(s) frame (13% = 57) – stories that focused on the impact of the lahar, whether it be a negative, positive or debated impact (see Figure 13). This frame was first used in June 1997, when the potential for a dam-break was confirmed in the Hancox et al. (1997) report. During the debate between Government, opposition MPs and the Councils, which predominately took place from 2001-2004, the frame was employed a total of 36 times. Usage of this frame was generally applied evenly across the papers with the Ruapehu Press (12) printing the most stories using the frame followed closely by the NZ Herald (11), Waikato Times (10) and Dominion Post (9). The Dominion (4), Evening Post (4) and Manawatu Standard (7) were the papers that employed this frame the least.

5.3.4 Frame #4: Action statements

Figure 14: Frame #4 - Action statements

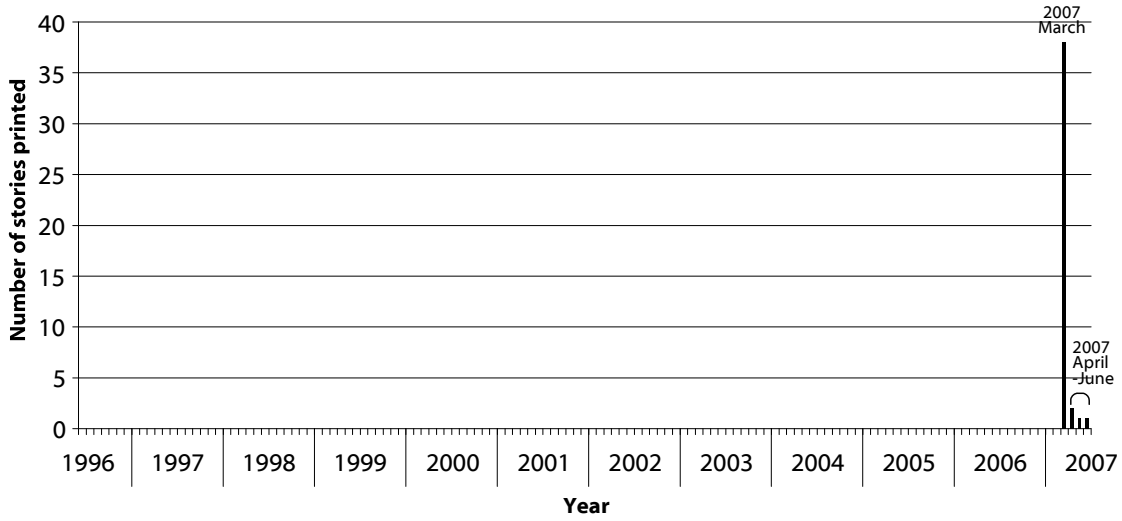


Action statements – stories which presented general statements calling for action, reporting action blocked, or presenting an argument that a course of action is not clear – made up 11% of all frames used (N=50). The use of this frame was concentrated in the period from April 2001 to July 2004, the time which saw debate over the Government's decision not to intervene at the crater by Opposition MPs and the Local and Regional Councils (see Figure 14). During this period, a total of 47 stories were printed (only 3 stories using this frame were printed outside this period). Notable points include June 2001, during which 9 news stories used this frame when National MP Nick Smith questioned the decision to not intervene and the Councils publicly declared their opposition to the plans for managing the lahar. September-December 2003 saw repeated use of this frame. In September 2003, Horizons Regional Council chairman, Chris Lester, sought protection from liability for the lahar. In October, a meeting between Lester, Ruapehu District Mayor, Sue Morris, and Minister of Conservation, Chris Carter (October) was controversially cancelled and then rescheduled for late November. In December, a few days after the Tangiwai Disaster commemorations, Opposition MPs (from National and ACT) again attacked the Government for its decision to not intervene. The last month, which saw substantial coverage using this frame was March 2004 (6 stories) when Horizons chairman, Lester, appealed to the Government for one last time to intervene. As seen on the graph, this opposition continued until mid-2004, when the Government agreed to reimburse some of the costs for the lahar's management. The Ruapehu Press printed the most stories that employed this frame (19)

followed by the Manawatu Standard (10). The Evening Post (1), The Dominion (3) and the Dominion Post (3) printed the least.

5.3.5 Frame #5: After the event

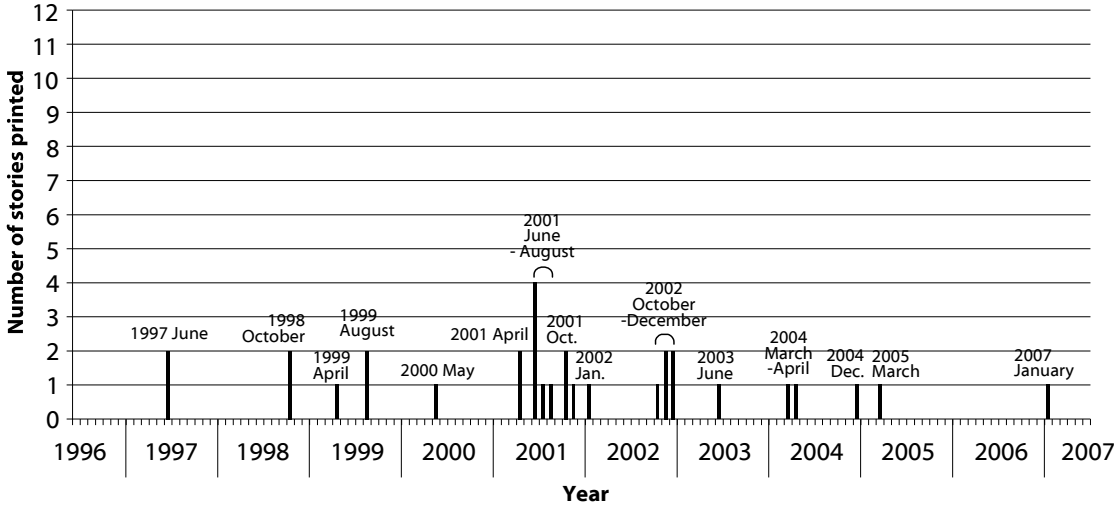
Figure 15: Frame #5 - After the event



'After the event' was the fifth most-used frame during the lahar's coverage (10% = 42), which focused on what happened after the lahar took place and, possibly, assessments of the lahar's management (see Figure 15). This frame was used predominately during March 2007 (38 stories) and April (2 stories), May (1) and June (1). The Dominion Post (14 stories) printed the most 'after the event stories', followed by the NZ Herald (9 stories), the Waikato Times (9 stories) and the Ruapehu Press (7 stories). The Manawatu Standard printed the least stories that used this frame (3 stories). (NB: The Dominion and Evening Post's coverage did not cover this period).

5.3.6 Frame #6: Suggesting remedies

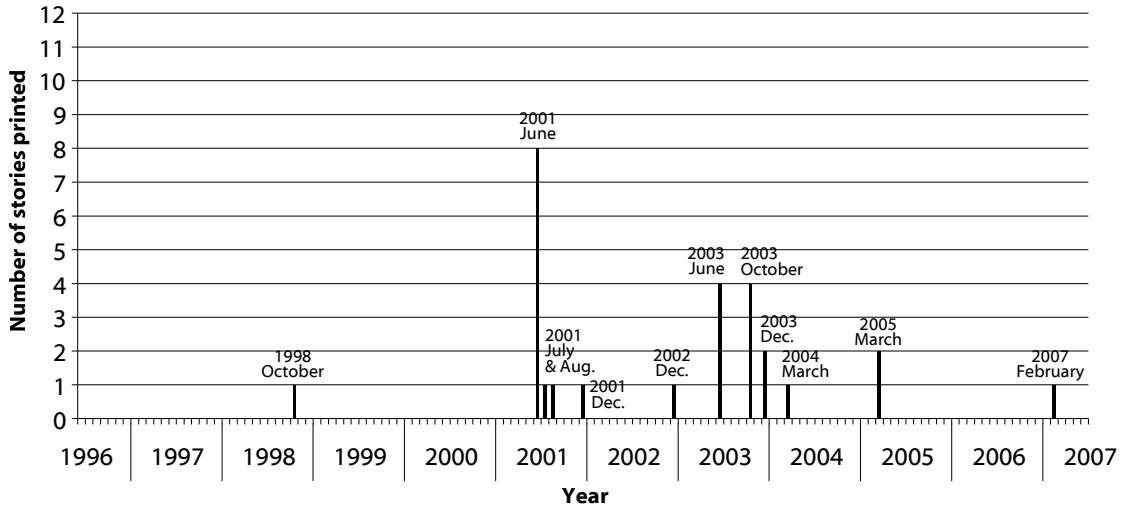
Figure 16: Frame #6 - Suggesting remedies



The sixth most-common frame was suggesting remedies (7% = 31). This frame was distinguished from action statements by the inclusion of *specific information* about how the solution(s) should be implemented. These 'solutions' could be proposed, rejected or deemed inadequate. This frame was also used in stories that presented a debate about a solution or solutions. The frame appeared early in the coverage during the period of public consultation and the formulation of options (June 1997 – April 1999) (see Figure 16). It also featured in the coverage during the 2001-2004 period when the lahar solution was being debated. Notably, after March 2005, this frame only appeared once (January 2007). The Dominion printed the most 'suggesting remedies' stories (9 stories), followed by the Manawatu Standard (7 stories) and the Ruapehu Press (6 stories). The Evening Post printed the least (1 story) along with the NZ Herald (2 stories), Dominion Post (3 stories) and Waikato Times (3 stories).

5.3.7 Frame #7: Conflict

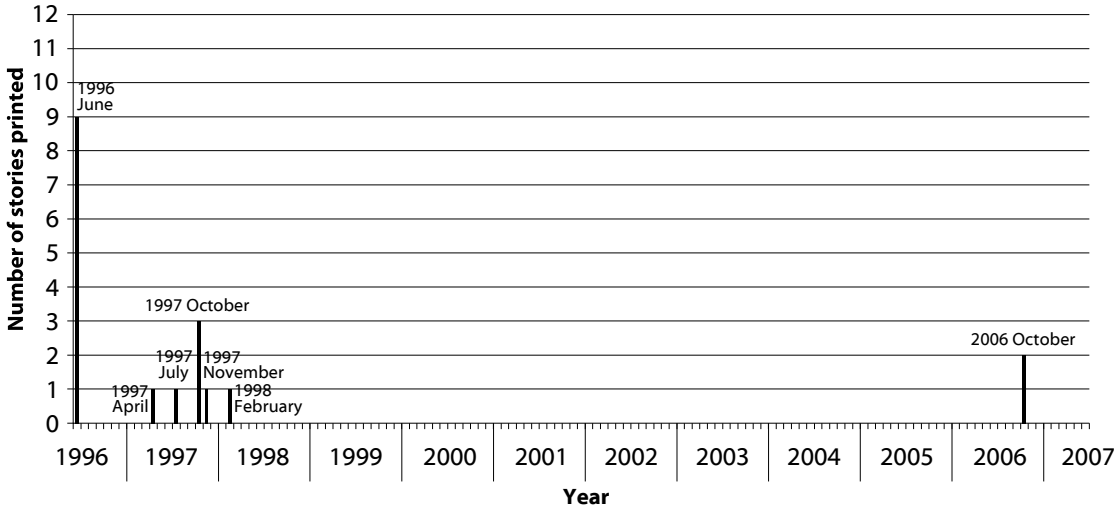
Figure 17: Frame #7 - Conflict



The seventh most-common frame was conflict (6% = 27) – stories framed as disagreements or clashes between individuals, groups or organisations. The bulk of stories featuring this frame were printed during the 2001-2004 debate period (see Figure 17). Notable peaks include June 2001 (8 stories) with the Government being attacked by National MPs and the Councils, as mentioned earlier in 'action statements'. Also, June 2003 (4 stories), which saw stories printed recapping the disagreement between the Councils and the Government, and October 2003 (4 stories) when a meeting arranged between the Minister of Conservation and the Councils was cancelled. The Ruapehu Press printed the most conflict stories (10 stories), the Manawatu Standard printed 5 stories and the NZ Herald printed 4 stories. The Dominion, Dominion Post, Evening Post and the Waikato Times all printed two 'conflict' stories.

5.3.8 Frame #8=: Assessing lahar risk in the context of volcanic eruptions

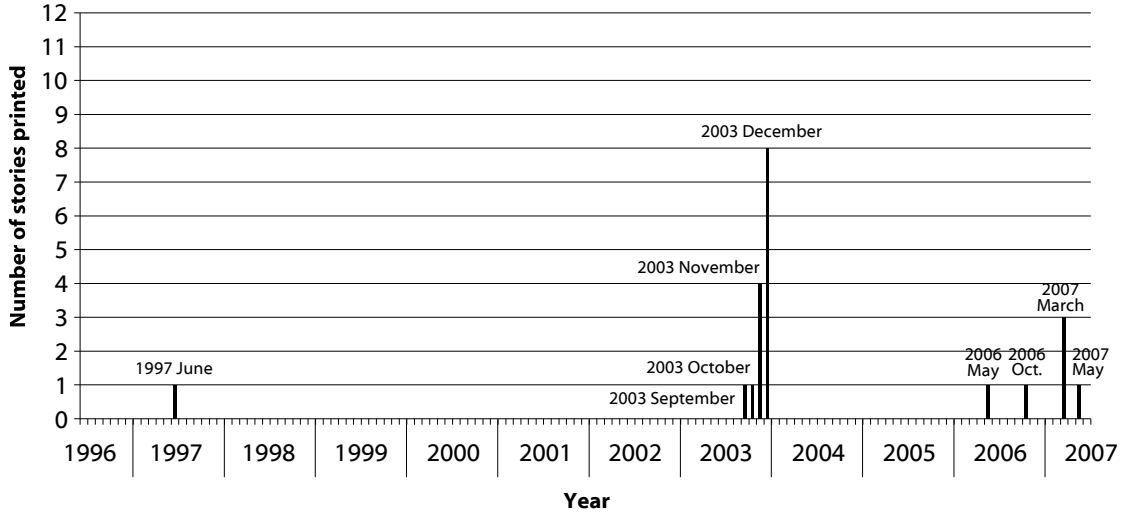
Figure 18: Frame #8= - Assessing lahar risk in the context of volcanic eruptions



Two frames were eighth-equal in their usage in new stories. One of these frames was assessing lahar risk in the context of volcanic eruptions (5% = 21) - a frame that examined the coverage of volcanic lahars as opposed to the tephra dam-break lahar (see Figure 18). Most of this coverage occurred in the first few years, in particular June 1996, when Ruapehu was erupting. There is also notable coverage from April 1997 to February 1999, during the early stages of the development of options to deal with the lahar and also some volcanic activity alerts. The Ruapehu Press (7 stories) and Manawatu Standard (6 stories) printed the most stories, while the NZ Herald (0 stories) printed the least.

5.3.9 Frame #8=: Reflecting on Tangiwai

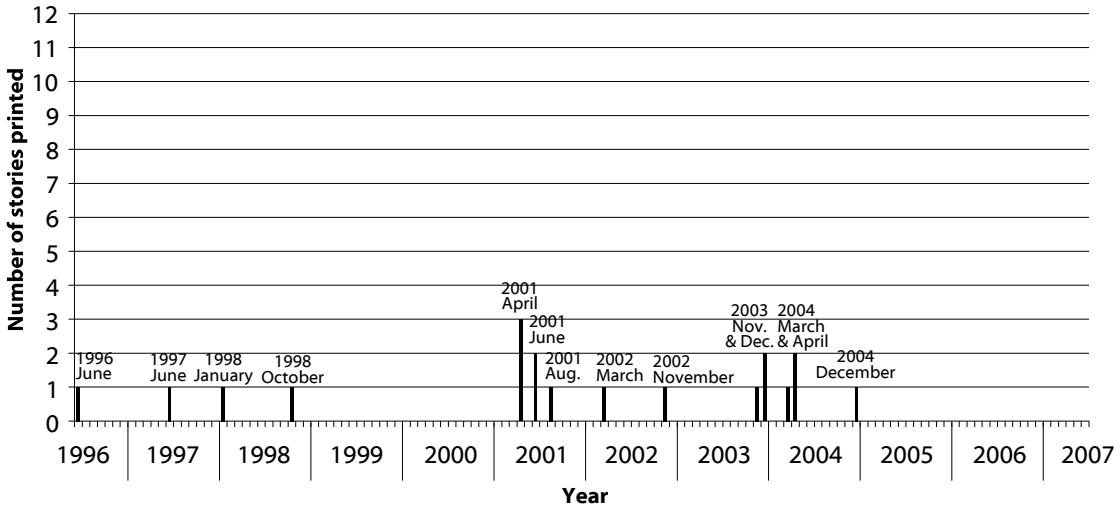
Figure 19: Frame #8= - Reflecting on Tangiwai



Reflecting on Tangiwai is the other eighth-equal used frame (5% = 21) (see Figure 19). Stories using this frame focused on the 1953 Tangiwai Disaster. This frame was particularly prominent in the months leading up to the 50th anniversary of the disaster, peaking with commemorations in December 2003 (8 stories). Interestingly, this frame was also used in coverage after the lahar took place in March 2007 (3 stories). The NZ Herald (6 stories) printed the most 'reflecting on Tangiwai' stories, followed closely by the Ruapehu Press and Waikato Times (5 stories each). The Dominion Post (2 stories) printed the least stories.

5.3.10 Frame #10: Implying disaster

Figure 20: Frame #10 - Implying disaster



The tenth most-common frame in coverage of the lahar issue was implying disaster (4% = 19). As its name suggests, this frame implied that deaths, injuries or damage may occur as a result of a dam-break lahar. As shown by the graph (see Figure 20), stories using this frame were printed during two periods: first, early on (1996-1998) when the options for the lahar were being conceived, and, second, during the 2001-2004 lahar debate period (as mentioned in the results for previous frames). The Manawatu Standard (5 stories) printed the most 'implying disaster' stories, the Dominion printed four stories, the Dominion Post and the NZ Herald printed three each and the Evening Post and the Waikato Times printed one.

5.3.11 Tangiwai

This study examined the Tangiwai Disaster as a framing element. In total, Tangiwai was mentioned in 44% (N=136) of stories (see Table 15). It is notable that Tangiwai was a regular element in the 'lahar issue' coverage.

Table 15: Tangiwai – Where mentioned?

	Frequency	Percent	Cumulative Percent
In the lead paragraph	32	10.4	10.4
Not in the lead, but in first half	62	20.1	30.4
Not until the second part	42	13.6	44.0
Tangiwai not mentioned	173	56.0	100.0
Total	309	100.0	

Figure 21: Tangiwai- mentions in news stories (grouped by month)

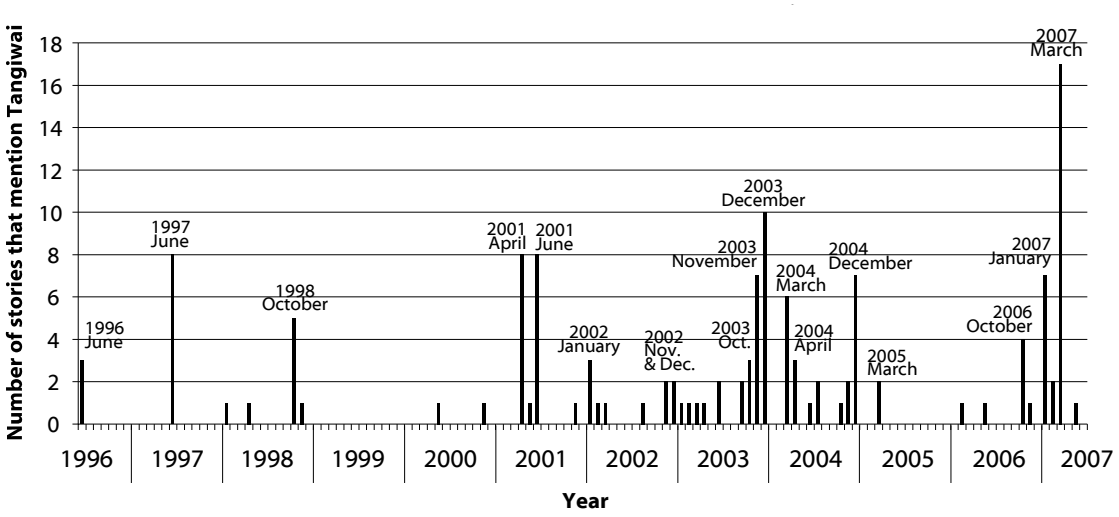


Figure 21 shows that Tangiwai was a feature throughout the lahar issue coverage. It is expected that Tangiwai would be mentioned in 2003 during the lead up to the 50th Anniversary commemorations of the disaster in December that year (10 stories). However, the graph illustrates that Tangiwai was regularly mentioned in lahar issue coverage from 1996-2007. Of particular note is March 2007, when the lahar took place. 17 of the 38 stories printed that month mentioned the lahar. Other notable peaks include June 1997 (8 stories), when the Hancox report was released and June 1997 (8 stories), as previously discussed, when National MP, Nick Smith, and the Councils attacked the Government for not intervening. Table 16 tabulates mentions of Tangiwai by newspaper. The NZ Herald printed the most stories which mentioned the lahar (28),

followed by the Ruapehu Press (27), Dominion Post (24) and Waikato Times (24). The Evening Post (6), Dominion (12) and Manawatu Standard (15) were the papers which printed the least number of stories that mentioned Tangwai.

Table 16: Tangiwai Disaster mentions by paper/year

Newspaper	1996	1997	1998	2000	2001	2002	2003	2004	2005	2006	2007	Total
Dominion	1	2	3	1	4	1	0	0	0	0	0	12
Dominion Post	0	0	0	0	0	1	3	8	1	2	9	24
Evening Post	0	1	2	0	3	0	0	0	0	0	0	6
Manawatu Standard	3	0	1	0	3	0	5	1	0	0	2	15
NZ Herald	0	1	0	1	1	1	10	5	0	2	7	28
Ruapehu Press	0	0	1	0	3	4	8	5	1	3	2	27
Waikato Times	0	4	1	0	4	3	2	3	0	0	7	24
Total	4	8	8	2	18	10	28	22	2	7	27	136

5.4 Sources

The content analysis of the newspapers in this study also examined which sources were used in 'lahar issue' stories and how they were used. This section examines the source data from the study. In particular, it aims to answer the question, 'which sources – if any – could be seen as "driving" media coverage?'. This section begins with a general overview of the sources results. It then focuses on the 15 individual most-frequently cited sources. In total, 508 sources were used in the 270 stories which used sources (39 stories used no sources). Just under half of all the stories (47.6%) cited only one source. A further 21% used only 2 sources (see Table 17) and 12.6% used no sources. These figures suggest that the majority of stories (81.2%, when the three totals are combined) were based upon few or no sources.

Table 17: Number of sources used

	Frequency	Percent
0	39	12.6
1	147	47.6
2	65	21.0
3	30	9.7
4	16	5.2
5	4	1.3
6	3	1.0
7	4	1.3
11	1	.3
Total	309	100.0

5.4.1 Organisations

DOC was the most-cited organisation (178) (see Table 19). In total, DOC sources comprised 35% of all cited sources. The second-most cited was the "not affiliated to any organisation" category (76), which shows the large number of non-organisational sources which were drawn upon for comment, in particular, members of the public (41). The Ruapehu District Council (RDC) (62) was the next largest source, followed by Horizons Regional Council (37), GNS (Geological and Nuclear Sciences) (33), National Party (21), OnTrack/Tranzrail (11), Labour Party (10), Police (9) and Ministry of Civil Defence (8). Table 10 lists the top 20 source organisations cited in the lahar issue coverage.

5.4.2 Roles

"Scientist – DOC" (94) was the most frequently-cited source type (see Table 20). As discussed later in 5.4.3.1, the "DOC scientist" referred to by this figure is Dr Harry Keys. The next most-cited source type were the three Ministers of Conservation (49),

followed by Member of Public (41), Scientist – GNS (33), Local Councillor (32), DOC Spokesperson (27), Regional Councillor (26), Politician – Opposition (25) (e.g. National Party, ACT), Tangiwai Survivor/Witness/Family Member (24) and Local Council Employee (21). Table 10 lists the top 20 types of sources cited in lahar issue coverage.

5.4.3 Individuals

In total, 164 individuals were used as source in the stories (see Table 18). The most-cited source was Department of Conservation Scientist, Harry Keys (94). The next most-cited was Opposition National MP, Nick Smith (31), followed by Horizons Chairman, Chris Lester (22), Minister of Conservation (2002-2007), Chris Carter (20), Department of Conservation Community Relations Officer, Dave Wakelin (18), Minister of Conservation (1999-2002), Sandra Lee (18), Ruapehu District Mayor (2001-current), Sue Morris (16), unspecified spokespersons from various organisations (15), Geological and Nuclear Sciences Brad Scott (14), and Ruapehu District Mayor (until 2001), Weston Kirton (11). Table 18 lists the top 20 sources cited in the lahar issue coverage.

The following section examines the top 10 sources cited in this study. These results do not include the 8th ranked source, 'Unspecified spokesperson' (n=15), who can be attributed to a number of (unknown) people and organisations. This examination looks at when the sources were cited in the overall coverage, where in the stories they were cited (e.g. lead, first half, second half), which papers used them as a source, and which frames they were frequently associated with. As mentioned earlier, part of this analysis looks at where the source was cited in the news stories. This analysis works on the logic that if the source is cited in the lead (first paragraph/sentence) then that person is likely to be the main informant in the story and possibly may be the cause. This may also be true if they are cited in the first half of the story. However, if they are cited in the second half of the story, then it is more likely they are commenting on the subject of the story rather than initiating it.

Table 18:
Top 20 most-cited individuals

#	Individual	N
1	Harry Keys *Department of Conservation*	94
2	Nick Smith *National*	31
3	Chris Lester *Horizons*	22
4	Chris Carter *Minister of Conservation*	20
5	Dave Wakelin *Department of Conservation*	18
6	Sandra Lee *Minister of Conservation*	18
7	Sue Morris [Mayor] *Ruapehu District Council*	16
8	Unspecified spokesperson *Various Organisations*	15
9	Brad Scott *GNS*	14
10	Weston Kirton [Mayor] *Ruapehu District Council*	11
11	Chris Ryan *Horizons*	10
12	Peter Davies *Ruapehu District Council*	9
13	Paul Wheatcroft *Ruapehu District Council*	8
14	Barbara Dempsey *Ruapehu District Council*	5
15	Hamish Blackburn *Member of the Public*	5
16	Paul Green *Department of Conservation*	5
17	Richard Pirere *Ngati Rangi*	5
18	Vern Manville *GNS*	5
19	Errol Christiansen *Tranzit*	4
20	Helen Clark Prime Minister	4

Table 19:
Top 20 most-cited organisations

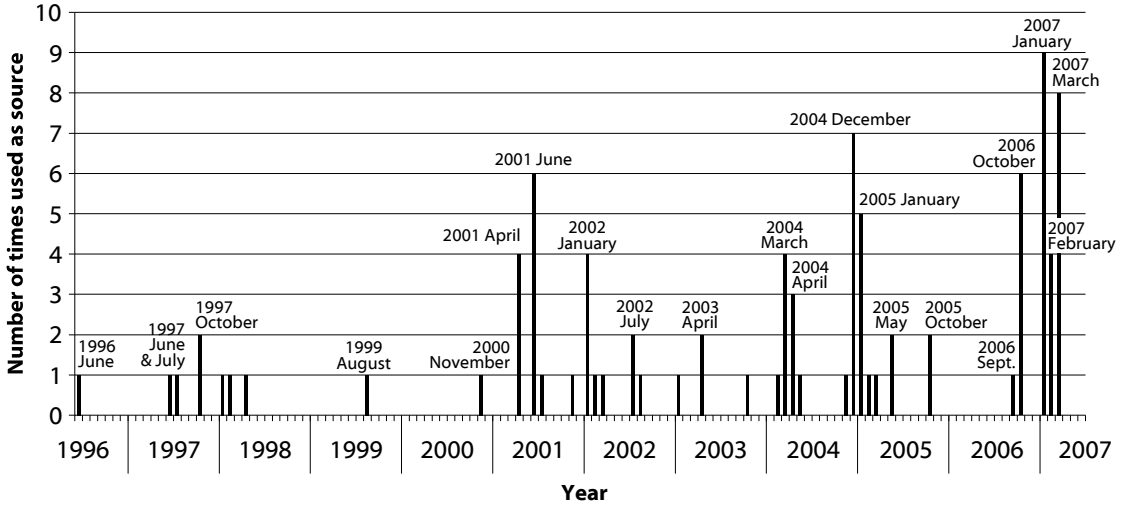
#	Organisation	N
1	Department of Conservation (DOC)	178
2	Not affiliated with any organisation	76
3	Ruapehu District Council (RDC)	62
4	Horizons	37
5	GNS (Geological and Nuclear Sciences)	33
6	National Party	21
7	OnTrack/Tranzrail	11
8	Labour Party	10
9	Police	9
10	Ministry of Civil Defence	8
11	Ngati Rangi	8
12	Transit NZ	7
13	Environment Waikato	4
14	Massey University	4
15	Ruapehu Alpine Lifts (RAL)	4
16	Wanganui District Council	4
17	The Crown (Governor General)	3
18	Metservice	3
19	Transpower	3
20	ACT Party	2

Table 20:
Top 20 most-cited roles

#	Role	N
1	Scientist – DOC	94
2	Minister of Conservation	49
3	Member of Public	41
4	Scientist – GNS	33
5	Local Councillor (including Mayors)	32
6	DOC Spokesperson	27
7	Regional Councillor	26
8	Politician – Opposition	25
9	Tangiwai Survivor/ Witness/Family Member	24
10	Local Council Employee	21
11	Regional Council Officials/Employee	19
12	Spokesperson – general	19
13	Council Spokesperson – Local	10
14	Police Officer / Spokesperson	9
15	Engineer	8
16	Iwi Spokesperson	8
17	Business Owner (in the region)	7
18	DOC Employee	5
19	Minister of Civil Defence	5
20	Scientist – Massey	4

5.4.3.1 Source #1: Harry Keys (Scientist, Department of Conservation)

Figure 22: Source #1: Harry Keys (Scientist, Department of Conservation) - When sourced?

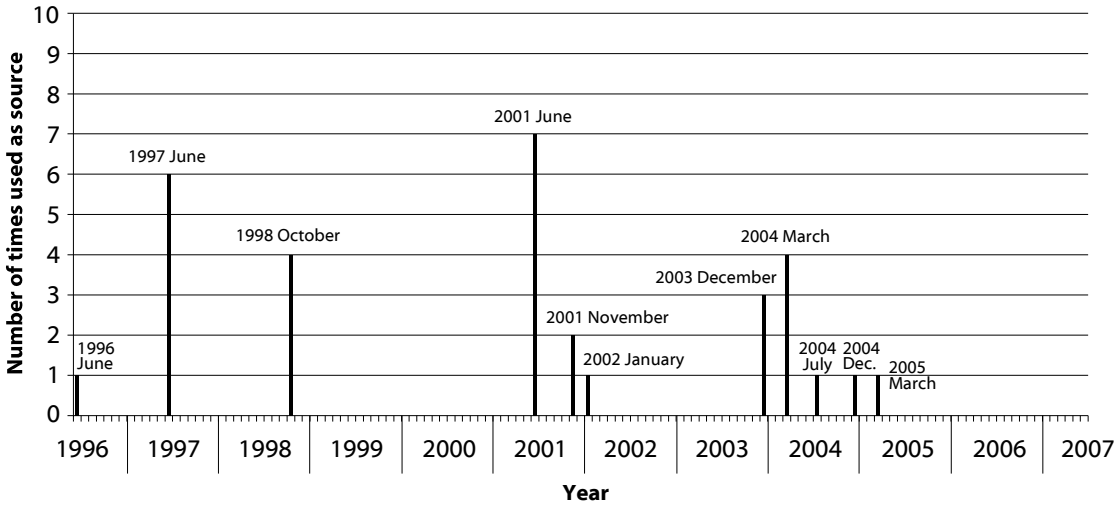


DOC Scientist Harry Keys (N=94) was the most-frequently sourced individual. He was also the person who was most-involved in the lahar's management from 1996-2007. Keys was one of the people interviewed for this study and his comments can be found in Chapter 6. His sustained involvement in the 'lahar issue' can be seen in Figure 22. His use as a source peaked in January 2007 (9 stories) in the lead up to the lahar in March 2007 (8 stories). Other notable peaks include December 2004 (7 stories) when Keys announced that the Crater Lake would be 100% full within four-to-six weeks and also June 2001 (6 stories) when he was forced to respond to the criticism levelled at the lahar's management by Opposition MP, Nick Smith, and the Councils. His significance as a source is again demonstrated when sources are categorised by role. "Scientist-DOC" – of which Keys was the only one - was the most-common role (94). Keys was the most-cited source for six of the ten frames examined by this study: 'Definition of Problem' (26), 'Diagnosing causes of problem' (45), 'Suggesting remedies' (9), 'Lahar response' (34), 'Implying disaster' (7) and 'After the event' (8). He was second most-cited source for 'Assessing lahar risk in the context of volcanic eruptions' (6) and the seventh most-cited for 'Action statements' (4). Overall, he was a top 10 source for eight of the ten frames examined in this study. The Dominion Post was the paper who most-frequently drew upon Keys as a source, citing him 23 times. The Waikato Times (19), NZ Herald (18) and Ruapehu Press (17) also sourced him regularly. The Evening Post (3), Manawatu Standard (4) and Dominion (10) cited Keys the least. Keys was most-

frequently cited (7 times) in the lead of stories, 62 in the first half (but not the lead), and 25 times in the second part, making him the top source in all these categories. Overall, the results of this study show that Keys was the only source who was consistently cited throughout the 11 years of the 'lahar issue' coverage (when compared with the results for the other top sources in this study). The results also suggest that he was an influential source (in terms of where he was cited in the stories).

5.4.3.2 Source #2: Nick Smith (Minister of Conservation – 1996-1999, National Party MP)

Figure 23: Source #2: Nick Smith (Minister of Conservation – 1996-1999, National Party MP) - When sourced?

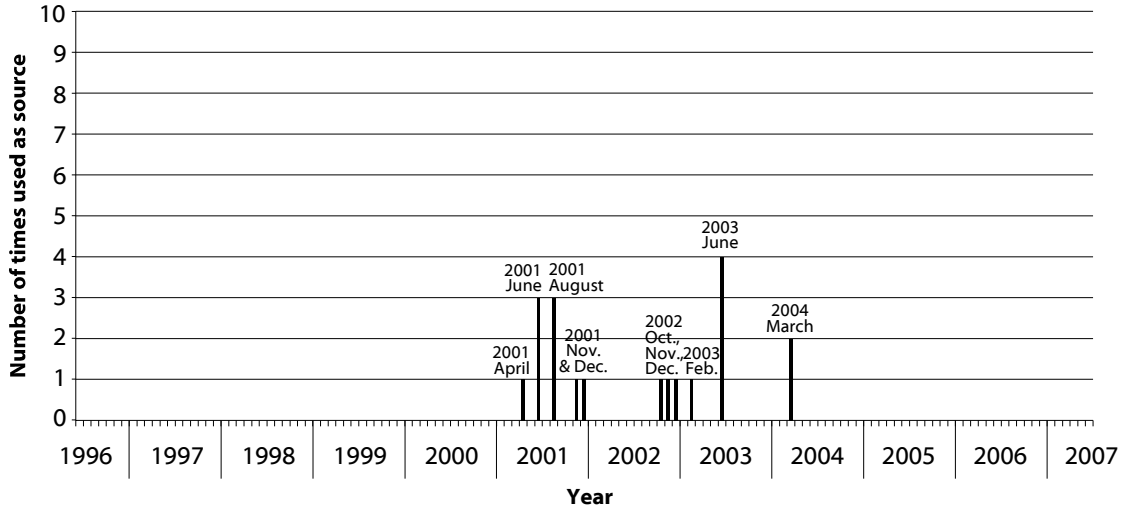


Nick Smith was the second most-sourced individual in this study (N=31). As shown in Figure 23, he appeared sporadically in the lahar issue coverage. The graph shows that there were two periods when he was active as a source: 1996-1998 and 2001-2005. The first time period is when he was Minister of Conservation from 1996 until 1999 (after which time Sandra Lee took the role after the change of Government in 1999). This can be seen in Figure 23 in June 1997 (6 stories) marking the release of the Hancox report confirming the lahar as an issue and October 1998 (4 stories), with the release of the DOC's draft Assessment of Environmental Effects (AEE) for public consultation. The second time period, June 2001- March 2005, represents Smith's time as an Opposition National Party MP. During this time he made repeated attacks on the Government's decision not to intervene at the crater rim. These events include June 2001 – 7 stories, November 2001 – 2 stories, December 2003, which coincided with the Tangiwai Disaster commemorations – 3 stories, March 2004 – 4 stories. Smith's last assault on

the Government took place in March 2005 (1 story). This was the last attack because in 2004 the Government agreed to reimburse the Ruapehu District Council for some of the costs of the emergency response and this also saw the Councils cooperating fully with DOC and the other agencies to ensure the lahar took place without loss of life. In terms of frames, Smith was frequently associated with the more negatively-oriented frames. Smith was the most-cited source for the 'Conflict' frame (8). He was the second most-cited source for 'Action statements' (9) (as discussed later, Horizons Chairman, Chris Lester, was the first), 'Definition of problem' (13) and 'Implying disaster' (6). Further, he was the third most-cited source for 'Diagnosing causes of problem' (7) and 'Suggesting remedies' (7). He was the eighth most-cited source for 'Lahar response' (3). Overall, he appeared in six of the ten frames examined in this study. The NZ Herald (7 stories) and Dominion (6 stories) were the two papers who most-frequently cited Smith as a source. The Ruapehu Press (2 stories) and Manawatu Standard (3 stories) sourced Smith the least and the Evening Post and Dominion Post both cited him in 4 stories. Smith was cited in the lead of 5 stories, in the first half (but not the lead) of 13 stories and in the second part of 13 stories. Overall, the results of this study indicate that Smith was an influential, although irregular, source, associated with negative aspects of the coverage.

5.4.3.3 Source #3: Chris Lester (Chairman, Horizons Regional Council)

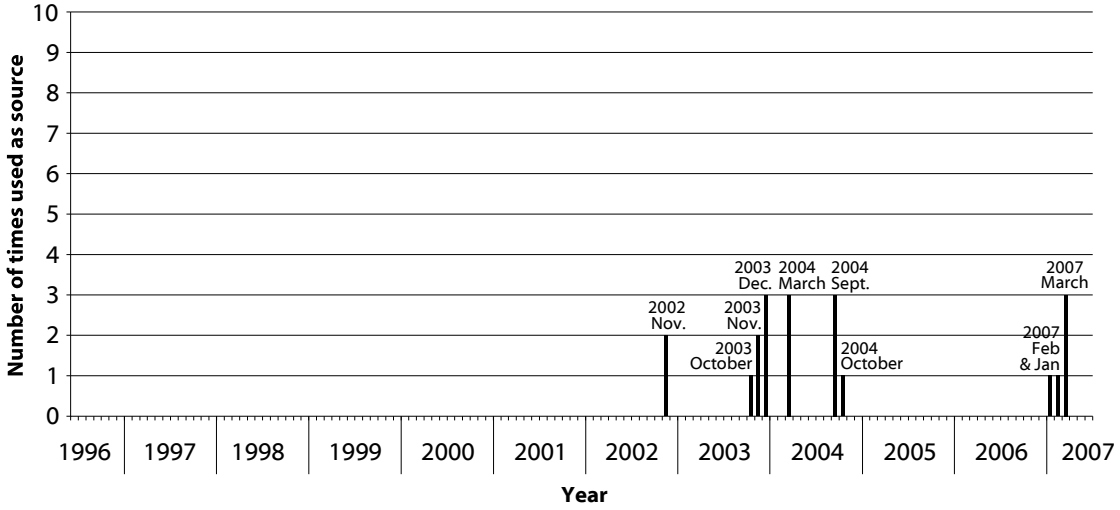
Figure 24: Source #3: Chris Lester (Chairman, Horizons Regional Council) - When sourced?



Horizons Regional Council Chairman, Chris Lester, was the third most-cited source (N=22). As Figure 24 shows, he was sourced exclusively during the 'lahar debate' period from 2001-late 2004. Lester was frequently associated with the more negatively-oriented frames. He was the most-sourced person for the 'Action statements' frame (14), the second most-sourced for 'Suggesting remedies' (7) and 'Conflict' (7), the third most-sourced for 'Definition of Problem(s)' (5) and 'Implying disaster' (3). He was a top ten source for five of the ten frames examined in this study. The Manawatu Standard (Lester's local paper) cited him 12 times, by far the most of all the papers in this study. The Evening Post and Waikato Times did not cite Lester at all, while the Dominion Post (1 story), Dominion (2 stories), NZ Herald (3 stories) and Ruapehu Press (4 stories) did cite him a few times each. Lester was cited in the lead of 3 stories, in the first half (but not the lead) of 15 stories and in the second part of 5 stories. Overall, Lester was frequently associated with the more-negative aspects of the coverage but received more attention locally (e.g. Manawatu Standard) than elsewhere.

5.4.3.4 Source #4: Chris Carter (Minister of Conservation – 2002-2007)

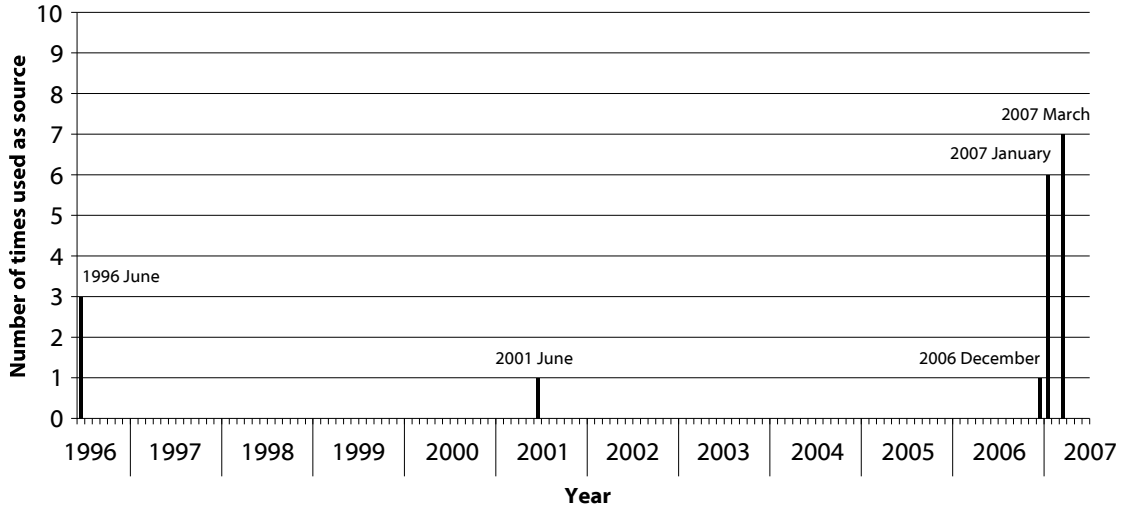
Figure 25: Source #4: Chris Carter (Minister of Conservation – 2002-2007) - When sourced?



Minister of Conservation (2002-2007), Chris Carter, was the fourth most-cited individual in this study (N=20). As shown by Figure 25, Carter appeared occasionally in the coverage, particularly from November 2002 to October 2004, which saw him responding to the criticisms of the Councils and Opposition MPs. Over the coverage period, the results show Carter was associated with a range of frames. Carter was the third most-cited source for the 'Action statements' frame (3) and 'Lahar response' (7), the fourth most-cited for 'After the event' (3), the fifth most-cited for 'Diagnosing causes of problem(s)' (3) and 'Implying disaster' (2), the seventh most-cited for 'Definition of Problem(s)' (3) and the eighth most-cited for 'Suggesting Remedies' (2) and 'Conflict' (2). He was in the top ten sources for eight of the ten frames examined in this study. The NZ Herald (6) and Dominion Post (6) were the papers that sourced Carter the most. The Dominion and Evening Post (0) – (because they were no longer in existence by the time Carter was Minister) printed the least stories, while the Manawatu Standard printed two and the Ruapehu Press and Waikato Times printed three stories each. Carter was cited in the lead of three stories, in the first half (but not the lead) of ten stories and the second part of seven stories. Overall, Carter was an intermittent source in the 'lahar issue' coverage.

5.4.3.5 Source #5: Dave Wakelin (Community Relations Officer, Department of Conservation)

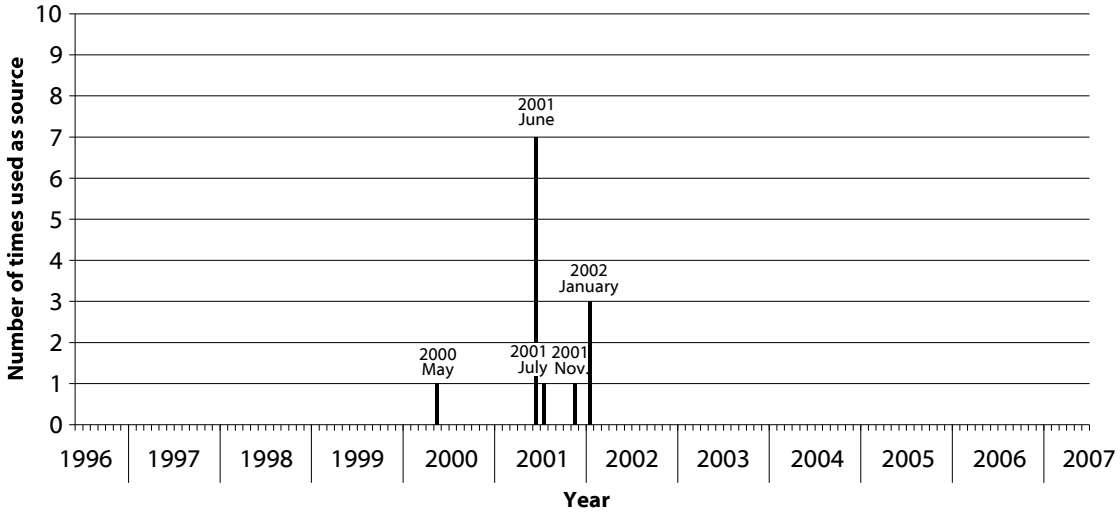
Figure 26: Source #5: Dave Wakelin (Community Relations Officer, Department of Conservation) - When sourced?



Department of Conservation Community Relations Officer, Dave Wakelin, was the fifth most-cited individual in this study (N=18). Wakelin was interviewed for this study and his comments can be found in Chapter 6. As shown by Figure 26, Wakelin appeared occasionally in the coverage. Most of his appearances as a source centre around the period from December 2006 to March 2007, when he was involved in increasing awareness of the increased potential for a lahar (December 2006 – 1 story and January 2007 – 6 stories) and then when the lahar took place in March 2007 (7 stories). Wakelin was the second most-cited source for the 'Diagnosing causes of problem(s)' frame (10) and 'After the event' (7), the fifth most-cited for 'Definition of problem(s)' (4), the seventh most-cited for 'Lahar response' (4), and the tenth most-cited for 'Conflict' (1). He was one of the top ten sources for five of the ten frames examined in this study. The Waikato Times (5) was the publication that sourced Wakelin the most, followed by the NZ Herald (4), Ruapehu Press (3) and Manawatu Standard (3), Dominion Post (2) and Evening Post (1), while the Dominion did not use him as a source. Wakelin was not cited in the lead of any stories . He was cited in the first half (but not the lead) of twelve stories and the second half of six stories. Overall, Wakelin was a regularly-used source, but only in the months when lahar activity increased (December 2006-March 2007).

5.4.3.6 Source #6: Sandra Lee (Minister of Conservation – 1999-2002)

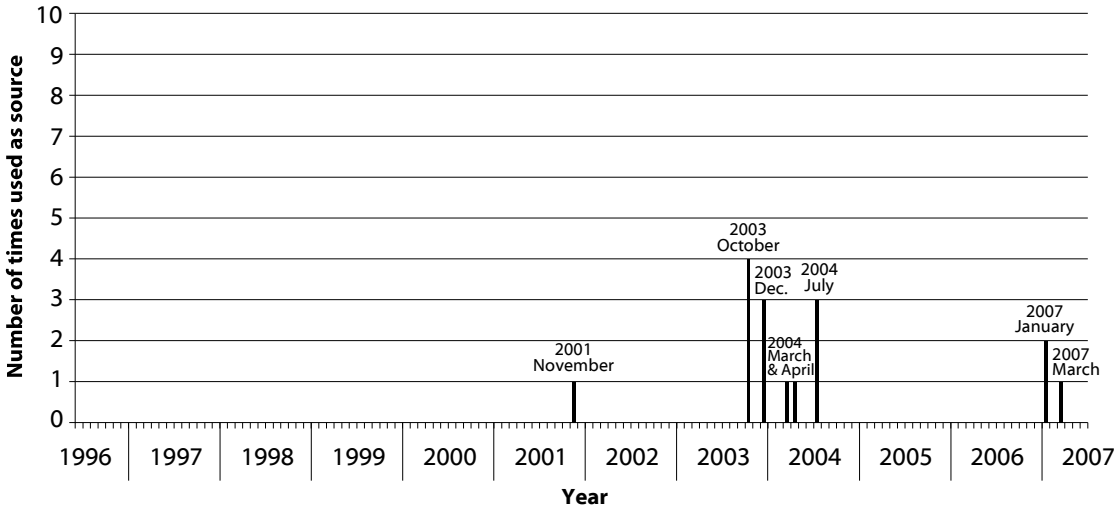
Figure 27: Source #6: Sandra Lee (Minister of Conservation – 1999-2002) - When sourced?



Minister of Conservation (1999-2002), Sandra Lee, was the sixth most-cited individual in this study (N=18). As shown by Figure 27, Lee was only cited during the period she was Minister, in particular during the 'lahar issue' debate between the Government, Opposition MPs and the Councils. Her use as a source peaked in June 2001 (7 stories) when she was responding to the first criticisms levelled at the Government by Nick Smith. Lee's response to the criticism can be seen in the frames she was associated with. She was the fourth most-cited with the 'Suggesting remedies' frame (6) and 'Definition of problem(s) (5), the fifth most-cited with 'Conflict' (5), and the tenth most-cited with 'Implying disaster' (1). Lee was a top ten source associated with four of the ten frames examined in this study. Lee was cited in the lead of three stories, in the first half (but not the lead) of eleven stories and in the second half of four stories. The Dominion (6) was the paper which sourced her the most, followed by the NZ Herald (4), Waikato Times (3), Ruapehu Press (2), Evening Post (2) and Manawatu Standard (1). The Dominion Post (which was only in existence for her final few months as Minister) did not use her as a source. Overall, Lee was a frequent source during the early stages of the 'lahar debate'.

5.4.3.7 Source #7: Sue Morris (Mayor, Ruapehu District Council – after 2001)

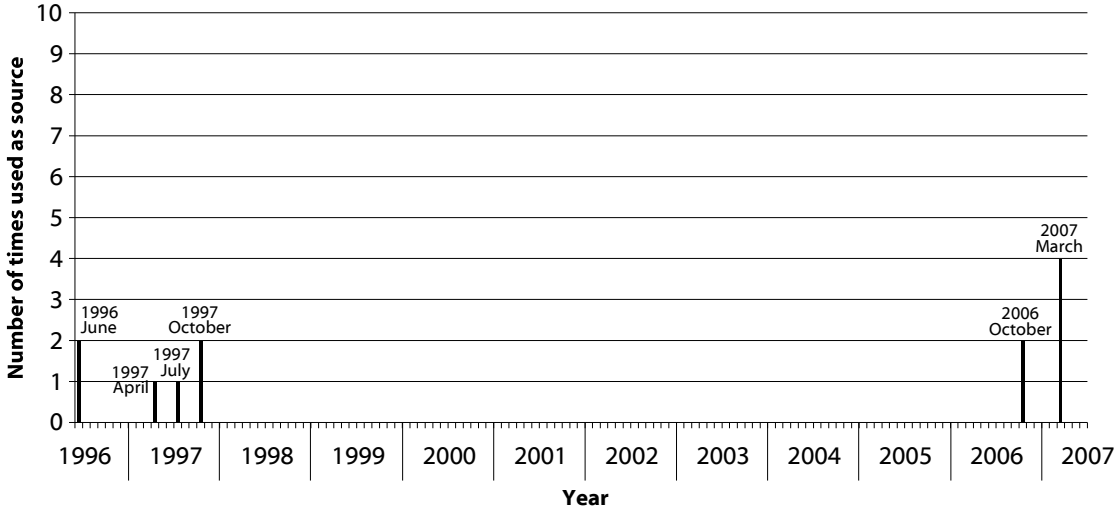
Figure 28: Source #7: Sue Morris (Mayor, Ruapehu District Council – after 2001) - When sourced?



Ruapehu District Council Mayor, Sue Morris (2001-), was the seventh most-cited individual in this study (N=16). As shown by Figure 28, she was a frequent source during the latter stages of the 'lahar debate' between the Government, Councils and Opposition MPs (October 2003 – July 2004). Her involvement in the debate can also be seen in the frames she was associated with. Morris was the third most-cited source with the 'Reflecting on Tangiwai' frame (2), the fourth most-cited source with 'Action statements' (7) and 'Implying disaster' (2), the sixth most-cited source with 'Lahar response' (5) and 'Conflict' (4), the ninth most-cited source with 'Diagnosing causes of problem(s)' (2) and the tenth most-cited source with 'Suggesting remedies' (1). She is one of the top ten sources associated with seven of the ten frames examined in this study. Morris was cited in the lead of four stories, the first half (but not the lead) of four stories and the second half of eight stories. Morris was sourced the most by her local paper, the Ruapehu Press (9). The Dominion (3), NZ Herald (2) and Waikato Times (2) all cited her, while the Manawatu Standard, Dominion and Evening Post did not use her as a source. Overall, Morris was a minor source who was frequently sourced locally (e.g. the Ruapehu Press), in particular, during the lahar debate period.

5.4.3.8 Source #9: Brad Scott (Volcano Surveillance Coordinator, GNS)

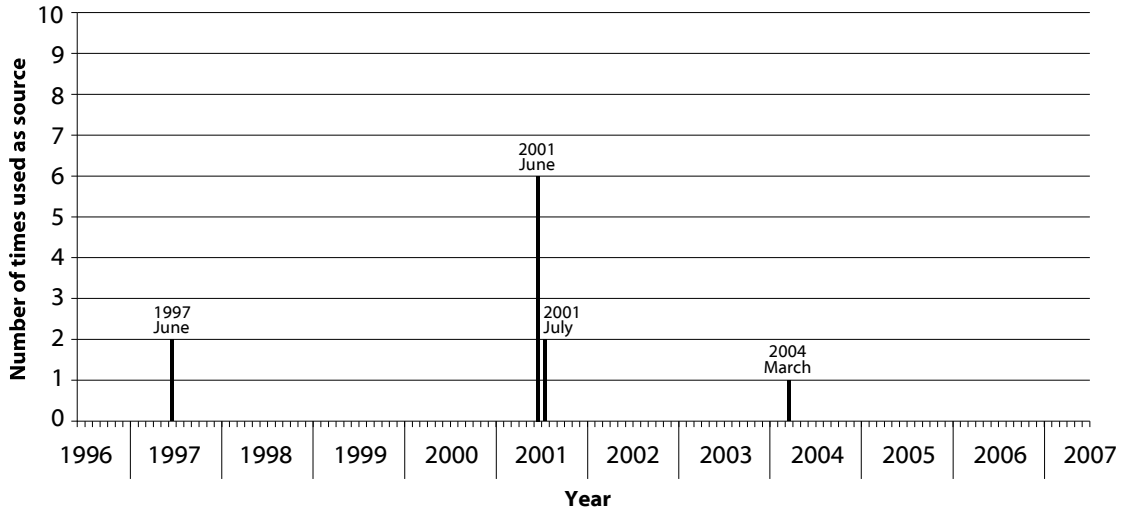
Figure 29: Source #9: Brad Scott (Volcano Surveillance Coordinator, GNS) - When sourced?



GNS (Geological and Nuclear Sciences) Volcano Surveillance Coordinator, Brad Scott, was the ninth most-cited individual in this study (N=14). Scott was interviewed for this study and his comments can be found in Chapter 6. Figure 29 shows that as Volcano Surveillance Coordinator, Scott was on duty to comment on lahar events at Mt Ruapehu, in particular the false alarm that set off the ERLAWS warning system in October 2006 (2 stories) and when the lahar took place in March 2007 (4 stories). Figure 29 also shows that he was sourced early on in the coverage when options for managing the lahar were being developed (April-October 1997). His role as a scientist can also be seen in the frames he was frequently-associated with. He was the most-cited source with the 'Assessing lahar risk in the context of volcanic eruptions' frame (8), the third most-cited with 'After the event' (4) and the fourth most-cited with 'Diagnosing causes of problem(s)' (5). Scott was a top ten source associated with three of the ten frames examined in this study. He was cited in the lead paragraph of one story, in the first half (but not the lead) of nine stories and in the second half of four stories. Scott was sourced the most by the Ruapehu Press (4). The other papers who sourced him were the NZ Herald (3), Waikato Times (2), Manawatu Standard (2), Dominion (1), Dominion Post (1) and Evening Post (1). Overall, Scott was a minor source who appeared in coverage of the lahar activities at Mt Ruapehu.

5.4.3.9 Source #10: Weston Kirton (Mayor, Ruapehu District Council – until 2001)

Figure 30: Source #10: Weston Kirton (Mayor, Ruapehu District Council – until 2001) - When sourced?



Ruapehu District Council Mayor, Weston Kirton (until 2001), was the tenth most-cited individual in this study (N=11). As shown by Figure 30, Kirton was only occasionally sourced. He was sourced six times in June 2001, when Opposition MP Nick Smith made his first attack on the Government's decision not to intervene at the crater. This can be seen in the frames he was frequently-associated with. Kirton was the fifth most-cited source with the 'Action statements' frame (6) and 'Suggesting remedies' (3), the seventh most-cited with 'Implying disaster' (2) and the eighth most-cited with 'Definition of problem(s)' (2). He was a top ten source for four of the ten frames examined in this study. Kirton was cited in the lead of three stories, the first half (but not the lead) of three stories and in the second half of five stories. He was sourced the most by his local paper, the Ruapehu Press (5), followed by the Waikato Times (3), Dominion (2) and NZ Herald (1). The Dominion Post, Evening Post and Manawatu Standard did not cite him. Overall, Kirton was a minor source in the 'lahar issue' coverage.

5.5 Conclusion

This chapter has presented the results of a content analysis of media coverage of the 'lahar issue' spanning the 11 years from 1996-2007, taking into consideration seven papers. These results were presented in three sections: (1) salience, (2) framing and (3) sources. The main results from these sections are summarised below.

5.5.1 Salience

In total, this study analysed 309 stories printed over 11 years. A number of elements were factored into the analysis to answer the questions: 'How much attention (salience) did media give the issue?' and 'How did this 'attention' change over time?' The results of the salience part of this analysis were as follows:

- The results indicate that salience (attention) for the lahar peaked in 2007 when the lahar took place.

- Overall attention for the lahar issue was found to have a slight upward trend, despite that fact that some years no stories were printed.

- Attention remained stable during the 'lahar debate' period from 2001-2004, which saw Opposition MPs, and the local and regional councils debating with the Government over its decision not to intervene at the Crater Lake.

- The Dominion Post (when its figures are combined with the Dominion and Evening Post's stories) and the Ruapehu Press were the two papers which gave the 'lahar issue' the most consistent coverage.

- In terms of story placement, 69.9% of stories were printed 'above the fold' on the top half of the newspaper page, indicating that Editors of the newspapers in this study considered the subject to be of interest to their readers.

- Further, 69 of the 309 'lahar issue' stories in this analysis ran on the front page while a further 56 and 57 stories ran on pages three and two, the other two news pages considered to be the most important in a newspaper.

- However, most lahar stories were of small size. 75% took up 20% or less of the page.

- 45% of lahar issue stories included visuals. 75.5% of these visuals took up 20% or less of the page.

Overall, the results from the content analysis suggest the 'lahar issue' was a salient topic for the newspapers in this study and, as a result, received a large amount of attention. Further, the results of this analysis suggest that the lahar's salience increased until it peaked when the lahar finally took place in March 2007.

5.5.2 Framing

The frames for each of the stories in this study were noted. In total, 10 frames were identified and examined in this analysis in order to answer the question: 'What frames did media use when reporting the lahar?'. The frames - in order from most to least-used - were:

- *1. Lahar response* (22% = 97) - stories that focused on the things being done to manage the lahar. This frame appeared in the coverage from late-2000. Its use peaked in October 2006 and the months leading up to the lahar.

- *2. Diagnosing causes of problem(s)* (17% = 74) - stories that focused on providing evidence to show the problem exists or that presented an argument that the nature of the problem was unknown. This frame appeared throughout the 'lahar issue' coverage from 1996-2007. Its use increased as the lahar became more probable, peaking in January 2007.

- *3. Definition of problem(s)* (13% = 57) - stories that focused on the impact of the lahar, whether it be a negative, positive or debated impact. This frame appeared throughout the lahar coverage, with notable peaks in June 1997, April 2001, March 2004 and January 2007.

- *4. Action statements* (11% = 50) - stories which presented general statements calling for action, reporting action blocked, or presenting an argument that a course of action is not clear. Use of this frame was concentrated from April 2001 to July 2004, during which time Opposition MPs and the Local and Regional Councils debated with the Government over its decision not to intervene.

- *5. After the event* (10% = 42) - stories which focused on what happened after the lahar took place and, possibly, assessments of the lahar's management. This frame was applied in March 2007 when it appeared in 38 stories.

- *6. Suggesting remedies* (7% = 31) - stories using this frame are distinguished from action statements by the inclusion of *specific information* about how the solution(s) should be implemented. These 'solutions' could be proposed, rejected or deemed inadequate. This frame was also used in stories that presented a debate about a solution or solutions. The frame appeared early in the coverage during the period of public consultation and the formulation of options (June 1997 – April 1999) and was also used during the 'lahar debate' period (2001-2004). It appeared only once after this period.

- *7. Conflict* (6% = 27) - stories framed as disagreements or clashes between individuals, groups or organisations. The bulk of stories featuring this frame were printed during the 2001-2004 lahar debate period.

- *8=. Assessing lahar risk in the context of volcanic eruptions* (5% = 21) – stories that examined the coverage of volcanic lahars as opposed to the tephra dam-break lahar. Most of this coverage occurred within the period June 1997 to February 1999. However, this frame was also used when a small eruption triggered the ERLAWS warning system in October 2006.

- *8=. Reflecting on Tangiwai* (5% = 21) - stories that focused on the 1953 Tangiwai Disaster. This frame peaked in December 2003 with the Tangiwai 50th Anniversary Commemorations, although it was again used during 2006 and in the coverage in March 2007 after the lahar took place.

- 10. Implying disaster (4% = 19) – stories that implied that deaths, injuries or damage may occur as a result of a dam-break lahar. Stories using this frame were printed in the early years, when the lahar was first discovered and management options were being developed (1996-1998) and then again during the 'lahar debate' period (2001-2004).

The results of the content analysis also showed that the Tangiwai Disaster was a constant framing element throughout the coverage from 1996-2007. In total, Tangiwai was mentioned in 44% of stories (N=136). The most mentions of Tangiwai during a single month were in March 2007 when the lahar took place (17 stories).

5.5.3 Sources

This study also examined the use of sources in the lahar issue coverage to answer the question: 'Which sources – if any – could be seen as "driving" media coverage?'. The results were as follows:

- The five most-cited organisations were: (1) Department of Conservation (178 - 35% of all cited sources), (2) "not affiliated to any organisation" (76), (3) Ruapehu District Council (RDC) (62), (4) Horizons Regional Council (37) and (5) GNS (Geological and Nuclear Sciences) (33).

- The five most-cited source-types were: (1) "Scientist – DOC" (94) (i.e. Dr Harry Keys), (2) Minister of Conservation (49) (this figure incorporates the three Ministers from 1996-2007), (3) Member of Public (41), (4) Scientist – GNS (33) and (5) Local Councillor (32).

- The five most-cited individuals were: (1) Department of Conservation Scientist, Harry Keys (94), (2) Opposition National MP, Nick Smith (31), (3) Horizons Chairman, Chris Lester (22), (4) Minister of Conservation (2002-2007), Chris Carter (20) and (5) Department of Conservation Community Relations Officer, Dave Wakelin (18), Minister of Conservation (1999-2002), Sandra Lee (18),

Department of Conservation sources were particularly pervasive in the coverage. In particular, lahar scientist Harry Keys, was found to be the most-consistent and

influential source in the ‘lahar issue’ coverage. Nick Smith was another influential source, but only during the period when the lahar management decisions were being debated. Most of the top 10 sources were involved during the ‘lahar debate’ period (2001-2004).

This chapter has presented the results of the content analysis. The next chapter, Chapter 6, covers the results of the interviews with people involved with the lahar’s management, some of whom were found to be prominent sources in the content analysis. Chapter 7 contains a discussion of the results of the content analysis with reference to the literature on the issue’s lifecycle and the results of the interviews.

Chapter 6:
Interviews Results

6.1 Introduction

The first objective of this thesis is to explore how the lahar management process developed over time. This chapter compiles the results of the interviews to provide qualitative data to achieve that objective. Further, these results assist the achievement of the second objective: to assess how the lahar management aligned with models of issues management.

This chapter is structured chronologically into four sections which examine the phases of the lahar's management. Discussion of the tactics used to communicate with stakeholders and the influence of media coverage on the management of the 'lahar issue' are discussed in Chapter 7. Table 21 gives an overview of the involvement of the 19 participants interviewed for this study. It also indicates how they were interviewed - either face-to-face or over the phone.

Table 21: Interview participants (ordered alphabetically by surname)

Person	Role
Shane Bayley Manager - Emergency Management Office Horizons Regional Council *Face-to-face interview*	• Involved since August 2006 • Responsible for overseeing Horizons' response to Civil Defence emergencies within its boundaries • Developed Horizons' part of the lahar emergency response plan • Chair of the Southern Ruapehu Lahar Planning Group (SRLPG)
Harry Broad Manager – Strategic Issues Department of Conservation *Face-to-face interview*	• Involved since 2005 • Head of Strategic Issues at DOC headquarters in Wellington • Observed the lahar's management • Along with Herb Christophers developed the DOC communication strategy for when the lahar took place

Herb Christophers Senior Issues Manager Department of Conservation *Face-to-face interview*	• Involved since beginning 2005 • Was the Issues Manager at DOC headquarters in Wellington given responsibility for monitoring the lahar's management • Along with Harry Broad, developed the DOC communication strategy for when the lahar took place
Mike Craig Lahar Incident Controller / Officer who oversees Ohakune Police station Police *Telephone interview*	• Involved since 2002 • Was the Incident Controller – the top person - n the lahar emergency response • Initially oversaw the Police stationed at Waioru who were responsible closing the safety gates at the Tangiwai Road Bridge and on State Highway 1
Johan Cullis Team Leader of Regulation Ruapehu District Council *Telephone interview*	• Involved since December 2003 • Involved with developing the Ruapehu District Council's response to the lahar • Was the backup for the Council's Emergency Management Officer
Barbara Dempsey Formerly Group Director – Emergency Management (until February 2007) Ruapehu District Council *Telephone interview*	• Involved from 1998 until February 2007 • Member of the Southern Ruapehu Lahar Planning Group (SRLPG) • Lobbied Government, along with Ruapehu District Council senior management, to intervene at the Crater Rim • Involved with the efforts to keep stakeholders (e.g. farmers) informed about the lahar
Roland Devine Consultant – Automatic Barriers Opus *Telephone interview*	• Involved since 2001 • Contracted by Transit New Zealand to develop a system to handle traffic around the Tangiwai Road Bridge and on State Highway 1 when the lahar took place • Involved with the development and installation of the automatic barriers placed on either side of the Tangiwai Road Bridge and on State Highway 1
Paul Green Area Manager – Tongariro Conservancy Department of Conservation *Telephone interview*	• Involved since before 1996 • Responsible for DOC's management of Tongariro National Park • Primarily involved with developing options to mitigate the effects of the lahar
Harry Keys Chief Scientific Advisor –Lahar Department of Conservation	• Involved since before 1996 • Extensively involved in the development of the lahar mitigation and emergency response

Face-to-face interview	• Compiled the Assessment of Environmental Effects (1999) – the document that contained the options to manage the lahar • Provided information to the Southern Ruapehu Lahar Planning Group (SRLPG) • Kept lahar stakeholders informed about developments in the lahar's lake level • Monitored the tephra dam and lake level • Involved with the efforts to keep stakeholders (e.g. farmers) informed about the lahar
Murray Marshall Rail Standards Specialist Ontrack *Face-to-face interview*	• Involved since approximately 2005 • Developed and implemented Ontrack's internal procedures to deal with the lahar • Member of the Southern Ruapehu Lahar Planning Group (SRLPG)
John Norton Director (2001-2006) Ministry of Civil Defence and Emergency Management *Telephone interview*	• Involved from 2001 until 2006 • Involved in the development of both the lahar mitigation and emergency response • Commissioned the Taig Report that assessed the risk to life from the lahar • Recommended the raising of the Tangiwai Road Bridge • Member of the Southern Ruapehu Lahar Planning Group (SRLPG)
Annie Pedersen Emergency Management Coordinator Ruapehu District Council *Face-to-face interview*	• Involved since 2005 • Member of the Southern Ruapehu Lahar Planning Group (SRLPG) • Responsible for coordinating the Ruapehu District Council's response to Civil Defence matters in the Ruapehu region • Coordinated the Emergency Response Plans – as organisations updated their individual plans, Pedersen sent out the new sections to all the plan holders • Involved with the efforts to keep stakeholders (e.g. farmers) informed about the lahar
Brad Scott Scientist – Volcano Surveillance Coordinator GNS *Face-to-face interview*	• Involved with monitoring volcanic activity since before 1996 • One of a team of scientists who monitor Mt Ruapehu's volcanic activity, including any lahars • Responsible for confirming (or denying) that a lahar had occurred • Was on duty March 18, 2007 – the day the lahar

	occurred
Brian Sheppard Formerly Senior Issues Manager Department of Conservation *Face-to-face interview*	• Involved from 1999 until approximately 2003 • Responsible for observing the 'lahar issue' from DOC headquarters in Wellington • Coordinated communication between the Minister of Conservation and the Tongariro conservancy • Liaison between DOC and the Ministry of Civil Defence and Emergency Management (MCDEM) • Arranged regular meetings in Turangi between DOC, MCDEM and any interested members of the public
Doug Tucker Operations Manager for Renewable Energy Genesis Energy *Telephone interview*	• Involved since 2003 • Helped develop safety procedures for Genesis Energy employees to follow in the event of a lahar • Liaised with DOC to allow information from Genesis' warning alarms to be used in conjunction with the ERLAWS lahar warning system
Dave Wakelin Community Relations Officer Department of Conservation *Face-to-face interview*	• Involved since before 1996 • Member of the Lahar Information Group (LIG) • Primary role over the 11 years was dealing with the media • Involved with communication with stakeholders (e.g. farmers and other interest groups) to make them aware of the lahar • Dealt with the media on March 18, the day the lahar took place
Grant Webby Hydraulic Engineer Opus *Face-to-face interview*	• Involved with providing technical information since 1997 • Offered technical advice about the nature of the dam – the ways it might fail - and estimating the volume of water that would be released • Member of panel of scientific experts set up to advise Ministers about the lahar • One of the authors of the 1997 report that confirmed the potential for a dam-break lahar • Contributed much of the data for Tony Taig's risk assessment, which is contained in an appendix attached to the Taig Report (2002)
Paul Wheatcroft Communications Manager (2005 - current) Ruapehu District Council *Face-to-face interview*	• Involved since 2004 • Member of the Lahar Information Group (LIG) • Operated the OPTN text message lahar warning system • Involved with ongoing efforts to make public aware

	of the lahar • Answered media queries from Ohakune the day the lahar occurred
Dave White Inspector / District Operations Manager Police *Face-to-face interview*	• Involved since October 2004 • Member of the Southern Ruapehu Lahar Planning Group (SRLPG) • Developed the Police part of the lahar emergency response plan • Liaised with the other agencies involved in the lahar emergency response (e.g. Civil Defence, Horizons etc.)

6.2 1995-1996: Discovery

According to Department of Conservation scientist, Dr Harry Keys, the 'lahar issue' was first identified in November 1995. Keys said, "the scientists knew, but I didn't tell my boss until February [1996]". He said that he kept this information to himself because in 1995 the dam seemed to be eroding. Without further eruptions, the crater outlet may have cleared itself. However, after the eruptions in mid-1996, the erosion stopped. At that point, the potential for a dam break lahar was realised. Keys said DOC first consulted with non-DOC people in March 1996. In April, the dam was made public. GNS Volcanologist, Brad Scott, said at that meeting GNS raised the potential for the outlet to be blocked and suggested an investigation was needed "because of what we knew about Tangiwai".

6.3 1997-2000: Consultation and developing options

The impending lahar was confirmed in June 1997 when GNS Scientist Graeme Hancox and other scientists, including Keys, released a report outlining the potential for a lahar caused by the tephra dam that had formed during the 1995/1996 eruptions. Following the release of the report, DOC began developing options to deal with the lahar. The lahar consultation process adhered to the resource consent process set down in the Resource Management Act (RMA). The resulting Assessment of Environmental Effects (AEE) – the document that collates the options for dealing with the lahar - follows the structure set down by the Act. Keys said that if a decision had been made to bulldoze the dam, then the RMA process would have been followed even more closely.

Brian Sheppard, formerly a Department of Conservation Issue Manager, said top management were involved with the 'lahar issue' from the start. He said, "the DOC Director General and the General Management team at head office agreed that the lahar was an issue to be managed very carefully". Grant Webby, a Hydraulics Engineer who gave advice about the tephra dam, said "it was pretty obvious that they had a problem before any reports had been written". He said the Hancox et al. report had attempted to quantify the impact of a lahar and assess what the impact of a lahar would be from a repeat of the 1953 Tangiwai disaster. DOC began consulting with stakeholders. This process is discussed in Chapter 7 (see 7.8.1).

6.3.1 Testing options

In April 1999, the final Assessment of Environmental Effects was released incorporating the feedback received. Twenty three options were suggested for dealing with the lahar (the suggested options are summarised in Appendix E). Twenty two of the options involved intervention. Among the options was a suggestion to bomb the crater using a laser-guided missile. Keys said, "it was seen as a hands-off option". The missile option and 19 others were later declared impractical. Keys said this left three options that were considered feasible: (1) trenching with a bulldozer, (2) sluicing and (3) siphoning. Tests were done on the siphoning option by an independent third-party engineer. Keys said the tests found siphoning would be less-effective than first thought:

> At higher altitude you get lower vapour pressure – you can't suck as much. A lot of people talked about siphoning as it was perceived as a less-harmful process. We proved that we could do it, but it would have taken a lot more resources than what we first planned.

During 1997, when solutions were being suggested, discussions were had about 'stripping down' a bulldozer to enable it to be flown to the crater. Keys said this option was suggested because of the problems associated with getting equipment to the crater:

> It's not straight-forward. We can walk up there [to the crater] or fly up there. But when you're talking about heavy machinery, you've got to decide whether you're going to go in by ground or helicopter. It looks quite benign, but it's actually quite steep.

Another option suggested by engineers was using a snow groomer in the place of a bulldozer. The option was trialled. However, Keys said, snow groomers are not designed to shift boulders. In 2001, a trial was also done for sluicing (using a high-pressure hose). The trial was undertaken lower down on the ski field. From the test, it was decided that sluicing was too complex to be used to make the 80 metre trench required.

6.3.2 The argument against intervention

Paul Green said that public safety was always one of the considerations in the development of options to handle the lahar, however, DOC had another consideration:

> There was several objectives and one was public safety of course and that's gotta be a bottom line. But then it's managing the National Park in accordance with the legislation and including its World Heritage status. So if at all possible you let natural processes occur. But you obviously do have a public safety driver as well. So it's balancing those things in terms of your decision-making.

In the 1997 Hancox report, Keys and the other authors recommended cutting a trench through the crater rim. However, Keys said, "it did not consider the politics". The initial discussions with the Conservation Board supported the idea of a trench. The problem with this option, as Keys saw it, was that it did not take into account the implications for conservation management. Those implications were outlined in a letter the Department of Conservation received from a member of the public, Guy Harding. Keys said that Harding's argument against trenching was very convincing. The letter marked the point that the Department reconsider intervention. Key said that this was the first 'powerful reason' why trenching was reconsidered: because of the danger of setting harmful legal precedents in a National Park:

> [The crater lake] is at the heart of a World Heritage area. The National Park was created for its natural volcanic values. The management plans for National Parks in New Zealand have a series of objectives. The classics are that you protect native parks and animals. The one for Tongiriro talks about protecting natural processes. The lahar was clearly a natural process. By intervening with [the lahar], you're intervening with natural processes, and you set a whole set of new precedents by which you disregard natural processes as important. Therefore, if we decided to do some development lower down in the National Park, it would be easier for us to do it. However, if someone else came and asked us to let them

> do something, then we'd have to let them to it too. We came to realise that this was a very important point.

Keys said it was realised that any decision to deal with the lahar should not weaken DOC's ability to manage the National Park:

> The management of a National Park is not a strong thing. The management of these areas, the management of everything – whether it's a leaky house, or building a bridge, or a house in a subdivision – they all rely on law and case study and policies to a greater or lesser extent. If you've got a dedicated-enough lawyer, then you can hold Government to ransom.

While all the decisions were ultimately based on preserving DOC's ability to manage the National Park, Keys said this reason was not easily digested by media or the 'bulldozer lobby'. For this reason, both media and the 'bulldozer lobby' pushed the idea that it was the Maori tribes who had exerted the greatest influence in the decision not to intervene. Keys said that the reason for this was that while it might not have been the correct reason, it was a reason they understood:

> It's harder for them to understand this argument [retaining the integrity of the National Park's management], very hard for them. We told it to them enough, but the media make up their own mind and it's hard to change that.

However, as Sheppard pointed out, the opinion of the tribes was only one of the reasons and legislation played a large role in guiding the decision against intervention:

> Those peaks of the mountain were gifted by the paramount chief of Ngati Tuwharetoa at the time, to New Zealand, and it formed the basis for our first national park. They are really sacred peaks to the iwi. Because that was mentioned, we got a sector of the community who said "you are only doing this because you don't want to tell the Maori to push off, because we don't believe in your taniwha." That sort of thing is very difficult to deal with, and we had to say to people, "look, these are the range of issues we are dealing with, there is certainly an issue that we have to take into account as we have to the Conservation Act, the National Parks regulations, that it's a World Heritage site, and all these things, and those, as a block, provide a general support in saying if we can manage the risk to human safety, then this is the way to go, but we're not doing it just because Maori say they don't want to do it.

6.3.3 Maori stakeholders

Ngati Rangi and Ngati Tuwharetoa are the two main tribes in the Ruapehu region who are stakeholders in the mountain. Ngati Rangi were the first group to come to a decision about the best course of action to deal with the lahar. In an unsolicited letter to the Department of Conservation, they stated that the crater should be left untouched. While Ngati Rangi was the first group to make a submission, conversely, Ngati Tuwharetoa were the last group. The tribe, Keys said, were caught between deciding whether to argue for protection of the peaks or protection of the Tongariro River. The river, which flows into Lake Taupo, is important to the tribe as the trout that live in it provide income for the tribe. Their dilemma was:

> If they kept the peaks out [no intervention] they would lose the fish. If they saved the fish [intervention at the crater], they would lose the peaks. Because it was complex, it was hard for them to make up their mind and their submission was weak.

In the end, the tribe supported Ngati Rangi's stance. Earlier, Ngati Haikairo, a Ngati Tuwharetoa hapu (sub-unit of the tribe), made their own submission, strongly opposing intervention. However, Keys said, there were many tribes who expressed their views on the lahar and some supported intervention:

> Later on there was another iwi out over here [pointing to further down the Whangaehu River] that said 'bulldoze'. There was another iwi down the Whangaehu who weren't sure – they were worried after the floods in 2004, the hundred year floods. People thought the lahar was going to be worse than that. In total, there were at least four iwi. Then there were iwi even further away – we got a submission from Wainuiomata. Like any group of people, they all had their own views. The Maoris, just like Pakehas, weren't speaking with one voice. The media and the public believed that they were all anti [intervention]. They clearly weren't.

For Ngati Rangi, the crater held special significance as it is where the tribe members would deposit the remains of their highest chiefs. However, Keys said, it is possible that intervention still may have gone ahead, against the tribe's wishes:

> [For example], if there is an urupa [grave] in Queen Street and somebody wants to build a motorway there, there will be discussion with the tribe. But if there's a rich developer, or enough precedence for building a motorway, [the motorway] will happen.

Barbara Dempsey, formerly the Group Manager of Emergency Management at the Ruapehu District Council, believed that if the council had "been more organised" in lobbying the iwi groups, some iwi would have been "dead against it". However, according to Keys, in the end, the significance of the mountain to the tribes was the second 'powerful reason' against intervention.

6.3.4 The politics of decision making

By 1999, at the end of the submission process, it became clear to Keys that intervention should be avoided. Keys said that he "kept an open mind up until the end of the submissions". Paul Green, Keys' boss, was the first to conclude that intervention was not the right way to go. Keys, however, was more ambivalent:

> I could see the things that could go wrong. I could also see the huge job we had to do this. I could see that more clearly than Paul could. Or perhaps, taking it from the other way, he'd say he could see clearly what had to be done, and I could see the problems with it.

When the report was released in April 1999, the Crown Law Office got involved, stopping Keys from discussing the contents of the report due to the potential for liability. During this time, questions were being raised about the potential liability of the Minister of Conservation.

Keys believed that the ultimate decision to let the lahar occur naturally was possible only because of who was in Government at the time the decision was made: "It was essentially a political decision". Keys said that while he had attempted to integrate the views of all the stakeholders in his Assessment, elements of the report were prejudiced by the Conservation Minister at the time, Nick Smith:

> When the objective became clear [to manage the long-term risk], the Minister of Conservation, Nick Smith, began influencing this document [Assessment of Environmental Effects, 1999]. And in the weeks and months he had left, he was putting pressure on us.

Smith did this by limiting what Keys could write in the report. Keys gave the example of the various lahar 'solutions' covered in the report. For one of the options – building

dams lower down the mountain to catch the lahar - Nick Smith insisted that the specifications for the dam be changed:

> The standard approach internationally is that you build them so they catch 20% of the water, so you slow down the flow, you don't stop it. But [Smith] said that they had to catch the whole thing, which immediately meant they were much bigger and more expensive, which made it less likely they'd be attempted.

However, with the 1999 election pending, Smith was unable to make any final decisions about the course of action to deal with the lahar. Sheppard said that as part of Parliamentary protocol, "matters of great significance" are held over for the next Minister.

In October 1999, the Labour-Alliance coalition became the Government. Alliance Party MP, Sandra Lee, became the next Minister of Conservation (1999-2002). Her first decision regarding the lahar was to have the work that had already been conducted reviewed. In May 2000, following the review, she endorsed the development of an emergency response plan along with the installation of a lahar warning system.

6.4 2000-2004: Evaluating, debating and implementing

6.4.1 Ruapehu District Council (RDC)

Paul Wheatcroft, Communications Manager for the Ruapehu District Council, explained the Council's role in the lahar's management as the "lead agency" in the emergency response. This role fell to the Council due to its legal responsibility for Civil Defence emergencies within the Ruapehu region. Dempsey said that the Ruapehu District Council were opposed to the lahar being left to occur naturally, however, it was also responsible for ensuring no one was killed:

> Initially our objective was to fight for intervention to prevent a lahar from occurring. We didn't want it to happen. We were extremely confident because we had some engineering advice that someone could have intervened, and the expense and heartache we went through, because of the lahar, was not necessary. So Ruapehu District Council wore two hats - we were advocating for its District Council's perspective, for intervention, we went to two Ministers, but at the same time knew we had responsibility under the Civil Defence Emergency

> Management Act – so we started our response planning as well – the objectives were safety of life primarily, and secondly safety of infrastructure.

Wheatcroft agreed that the lahar was a huge financial burden for the council:

> Being a small council, [the lahar] had a huge impact on this organisation. We've got our core business that we deal with every day. And this was something that was a 'bit to the side' – it took a lot of staff away from our core business. It basically placed a huge overhead on the organisation. As soon as we recognised they were going to let [the lahar] run its course, at that point it became a big issue for us.

Dempsey said in 2000, the council formed the 'Ruapehu Lahar Committee', which put together a draft Emergency Response Plan. Johan Cullis, Team Leader of Regulation at Ruapehu District Council, said this 'Best Endeavours Plan', was rejected by Council as too expensive to implement. The consensus, he said, was that Central Government agencies needed to be involved. However, Dempsey said that after the Government decided against intervention at the crater, the council had no choice but to develop the Emergency Response Plan:

> From an organisational point of view, we never agreed that it was the right thing to do, but once the owners of the land, the Government, decided that it was what they wanted to do, we just had to get on with the job and start planning for the event. It would probably be the only emergency in New Zealand to date that you could have done something about, and stopped it.

6.4.2 Opposition to the lahar's management

The period from 2001 to 2004 saw an intense period of lobbying by the local and regional councils calling for intervention at the Crater Rim along with financial assistance for the development of the emergency response. Ruapehu District Council was the 'lead agency' in the response. However, Horizons Regional Council were also involved as they too were responsible for Civil Defence management of the lahar as its boundaries encompass the Ruapehu district. Keys believed the conflict between the organisations resulted from different policy positions:

> Agencies have different mandates, so they will take information and use it to justify their particular position. Because we've got different mandates, the decisions that are made won't please everyone.

Green had a similar view. He thought Ruapehu District Council's continued resistance was due to their responsibilities:

> They're not responsible for managing the National Park. So I guess the objectives of the park and the goals of the park about natural processes don't quite mean the same to them. I'm not criticising their position, it just reflects their role and responsibilities more than anything.

Keys said that Horizons Regional Council were happy when they saw the resource consent process was being followed. However, when it became clear that DOC were favouring non-intrusive means to manage the lahar, Horizons became concerned. This coincided with staff changes. Peter Davies, an engineer, had become chairman of the Horizons board, and he voiced his opposition to DOC's plans. At the same time, newly-elected Ruapehu District Mayor, Sue Morris, began lobbying for the Government to intervene. The councils eventually united to push for intervention, which resulted in a series of meetings in 2003 with then Minister of Conservation, Chris Carter.

Wheatcroft suggested that the Ruapehu District Council's concerns were with the financial aspects of dealing with the lahar:

> We're a small district. Our ratepayers aren't wealthy. The average income for people in the Ruapehu district is less than the national average. What we had to argue is that the Ruapehu district shouldn't have to bear the cost of this emergency on our own. Legally, anything that happens within our district, we have to respond to, so we have to pay. The Government says, "Well, that's the cost of living in that district". But when you've got something the size of this, it can overwhelm us financially.

Civil Defence Director, John Norton, found that the Ruapehu District Council's concerns eased when Government agreed to provide assistance:

> The relationship with Ruapehu District Council became quite difficult in parts because they felt that they were going to be left to deal with the impact of the lahar when it occurred including the question of monitoring and responding to it. And in the end we sat down with them and agreed that the Government would contribute and MCDEM [Ministry of Civil Defence and Emergency Management] would contribute to the arrangements for managing the event. They wanted guarantees that everything else would be paid for by the Government, but the Government clearly was not going to give that guarantee. But they did agree to contribute substantially to the arrangements for responding. And I left it with Ruapehu District that any question of assistance

> with dealing with any large impact would be dealt with after the event. And they became okay about that.

Dempsey said that while the Government did provide support to the council, the cost to the district was still high:

> From an operational point of view, it was great with people like Harry [Keys], we got on and got the job done. We were two different organisations with very different views of what the right solution was. I guess that while central government came to our assistance and helped, it still cost the Ruapehu district ratepayers a lot of money. People like me, you're on a salary, so you're not paid extra, but you're spending so much time on it, there are a lot of other things that aren't being done. So it was a huge cost to the district, even with government support, and a little district like Ruapehu struggles to get ahead with all the things we've got to do anyway.

Shane Bayley, Manager of the Emergency Management Office at Horizons Regional Council, suggested that the political discussions stalled the start of efforts to deal with the lahar:

> In the early days, there was a lot of talk around do we go in and blow up the dam and things like that – get rid of that issue. There was a lot of political involvement in that – both nationally and regionally. And then when it settled into something that was known, it was just something that we had to manage.

6.4.3 Values and the lahar debate

While the councils were lobbying the Government, the 2001-2004 period also saw repeated attacks from former Conservation Minister, National MP Nick Smith against the decision not to intervene. Keys suggested that Nick Smith used the politics of fear: "he was trying to shift public opinion". Keys thought that the underlying catalyst for the debate was values:

> In this issue, there is a huge spectrum of opinion. Potentially, you can simplify it to two ends: to bulldoze, or not to bulldoze. And the pro-bulldoze lobby are people that don't understand conservation values. They want to make people safe. However, they give a lot of priority to making things safe. They take a relatively short-term view. They don't give any credence to cultural values. I'm pushing this to the extreme. Whereas, this group [the not-to-bulldoze lobby] they take a long-term view. They give quite a lot of value to conservation and management and not creating the wrong precedents.

DOC Director General Al Morrison has shared similar views. In an interview on April 1, 2007 with Chris Laidlaw on Radio New Zealand National, he briefly discussed the lahar's management. In that interview, he expressed his belief that the interventionists were prioritised safety over cultural significance:

> It was a fascinating exercise where all the values that were taken account – the science values and the other things – seemed to be legitimised. But as soon as you talked about taking into account cultural values, there seems to be something in New Zealanders –or at least in that brand of critic – that dismisses that range of values as if they're not valid. In terms of the lahar, when it got to that range of values [spiritual values] as opposed to any others, they were immediately dismissed. The tell-tale sign for me is if somebody dismisses values as 'politically correct'. That tells me that they don't have a good argument, so they're using a cheap one.

6.4.4 Scientific advice

Because of the continued debate around the lahar options, Minister Lee decided she needed expert advice on handling the lahar. In November 2001, Lee organised a 'science panel' - a group of experts to give lahar advice. The six members of the panel were Harry Keys (DOC), Jim Cole (University of Canterbury), Professor Vince Neal (Massey University), Grant Webby (Opus), Graeme Hancox (GNS) and Murray Gillon (Damwatch). In December, Lee again endorsed the lahar warning system and emergency management plans. Sheppard said of the panel:

> The special advisory group set up by the Minister had the best independent brains from within the country and from overseas contributing to this, and they would say things like "a siphon wouldn't work up there because of the lower atmospheric pressure, and it wouldn't work, if you're putting bulldozers up there because of the safety for the bulldozer operators, you've got to be able to get them off if there's an emergency or an eruption comes up you're going to have to put a shelter up there that they can get under if there's boulders and things flying out of the volcano and things like that.

Discussions about setting up a scientific advisory panel started in July 2001. The panel was finalised in November 2001. Webby said the panel met "once or twice a year" in Wellington. Meetings were called on an as-and-when-required basis when the Minister, Chris Carter, had questions that he wanted answered. The purpose of the group was to answer questions that the Minister had posed - to provide guidance on the management. Webby thought that some of the questions resulted from discussions within Cabinet:

"There was a certain amount of interest from the top. They wanted to get it right. The Prime Minister was certainly interested in the issue."

6.4.5 Civil Defence becomes involved

In mid-2001, Ministry of Civil Defence and Emergency Management Chief Executive, John Norton became involved in the lahar's management. Up until that point, the Civil Defence aspects of the lahar's management had been dealt with locally by the Ruapehu District Council. Norton said that Civil Defence was aware of the lahar issue, but it was seen as "a local issue to be dealt with by the local Civil Defence". However, Norton said, Civil Defence became involved for two reasons:

> It was the enormously heightened awareness of the lahar issue. But also the Government's decision not to intervene on the mountain left the community and everybody saying, "Well, this is the Government's fault and, therefore, their responsibility". That was probably quite unreasonable, but that was the view that was taken.

John Norton was invited by DOC's then Director General, Hugh Logan, to advise him on the risk issues regarding the lahar. Later, Norton also offered advice to the Cabinet committee set up specifically to deal with the lahar. Norton said a key achievement of his was to shift the discussion from shifting the blame to taking responsibility:

> I went to a meeting at Turangi with Harry Keys and all of the stakeholders. What occurred at that meeting was that everyone was sitting back and waiting for Harry Keys to give instructions on what was needed and that DOC would pay for it. It was at that first meeting that I made the statement that this was a natural hazard and that everybody had a responsibility to deal with their own component of managing that risk. For the first time, the discussion was about people taking responsibility for their viewpoint and what they would do about it. Up until that point, everything was being dropped on DOC in what was, one, a very unfair way and, two, one that at one level DOC had brought upon themselves.

From that point on, Norton became heavily involved with the lahar's management:

> I went up there to Taumaranui four to six times. This took up a lot of my time. You need to understand that as Director, you don't normally get involved with all those local details. But this took a lot of my time because it was such a difficult issue to deal with.

6.4.6 Assessing the risk

After the Turangi meeting, Norton attended a further meeting with Minister of Conservation, Chris Carter, Taupo MP, Mark Burton and Minister of Civil Defence and Emergency Management, George Hawkins. Norton advised the Ministers that an assessment of the risk to life was needed for the lahar to be properly managed. This assessment took the form of the Taig Report:

> I commissioned Tony Taig to do a risk-to-life assessment of the measures that DOC had proposed up to that point. And that was in relation to the existing arrangements for the rail bridge, the road bridge at Tangiwai, the various other road crossings – State Highway 1, the farm access roads – all those roads as they were. DOC were proposing to put in a monitoring arrangement on the mountain – what was the risk of that failing and the lahar occurring and there happening to be a vehicle on the rail bridge or the road bridge, which might cause a death?

However, producing the report was not straight-forward. Norton says a major problem with assessing the risk was that they needed to assess "things we couldn't measure":

> For the first time in New Zealand, the definition of uncertainty became the thing to deal with because you couldn't measure the likelihood of three policemen in Waiouru might all sleep through a phone call. There was still uncertainty as to whether this lahar would cause a collapse of the road bridge and/or the rail bridge at Tangiwai. We had to decide what an acceptable level of risk was because, obviously, you can't eliminate the level of risk entirely.

The Taig Report, released internally in October 2002, suggested there was a 10% probability that someone might be killed as a result of being caught in the lahar's path. However, he emphasised that it would cost a substantial amount of money to reduce the risk level. The key recommendation of the report was the raising and reinforcing of the Tangiwai road bridge, which, Taig said would make the road as safe as any bit of road in New Zealand.

Sheppard said that DOC were surprised when the draft report was released because they had not known about it before that point:

> The draft report was quite startling to us, because it contained advice and conclusions which didn't accord to our understanding of what was happening, and it was partly because Tony Taig – who is a UK-based consultant with a good reputation - based his assessments on the 1999 Assessment of

> Environmental Effects (sic). Things were moving on after that AEE at a pretty fast rate because of the urgency to this. But the Taig report did a useful thing because it did give independent advice about the risks and whether or not they were significant. At the time it gave us a checklist of 'have you looked at these things, and what do you do about them'.

[NB: When asked about the data Taig was using, Webby said that while Taig did draw upon some of the older data from the AEE, Taig also included new data Webby had provided to get an overall picture of the risks associated with the lahar.]

Ultimately, Norton believed that the Taig Report started the discussion around an acceptable level of risk:

> We came to the conclusion that 1 in 1,000 probability was probably unacceptable and 1 in 10,000 was probably acceptable. That came from reviewing nuclear power station levels of risk. At that point, the risk was sitting at 1 in 1,000, so it was concluded that the risk was probably unacceptable.

However, it was a discussion the politicians did not want to have:

> Politicians don't deal with risk well. They just want it removed. Discussions on whether 1 in 1,000 was probably unacceptable or whether 1 in 10,000 was acceptable were not figures that you could have a rational discussion about in a political environment. So I went to the meeting and said to them, "It is my advice to you that there has not yet been sufficient measures put in place to remove this risk".

In response, the Cabinet Committee members asked Norton to go away and come back with an action that could be taken to reduce the risk:

> They asked me to come back to them and recommend to them what actions were needed. And I said to them, "Okay, well there are two actions that could happen. One is that we could put in place a mechanism to initiate the lahar at a time we choose. Or the road bridge will have to be raised." And they said, "Go away and meet with the Ministers and decide what should be done."

Of the two actions Norton suggested, the decision to raise and reinforce the Tangiwai Road Bridge was put into action. Raising the bridge was the most-expensive decision made to manage the lahar. Its reported final cost was $4.41 million dollars:

> The bridge was raised and at that point, my advice to the Government was that the risk was probably acceptable. The risk went to around about 1 in 3,000 and it

> was not practicable to get it above that without doing extraordinary things. We didn't reach the 1 in 10,000. It was interesting that the politicians didn't ask what that level was. And I didn't tell them. My advice to them was this was probably acceptable.

Keys also talked about doing some work related to the risk associated with the lahar in the months after the Taig Report was released (although he never mentioned the report). In the Assessment of Environmental Effects (1999), Keys had suggested as an estimate for a worst-case scenario, a bus going into the Whangaehu River with 50 passengers on board. However, Keys said, more work was needed on calculating a figure for the risk:

> We had worked out what the worst-case lahar was and we had worked out the best-case lahar, but we couldn't work out the most-probable case. So in 2002, as a result of this exercise, someone said, "How can we work out the most-probable lahar?".

Samples were taken from the tephra dam in November/December 2002 and sent to an Australian 'dam break' expert for analysis. The results of the analysis suggested the lahar would be twice-as-large as Tangiwai. Keys said the results shifted the focus from a disaster orientation to a more-realistic view of the lahar. Keys said that before the most-probable lahar estimates were made, most people were focusing on the worst-case lahar scenario.

6.4.7 Reviving the debate around intervention

While Norton's option for raising the bridge was accepted, his suggestion for a controlled release of the lahar with explosives was met with opposition from DOC. Norton said, "DOC by that point had got to the point where they were 'winning' and there was nothing they were going to do that would interrupt the natural process". Norton had come upon the idea of a controlled release after talking with the Damwatch consultants who were on the Ministerial advisory panel and also the Australian consultants, who were brought in to estimate the size of a lahar. However, Norton said, DOC were determined that the lahar would occur without any form of intervention:

> DOC actually got more consultants to do a report on that proposal [the Meritec report]. [The consultants] completely misunderstood the mechanism I was asking to be investigated. They did a report that talked about the logistics of blasting a channel in the dam. And I got really quite angry: "Of course, you

> can't blast a channel reliably in the dam. I don't need your report to tell me that, but you haven't done the things I asked you to do." DOC briefed them and DOC was happy with the report. So that option was not properly evaluated or put before the politicians.

Norton believed that DOC's denial of the feasibility of other options – for example, a controlled release – actually sustained the debate around the options as the engineers and scientists involved knew they could be implemented. Instead, Norton said, DOC got "tied up in knots with all the other reasons that were relatively spurious – lacking in real credibility":

> Technically, you could have dug a channel in that dam without any fatality at all and without any risk to life. It might have cost a lot of money, but it could be done if it were a practicable solution. And DOC tried to argue that it couldn't be done.

However, Norton introduced another argument that strengthened DOC's position:

> Cutting a hole in the dam was not practicable because the process had been occurring for five million years and there was no way that man was going to stop those lahars occurring. We might stop the first one. If we dug a hole through the centre of six metre dam and move 10% of the material to let the water out the next eruption would go on top of the six metre dam, which means we end up with a 10 or 12 metre dam. One day the lahar will burst. And the more you try to stop it, the bigger it will get. I think that was the only rationale DOC needed not to dig a channel through the dam. And they tied themselves in knots with all the other reasons, which really were a load of rubbish. The risk to the bulldozer driver – goodness gracious - that happens every day of the year. I suppose what's interesting here is that the discussion about the risk and the communication around it became quite distorted.

Norton's view was that the problem could have been dealt with more easily:

> With some care in explaining the risk issues, DOC could have diminished that media issue probably in 12 months. In the end, there was no issue. In the end, the media were not arguing with anybody. And in the end, all the arrangements were in place – there were no arguments about what needed to be done. The issue became, "okay, we've resolved this and everyone is happy".

However, Norton was quick to add, "I have a lot of respect for DOC. But this was one issue on which I differed with them". He also observed:

> It was interesting that most of this was done from Turangi with Harry and his boss, Paul Green. They were quite autonomous and we got on really well with them. We had pretty upfront discussions on the issues.

Sheppard said, that the Taig report forced DOC to re-examine the risk relating to the lahar:

> The thing that really grabbed attention, he had a statement, I can't remember the wording, you can find it in the report, that led people who were not statisticians to say that one in six people, one in ten, whatever it was, were likely to die as a result of this. That was a level that to anyone if that was truly the case, would have meant that if that's the case, then we're not managing this risk properly. So we really had to look at that.

In particular, Sheppard suggested the Taig Report provided a checklist of practical things to reduce the risk:

> The focus went on to "well, how do we identify the component risks" and Tony Taig had done that very accurately for us. For instance, we hadn't been able to raise the State Highway 49 barriers and things like that, and he was working on the basis: if things like that don't work, then you've got these risks. It was something to focus our attention and say we've got to tick off these things.

The result, Sheppard said, was increased confidence in the lahar's management: "Gradually, we got enough of a feeling of confidence that we could do this and reduce to a negligible level the risk to public safety." However, in hindsight, Sheppard wished that DOC and Civil Defence had worked together sooner.

6.4.8 Southern Ruapehu Lahar Planning Group (SRLPG)

Sheppard noted that the Taig Report marked increased collaboration and cooperation between DOC and Civil Defence. However, it also marked increased collaboration between the agencies involved with the emergency response. Dempsey said that following the release of the Taig Report, the Southern Ruapehu Lahar Planning Group (SRLPG) was formed in 2003. Police Inspector, Dave White, suggested the group was set up to bring together the various agencies with their various responsibilities:

> Other agencies have different boundaries – fire service, DOC is based on completely different things – which is one of the dangers – deciding who should make decisions. That was why the Southern group was set up.

Ruapehu District Council Emergency Management Coordinator, Annie Pedersen said that most of the Group's meetings were held at Ohakune, which was also where the Incident Control Point was located when the lahar took place. Members attended from Wellington, Palmerston North and Taumaranui. Ruapehu District Council Team Leader of Regulation, Johan Cullis, said DOC was involved on the planning group as a technical advisor. Horizons Regional Council held the chairmanship from the Group's formation until when the lahar took place.

The group worked together to develop the Emergency Response Plan. The plan was based on CIMS (Coordinated Incident Management System) – an international model for how to deal with emergency situations. Pedersen said the model was introduced by the Ministry of Civil Defence and Emergency Management. A shared plan was constructed using the model. The plan – contained in a large blue folder – had sections for each organisation, which set out their part of the emergency response. Every organisation had a copy of the plan and every plan was numbered. When one of the response plans changed, all the folders had to be updated.

Cullis said, initially, the members met on a monthly basis while the response plan was being formulated. This was scaled back to every six weeks. Later, meetings were held only on an as-and-when-needed basis, although the group would meet at least four times a year. Cullis said the response plan was tested every September/October:

> Those worked out brilliantly for us. Obviously, in the early stages, it was on a smaller scale because we took the approach, crawl, then walk, then run. So, as the exercises progressed through the years, the agencies were totally involved. I think the last exercise saw almost 20 or 22 agencies in total participating.

As a result of the exercises, on the day the lahar took place, Cullis said, "it was so rehearsed, it could have just been another exercise". Ontrack's Murray Marshall thought the meetings were key to unifying the lahar response:

> When you talk about meetings, some meetings it's really hard to get people to unify and go into that common goal. That occurred… Finding the common goal was there and people became extremely focused.

He also thought that it was the meetings combined with the false alarms that enhanced communication between the agencies:

> We were really lucky that the people from the meetings we went to were able to network extremely well and make contacts and get our communication links going. That was one of the major things that happened because, yes, we had the exercises, yes, we had the few blips in between all that. And the networking that went on at the meetings, we were all able to communicate.

In a quote that sums up how many of the planning group members felt, Paul Green commented that, "it's amazing that in the end parties worked so well together, although some of them didn't agree with the way it was being done". An off-shoot of the Southern Lahar Planning Group was the Lahar Information Group set up to coordinate communication about the lahar. This group is discussed in Chapter 7 (see 7.9.2).

6.5 2005–2007: Communicating and responding

6.5.1 Strategic Issues at DOC

Most of the management of the lahar was left to Harry Keys, Dave Wakelin, and Paul Green and the other staff of the Tongariro Conservancy. However, DOC head office in Wellington were still monitoring the situation. Christophers described the role of head office as "flying pretty high about this - we were looking down at the people on the ground". Department of Conservation Manager of Strategic Issues, Harry Broad, described the role of strategic issues at the Department of Conservation as being there to support the people in the conservancies. Christophers suggested the work strategic issues does falls into two categories: planning and reactive. In terms of reacting to situations, one tactic the issues managers used was writing letters to the editor. However, Christophers said, these had to be used carefully:

> We've got to be very careful that we don't beat it up and make it an issue for them. You've got to be so careful that you don't respond to some little niggle and show that you're very sensitive about something and appear to be really concerned about it.

Late in the lahar's management, it was decided that a formal communications strategy was needed for the day the lahar took place. In December 2006, Harry Broad and Herb Christophers travelled to Turangi and met with Wakelin and Keys. Said Broad:

> They had a good comms [communications] plan for the area, but we didn't really have a full one – what we call a 'national perspective'. So we went up about three months before and sat down with them for a day or so and went through the whole communications planning exercise –Who's going to tell who? How's it going to go? Who are the spokespeople? What are the key messages? – all that. All of which built on their platform.

As part of the plan, three press releases were produced. Christophers said the press releases dealt with three potential outcomes for the lahar. Initially, Christophers said, Keys did not want to know about the scenarios:

> Harry Keys said, 'Oh, I don't like this stuff'. And I said to him, 'We've got to do this, Harry. We've got to write all this stuff down, because if something happens we've got to know who's going to say what. We can anticipate from what you've told us that we won't do anything because in the worst-case scenario, which we have planned for, the bund will hold, the bridge will hold and we won't have any problems as long as people keep off that footbridge [on the Round the Mountain track] that we know is going to be wiped out'. So he said, 'Fine, let's do that.' After I'd written the press releases, I gave them to Harry Keys and he said, "That's fine, but I hate the idea that it might happen".

The first press release dealt with the lahar if it went "without a hitch" and with only the expected infrastructure damage, the second press released dealt with the situation if the lahar caused severe (unexpected) infrastructure damage and the third press release dealt with the scenario if someone got killed and/or massive damage occurred. On March 18, the first press release was used. Broad said what he and Christophers did for the lahar is a standard DOC procedure. However, he also pointed out that the success of any communication strategy depended upon good management of the lahar:

> We made sure that we had key messages - that they were consistent. And that DOC, senior management and the minister's office were well aware of who's saying what, who's doing what. But - you know – we're very dependent on whether the lahar was well-managed or not.

6.5.2 March 18, 2007

On March 18, 2007 after a period of heavy rain, the lahar finally took place. The lahar managers were alerted to the movement at the dam at approximately 10.20 am. However, it took an hour for the dam to break, giving the management more time to initiate the response. The lahar took two hours to travel from the Crater to the Tangiwai road bridge. The lahar broke through the crater rim at 11.22 am and arrived at the Tangiwai road bridge at 1.22 pm.

Wheatcroft was based in Taumauranui. He said he was meant to have a pager linked to the ERLAWS warning system, however, his pager broke the week before the lahar took place:

> When the lahar happened, I didn't hear about it for an hour after the event. Then I had to jump in my car and drive for an hour down to Ohakune to the EOC (Emergency Operation Centre). At that stage, Dave Wakelin had been handling the media.

Wakelin had been alerted the lahar was taking place at 10.22 and had begun taking calls from journalists at his home in Taupo at 11.00 am. Many reporters already had Wakelin's cellphone number after the October 2006 mini-eruption, while others had found his home number in the phone book:

> A large number of them I'd already met through the 4th of October [mini eruption event]. It was interesting in that we found that the media turnover over that 11 year period – all the calls we were getting, so many of them were new names – people who'd suddenly expressed an interest in the eruption. There were a lot of new people we hadn't heard of before.

Wakelin knew the lahar was taking place but was unable to give reporters confirmation the lahar had occurred until he got permission from the area controller located in Ohakune – an arrangement set down in the Emergency Response Plan. However, media were not going to wait:

> It's not good when you're in a situation like this and you're telling people you can't confirm and that you're still waiting for information. I knew there was a lahar underway from looking at the instrumentation I had on the screen because I was getting sensory information from all three [ERLAWS] sites. And the only way you're going to get reaction from all three sites is if something has gone

> down past them. Or you've had a massive computer failure, but that looked unlikely, because the time intervals between the alarms being set off matched the predictions.

For some reporters, Wakelin found a way around the need to confirm or deny:

> The media knew damn well there had been a lahar. I had a reporter call in, and she said to me, "I'm driving towards Waiouru, and I know you can't tell me anything, but should I speed up or slow down". I said, "speed up".

For Wheatcroft, the lahar was another example of media often knowing what was happening in emergency situations before he did:

> The thing is that the media listen in on the Police emergency [radio] bands the whole time. So if something happens, they know about it straight away. They don't need to be told. Often the media will ring me before I know of something. For instance, that eruption we had the other day [September 29] when that guy lost his leg. I got rung at home, "Paul, what's happening with the emergency? What's happening with the eruption?" And I hadn't even heard about it. Often I go to the media and say, "So what do you know?" "Can I get a bit of information?"

Wakelin had also experienced the media's skill at obtaining information. He told the story of how, after the media visit to the Crater with the Ministers on January 29, 2007, he was driving back to Taupo with Dominion Post reporter, Mike Watson. As they were driving through Turangi, Watson received a call from his boss in Wellington. After Wakelin and Watson had come off the mountain, DOC workers had accidentally triggered the ERLAWS warning, initiating a pager message warning of a lahar. Watson's boss heard about the alert from amateur radio operators scanning police channels and had rung Watson to find out about the situation. Wakelin saw this as evidence of the need for a prompt media response:

> Because of the speed and mobility of the media, you've got to keep them in the loop as fast as you can. And that was something on the day that might have made things a bit easier.

He found the media response set down in the Emergency Response Plan to be idealistic:

> There was this idea that Ohakune was going to be the control centre. They were going to set up a media centre with phone lines and faxes and other stuff as though the media were all going to fly into Ohakune and sit there in a room and

> wait to be fed information. Of course, that's not how the media works. The media don't want to be sitting in a room, waiting for a fax machine to go, particularly if it's something like this [a lahar]. Because it was literally a two hour event.

At 12.15 pm, Wakelin received permission from Ohakune to confirm the lahar was taking place. He spent the rest of the afternoon answering calls. Wakelin found that some reporters had a better understanding of the lahar than others:

> I gathered from some of the reporters – we're talking largely print media, but particularly radio ones – some of them ring up, and you think, gosh, "what part of New Zealand don't you live in". It's obvious from the questions that they just happened to be the duty reporter and they've been told, "oh hey, ring this number and talk to this guy about the lahar". But they have no idea what a lahar is. One of the last questions of the day, which made my day, on March 18, was from a reporter saying, "when are you going to rebuild it?". But then again – let's face it – in every profession there's always someone who gets roped-in to deal with it, without really understanding what to do. And it does happen.

However, Wakelin also found that while some journalists may have lacked knowledge, professionalism was high:

> During the day of the lahar, I dealt with 100-plus phone calls in the afternoon. And actually I was incredibly impressed with the professionalism and understanding and the patience of those phoning in. At one stage I had eight calls – one-after-the-other – and they all said, "I realise you're busy". I think it took an hour and a half to write the first media release because the phone kept going.

At 1.15 pm Wakelin issued a press release. While it had taken time to get the release out, media did use it. Wakelin said of the radio interviews he participated in on the day, "for many of the interviews, they'd already got the media release. All they wanted you to do is read it back to them." According to the Emergency Response Plan, Wakelin was to have made his way to Ohakune. However, this did not happen due to the volume of calls Wakelin answered. Wheatcroft eventually arrived in Ohakune and opened a media centre and started taking calls.

6.5.3 The Emergency Response and the media

On the day, Wheatcroft found there were two groups: those managing the lahar and those handling the media: "The handling of the media, in my opinion was seen by the

people controlling the emergency as something they didn't need to worry about too much because LIG was doing that." However this could be, as Keys said, because the media were not important to the response efforts on the day: "it was important to the media, but it wasn't important to the response".

A comment Dempsey made gives further insight into the mindset of those managing the emergency response:

> We had a philosophy that our role was to protect people. It wasn't to be at the media's beck and call, that's the reason we had our open day, we wanted to be specific about what we were doing, we were aware that the media had a huge role in helping us, in particular around public perception and confidence that the event would be well-managed, getting out factual information about the size of the event, and the effect of the event.

Mike Craig, who was the Incident Controller - the Police officer in charge of the emergency response – said that handling the media was left to Wakelin and Wheatcroft:

> The media I largely stayed away from. They had media liaison guys like Dave Wakelin from DOC. And there were people above me in the police doing media releases. Yeah, no, I sort of had enough to do without bothering too much with media. Yeah, I did tend to - on the day in particular – avoid them like the plague.

Craig also noted that "Harry [Keys] was the main one [the media] wanted to talk to". Overall, Wheatcroft felt media were "well-served" on the day:

> When I got there, I organised to set up a media centre because we didn't want them hanging around the EOC [Emergency Operations Centre] or the ICP [Incident Control Point]. I think the original plan was that media weren't going to be told much at all until the lahar had past. Two hours after the lahar had went, we would hold a briefing. That was a problem in itself, because the media wouldn't wait.

However, Keys felt the media response was misunderstood. He said Paul Wheatcroft had template press releases prepared to send to media every five-to-ten minutes. However, Keys said, "by the time you'd finished writing the first release, the lahar would be over". On the day, none of the template press releases were used. Keys also thought that it would have been useful if Wheatcroft had arrived on the scene earlier:

> The media want stuff. It's happening fast, so the response has to be within the time of the event. The event was roughly two-three hours. So the response had to be within that. But Paul wasn't on the scene for two hours.

Wakelin said that if he could have done things differently, he would have brought more people in to help with the media response:

> If there's anything I could have done differently, I should have realised that there were several people I could have called in to answer the phone or to write the release. However, when you're so much in the thick of it and you've got two phones going and you've got emails coming in, you're watching the screen with the sensors, monitoring what's happening on screen with that, the fax machine is going. In hindsight, it seemed very obvious that I should have just said, "Hey Karen, get down here, we need somebody who can handle the phones." I'd been talking on the phone non-stop from eleven o'clock through to five o'clock

6.5.4 After the event

In the days after the lahar took place it was agreed by the Ministers and – in general – by media that the lahar had been well-managed. Wakelin credited the repeated practices response plan for guaranteeing a smooth response on the day:

> I think what worked really well was the Emergency Response Plan. I think it went well because the lahar was a long time coming and that meant we'd had six exercises over six years. Often in those you'd throw in fishhooks with things happening, or the size of it being bigger, or the bund being damaged – those sorts of things. And that means everyone's sitting around, the clock's ticking, you can check everyone's doing what they're meant to be doing. I think, because we had done that, on the day, pretty well everybody slipped into their roles quite comfortably. I think the success of that also showed up 25th September when, [there was a] different scenario, but to a large extent the things that swung into action were based on the Lahar Response Plan.

Wheatcroft also thought it went well, although he would have liked to have been in Ohakune sooner:

> In terms of the big picture, everything worked well. No one got killed. There was very little damage. So everyone was pretty happy. But picking it apart, what didn't work well was that I wasn't in Ohakune when it happened. The first text message should have gone out a lot sooner than it did.

Harry Keys was surprised by the positive response after the lahar had taken place:

> I wasn't prepared for the huge positivity after the lahar. I was prepared for negativity - I knew if we got it wrong, we'd be dumped on. There was a bit of a bandwagon effect.

Christophers summed up the actions of the media on the day as "understanding":

> In this case the press were very sympathetic. Whereas, if it had been a Cave Creek or something else – something where they felt they had a dirt story – they would have been far less friendly.

In the Radio New Zealand National interview, Al Morrison was relieved the lahar had finally taken place:

> In this game you have to have a thick skin and a good sense of humour. Frankly, it was an enormous relief to see that thing finally go. We didn't have any doubt what-so-ever that the preparation had been done. It was a huge cooperative exercise with a whole lot of government agencies, with local government and with iwi. And it worked as it was forecast and planned.

Herb Christophers summed-up the feeling at DOC after the lahar took place:

> It was a very good feeling after that because nobody had been hurt, [the lahar] had behaved well within predictions. There was a lot of back slapping all round because the scientists got their predictions well within the parameters that were safe. The public acceptance was good, the media behaved themselves well – it was a bloody good event to be involved with. And it was one of those days when we didn't get a kick in the cobblers.

Harry Broad saw how the situation would have been different if major infrastructure damage had occurred or someone killed:

> The overall thing is if it had gone wrong, the media would have been baying for blood. Because it went right, we got a whole raft of good, positive stories, just saying this has been managed as a national event and the flow's gone where it should.

Broad believed that science played a large role in the success of the lahar's management:

> We've got the memorial to the Tangiwai disaster. What we don't have is a memorial to say, 'actually with an ounce of good luck and a ton of good science, we got it right this time' – so why don't we commemorate that as well?" …A

> discrete distance away from the Tangiwai one. But it's just a reflection of that it was well-managed, the science was right, and we should actually say, "it wasn't bad, guys".

Paul Green said the lahar's management is now a model for other risk scenarios:

> I think it is probably the most well-planned hazard mitigation that I've heard about, read about, observed. Very strong science. Very strong engineering. Analysis of what would happen. And it turned out to be exactly true, you know. The path of the lahar, the size of it, the speed that it would move at, its impacts were all pre-determined extremely accurately. And the warning system worked to perfection. I think it's a model for how something can be planned for.

6.6 Conclusion

This chapter has explored material gained during interviews with nineteen people involved with various aspects of the lahar's management. The nineteen participants in this study came from nine organisations: Department of Conservation (6), Ruapehu District Council (4), Opus (2), Police (2), Genesis Energy (1), GNS (1), Horizons Regional Council (1), Ministry of Civil Defence and Emergency Management (1) and Ontrack (1). Twelve interviews were conducted face-to-face and the remaining seven were conducted over the phone.

The first two sections of this chapter looked at the lahar from its discovery in 1995 to the development of options to manage it from 1997 to 1999 as well as the consultation process during this time. This section also covered the decisions made by Conservation Minister, Sandra Lee, in 2000. The third section looked at the ensuing debate from 2001-2004 between the Government, local and regional councils and Opposition MP, Nick Smith, over the decision not to intervene at the Crater Rim. It also looked at the how the conflict during this period was resolved, including the involvement of Civil Defence and how the assessments of risk changed how the various agencies worked together. The fourth section of this chapter looked at how DOC's Strategic Issues group created a communication strategy in the months leading up to the lahar. Afterwards, the media response on March 18, 2007 – the day the lahar took place - was covered. In the final part of the fourth section, individuals involved in the 'lahar issue' reflect on how the management went.

The following chapter – Chapter 7 - draws upon the material presented in this chapter along with further information from the interviews to discuss the results of the content analysis. Further, the issues management processes talked about in this chapter are compared with a summary issues management process model. This chapter also includes discussion of the tactics used to communicate with the many lahar stakeholders. It also discusses how media coverage influenced the lahar's management.

Chapter 7:
Discussion

7.1 Introduction

This chapter discusses the content analysis results (Chapter 5) with contributions from the interviews (Chapter 6). The first part of this chapter looks at the issue lifecycle of the lahar. It then re-examines the three aspects of the media coverage analysed in the content analysis: salience, framing and sources. The second part of the chapter looks at the issues management processes used to manage the lahar, in particular, how the management process aligned with the summary model of the issue management process identified in Chapter 3. It then looks at the tactics used to communicate with the many lahar stakeholders. Finally, it discusses how media coverage influenced the management of the 'lahar issue'.

7.2 Lahar issue lifecycle

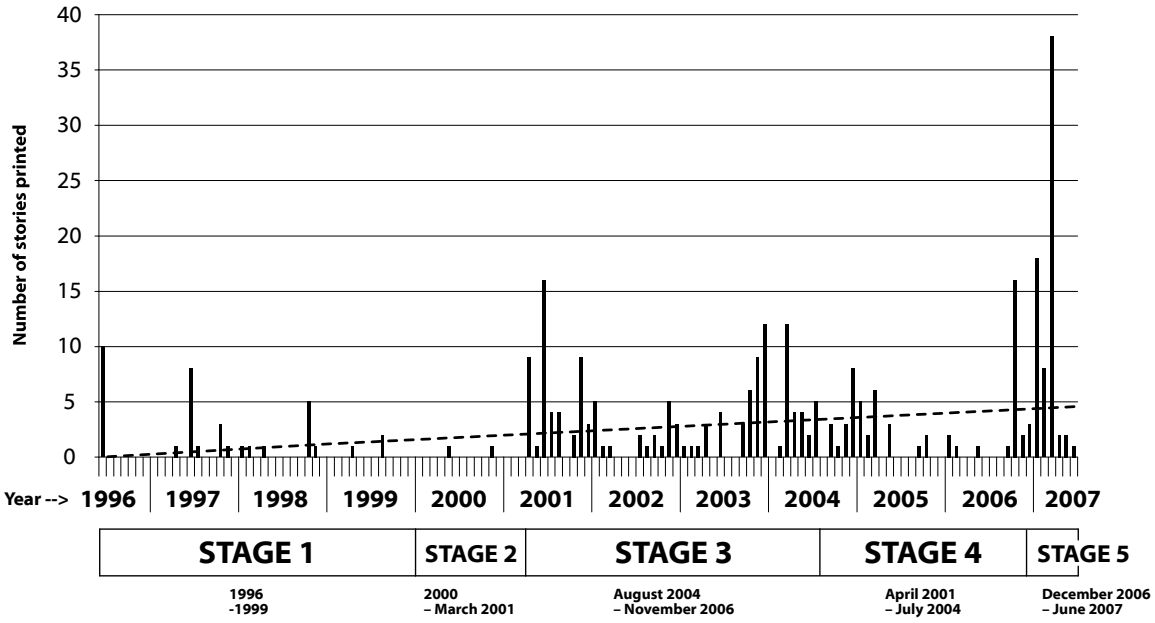
The results from the content analysis suggest that the 'lahar issue' went through a five stage lifecycle. This lifecycle was identified through the attention given to the issue and also insights from the various issue lifecycle models. Figure 31 shows the overall coverage given to the 'lahar issue' with the stages indicated below the graph.

7.2.1 1996 - 1999

The first stage (1996 - 1999) saw the announcement of the lahar in April 1996. During this period the Department of Conservation began consulting with stakeholders and developing options to deal with the lahar. This contradicts many of the issue lifecycle models, which suggest that issue-related policy is not developed until sufficient societal and media pressure is applied (e.g. Buchholz, 1988; Crable & Vibbert, 1985; Hainsworth, 1990a). However, the lahar issue did not receive the significant, sustained coverage to force the development of policy until mid-2001. During this stage the lahar

achieved Crable and Vibbert's first status: 'potential status' – groups and individuals had identified the lahar as an issue, but it still required wider public support to achieve prominence.

Figure 31: Lahar issue lifecycle (1996-2007)



7.2.2 2000 - May 2001

The second stage (2000 – March 2001) saw Conservation Minister, Sandra Lee, endorse the plan to not intervene at the Crater Lake. This could perhaps be seen as the third phase in Down's (1972) model: 'realising the cost of significant progress' or the second phase of Buchholz (1988) model: 'changing expectations'. It was during this period that opinion within the Ruapehu District Council and Horizons Regional Council shifted to opposition of the plan to deal with the lahar. As noted by Department of Conservation Scientist, Harry Keys, Horizons Regional Council approved of the development of lahar options when it seemed that intervention at the crater would be the option chosen. However, after Sandra Lee announced in May 2000 that an alarm system would be installed and emergency response plan developed, the councils became concerned. During this stage the 'lahar issue' had Crable and Vibbert's second status: 'imminent status' – it received the endorsement of the Ruapehu District Council and Horizons Regional Council as a valid issue.

7.2.3 June 2001 – July 2004

The third stage (April 2001 – July 2004) saw a prolonged period of debate between the Ruapehu District Council, Horizons Regional Council and the Government over the decision not to intervene as well as sporadic attacks by Opposition National MP, Nick Smith. This aligns with the second stages of both Buchholz's model – the 'political stage' and Hainworth's model – 'mediation and amplification'. According to Buchholz and Hainsworth, during this stage the issue gains media coverage and is picked up by interest groups. This also forces politicians to begin developing policy to deal with the issue. While plans to deal with the lahar had already been decided upon, the pressure put on Government did change how the lahar was being managed. The pressure saw the creation of a ministerial committee in November 2001 specifically to deal with the lahar and the formation of a scientific panel to advise to the Conservation Minister and the committee. As discussed in 6.4.5, it also prompted the involvement of Ministry of Civil Defence and Emergency Management Director, John Norton. Norton's involvement saw an assessment made of the risk relating to the lahar (the 2002 Taig Report) and the recommendation to raise the Tangiwai Road Bridge. Finally, this period ended in July 2004 with the announcement that Government would provide financial assistance to the Ruapehu District Council for the development of the Emergency Response Plan. During this period, the issue reached Crable and Vibbert's third status: 'current status' – the issue was of current interest to the public. As predicted by Crable and Vibbert's model, this period saw media create 'sides' (Nick Smith and Councils vs. Government) and individuals were chosen to play roles in the drama (as discussed later under sources).

7.2.4 August 2004 – November 2006

The fourth stage (August 2004 – November 2006) saw the end of disagreements between the lahar agencies and a united decision to ensure the lahar took place successfully. Interest was renewed temporarily in October 2006 when a mini-eruption triggered the ERLAWS warning alarm. However, during this stage the issue became 'dormant' (Crable & Vibbert, 1985; Meng, 1992) as the debate around the lahar options had subsided. Also, the predictions for the lahar were pushed out further, meaning that there was little issue-related activity to report.

7.2.5 December 2006 – June 2007

The fifth stage (December 2006 – June 2007) saw renewed interest in the lahar following the announcement in December that the tephra dam was eroding – a sign the lahar would take place in the near future. This period peaked with the lahar taking place on March 18, 2007. The following months match Downs' description of the fifth stage in his model – the post-problem stage. In this stage, this issue is dormant, but may reappear on the news agenda. In the months following the lahar, five stories related to the 'lahar issue' were printed. It is also correct to describe the lahar as 'dormant'. As Crable and Vibbert (1985, p. 5) say, while "issues may be resolved… but they are never solved in the sense of a final answer". The lahar may be 'solved' in that there is no longer a tephra dam blocking the crater outlet. However, an eruption on Mt Ruapehu, which may occur at any time, could cause a further blockage. This, potentially, might see the start of another issue lifecycle, although it is unlikely another 'lahar issue' would follow the same phases discussed above. This is because it would have to follow the same combination and timing of events, which marked the development of the 'lahar issue.

7.3 Salience

The results of the content analysis suggest that the lahar was a salient topic for media both in the level of attention and how it was presented (see 5.2). The results also showed that the number of 'lahar issue' stories varied over time. The results seem to confirm Peters and Hogwood's (1985) observation for an issue to receive sustained coverage requires sustained issue-related activities. As Newig (2004) points out, issues can be quickly replaced by other issues. However, just because an issue is not receiving coverage does not mean it is unimportant. Instead, issue salience is indicated by the volume and repetition, the logic being that important issues will be reported continually, while unimportant issues will receive little or no coverage. Therefore, the lahar issue's salience is confirmed by its continued coverage.

The changes in the level of 'lahar issue' coverage were noted mainly by those involved with working with the media. Department of Conservation Community Relations

Manager, Dave Wakelin, observed that media attention in the 'lahar issue' was sustained, but sometimes there were no events to write about:

Because it was over such a long period of time, there was some interest in the early days, but I think we then had a dying off just a bit. And that's understandable. Because there was a period when the lake was refilling, the bund was in place, ERLAWS was in place, the light may or may not have been in place. It was kind of a relatively quiet period when a reporter would ring up and say, "What's new on the lahar? – What's happening?". And the media interest did pick up again once the level started to get above the old lake outlet.

Ruapehu District Council Team Leader of Regulation, Johan Cullis, thought that media interest in the lahar was 'sporadical':

It took almost ten years from the initial eruption so in sporadical parts there was great interest in it. But – you know – as soon as something else happens somewhere, there wasn't much attention on the lahar until it reached the next critical stages.

Department of Conservation's Tongariro Conservator, Paul Green, also talked about the varying levels of media coverage:

During those twelve years it had ebbs and flows. It would often be someone in the media that all of a sudden would take an interest and would come out with something and it would set all the other people off. Because they all watch what each other's doing. So one newspaper person or one television person or radio person – talkback radio – would get going. Next minute, other reporters would be calling up.

7.4 News value of the 'lahar issue'

The salience given to the lahar can be attributed to its news value. Initially, the lahar's links to the 1953 Tangiwai Disaster ensured it received coverage. When the Hancox report, which confirmed the potential for a lahar was released in June 1997, eight stories that covered the announcement made mention of Tangiwai. Further, the results of the content analysis found that the 1953 Tangiwai disaster was constantly mentioned throughout the 11 years of 'lahar issue' coverage (see 5.3.11). Later, the debate around the options for dealing with the lahar (June 2001 – July 2004) centred on another news value: conflict. During this period, the lahar was frequently reported. Smith (1997 cited in Tankard, 2001) suggests that journalists 'reflexively' frame their stories about conflict. However, Civil Defence Director, John Norton suggested that it was the various parties involved in debating the lahar's management who shaped reporting of the issue:

My recollection of all that is that the media were relatively straight-forward in their reporting. But they, of course, delighted in reporting conflicts between the mayor and the Minister and DOC. I don't have any sense of recollection that the media over-stated the issues. I have other occasions when I'm clear they did. But on this occasion they didn't. My view is that the media reported the issues accurately. The questions and the arguments were being fuelled by DOC and the local authorities. So the media didn't need to get in and stir it up - it was all there happening**.**

Visualness (McGregor, 2002) also played a role in the lahar's newsworthiness. In January 2007, media ran photos of erosion to the tephra dam demonstrating that its collapse was imminent. Further, newspapers ran front page stories with large photos of the lahar flow and debris on March 19, 2007 - the day after the lahar took place (e.g. "Awestruck!," 2007; Binning, 2007; Staff Reporters, 2007; Waikato Times reporters & NZPA, 2007a; N. Wilson, 2007b) as well as photo spreads printed the following days (e.g. Mercer, 2007; Rowan & Johnston, 2007; "Ruapehu lahar," 2007; M. Wilson, 2007a). A notable example of visualness is the photo the Dominion Post printed taken from a NASA satellite showing the lahar's flow path ("Lahar from afar," 2007).

The increasing intensity of an event can increase its newsworthiness (McGregor, 2002). This was true of the ‘lahar issue’ as the predicted date for the lahar drew near. For example, when Department of Conservation Scientist, Harry Keys, announced that a lahar would take place sometime during 2006, the announcement received widespread coverage (e.g. Heffield, 2005b; "Ruapehu crater lake level 'low to normal'," 2005; Watson, 2005a). Further, the ‘lahar issue’ received a large amount of sustained coverage from December 2006 to March 2007 when it was announced that the tephra dam was eroding - a sign its collapse was imminent.

The results of the content analysis also indicated that the ‘lahar issue’ was most salient for the Dominion Post and the Ruapehu Press, who gave the topic the most-consistent coverage (see 5.2.1). According to theory regarding news value, local events are considered more news worthy than those that take place far away (McGregor, 2002). However, the Dominion Post is a Wellington-based newspaper. Dave Wakelin offered an explanation as to why the Dominion Post was interested in the lahar:

The *Dominion* was probably the paper that did the biggest coverage. That’s probably because the *Dominion* sees [from Taupo]-south as its patch. The *Herald* is largely an Auckland cosmopolitan paper with reaches out into the Waikato and Bay of Plenty, but I think the *Dominion* certainly sees what goes on on the mountain around here as being within its readership. And I think, because of that, we probably got better coverage through the *Dominion*.

7.5 Framing

This study identified ten frames that were used to present the ‘lahar issue’ (see 4.2.6.3). The application of the frames varied over time. This variation seemed to follow the events of the ‘lahar issue’ For example, the ‘action statements’ frame (see 5.3.4), ‘conflict’ frame (see 5.3.7) and ‘implying disaster’ frame (see 5.3.10) were mainly present in coverage during the lahar debate period (April 2001 – July 2004). Also the ‘lahar response’ frame only came into the coverage from the end of 2000 onwards as the first decision about how to deal with the lahar was made in May 2000 – before that point there was no lahar response.

The results of this study seem to support McQuail's (2005) assertion that sources influence how stories are framed. The three most-common frames were those that looked at how the lahar was responded to (lahar response), stories that provided evidence that the lahar issue existed (diagnosing causes of problems) and stories that focused on the impacts of the lahar, whether negative positive or debated (definition of problems). The basis of these frames is largely descriptive and informational. Department of Conservation (DOC) scientist, Harry Keys, was the source who was most-associated with the three aforementioned frames. Further, DOC was the organisation most-associated with these frames. The results of the interviews showed that DOC and the other agencies were actively providing information and assistance to media. This information fell into the three categories closely-associated with those three frames: informing about the Crater Lake level and lahar response, describing the causes of the lahar situation and discussing the potential impacts of the lahar.

The results suggest that other organisations also influenced how the lahar was framed. Ruapehu District Council and Horizons Regional Council were two organisations heavily associated with action statements and conflict – two frames associated with the lahar debate. On a side note, DOC was also strongly associated with the more negatively oriented frames. It was the top source organisation associated with 'suggesting remedies', 'implying disaster' and 'conflict'. DOC's involvement with these frames suggests it was responding to criticisms levelled at it. The sources influenced by 'lahar issue' coverage are discussed further in the following section.

7.6 Sources

Hall, Critcher, Jefferson, Clarke, & Robert's (1978) theory of 'primary definers' appear to be confirmed by the results of this study. Many of the frequently-cited sources in this study display the qualities of such definers: first, media repeatedly used them as sources and, second, these sources could be considered official and/or authoritative. Seven of the top ten source *types* (see 5.4.2) were from Local or Central Government sources, political parties or state-owned enterprises. Further, nine of the top ten source *organisations* the sources came from were Local or Central Government sources, political parties or state-owned enterprises (see 5.4.1). Finally, nine of the top ten

sourced *individuals* were from Local or Central Government sources, political parties or state-owned enterprises (see 5.4.3).

DOC Scientist, Harry Keys was the most-cited source. He fulfils Hall et al.'s two selection criteria for primary definers: first, he is a scientist – an authoritative source - and, second, he works for a Government department – an official source. These two selection criteria are true of 18 of the top 20 individual sources. However, Keys also fits the key attribute of a primary definer in that he was regularly sourced. Further, Keys was the only individual sourced consistently throughout the entire 11 year period. The results of the content analysis showed that the other top sources only appeared during parts of the coverage (see section 5.4.3).

As discussed earlier, the results of this study suggest an association between the frames and sources. Primary definers frame issues, which set the terms for the debate (Hall et al., 1978). For example, Opposition National MP, Nick Smith, appeared primarily during the lahar debate period. He was the top source associated with the 'conflict' frame. He was also heavily-associated with the 'action statements' and 'implying disaster' frames. The appearance of these three frames was mainly concentrated in the debate period during which Smith was involved. This is also true of Horizons Regional Council Chairman, Chris Lester, Horizons Regional Council CEO Peter Davies and Ruapehu District Council Mayors, Sue Morris and Weston Kirton. They were also associated with these frames and mainly appeared in the coverage during the lahar debate period. Further, Crable and Vibbert (1985) suggest that individuals are selected by media to play roles in the 'drama' of an issue. These individuals are arranged into 'sides'. The results suggest that Opposition MP, Smith and the Local and Regional Council were those chosen to play the role of those wanting intervention. While Minister of Conservation, Chris Carter, who was associated with 'action statements' and 'implying disaster', and DOC Scientist Harry Keys, who was the top source associated with 'implying disaster' and also associated with 'conflict' and 'action statements', played the role of those defending the plan not to intervene.

Political sources have their own motives for involving themselves in the discussion around an issue. Newig (2004) says politicians become involved with issues to reinforce their political position and to attract more votes. Further, Newig notes that "when public

attention dips below a certain threshold and the issue is not suited to enable politicians to gain popularity, no political measures will be taken" (2004, p. 167). This could be said to be true of Smith's involvement in the issue. He was most-vocal from June 2001 until early March 2005. After this point, he did not feature in news coverage as by this point, the Ruapehu District Council had resolved its dispute with the Government.

7.7 The 'lahar issue' management process

This section of the discussion chapter gives a brief overview of the issues management processes applied to manage the 'lahar issue' as described in the interview chapter (Chapter 6). These processes are examined using the process categories from the summary of the issue management process models discussed in the literature review in Chapter 3 (see 3.3.8). Chase (1982a, p. 106) said that he and Jones developed their model to "aid independent judgement, not as a substitute for it". He continued, "the model, like results of attitudinal and demographic research, cannot be literally superimposed on management of any type of organisational structure, nor was this ever its purpose" (p. 106). Therefore, the issues process discussed in this section is used as an indication of how an organisation might be expected to conduct issues management, not as a benchmark for best practise.

7.7.1 Identifying and/or monitoring issues

Jaques (2004a) stresses the importance of issue identification to the success of issue management programmes. Further, many issue process models suggest that organisations scan or monitor their environment for emerging trends that may become issues (e.g. Ewing, 1997; Renfro, 1987). However, the organisations involved with the lahar did not scan their environment. Instead, the lahar presented itself as an issue to be managed. The lahar was identified as an issue for the 'lead agencies' according to the various pieces of legislation that guide their organisations. For DOC that legislation was the National Parks Management Act (1980) and Conservation Act (1987). For Ruapehu District Council, Horizons Regional Council and Environment Waikato it was the Civil Defence Act (1983). Other organisations became involved with managing the 'lahar issue' because of infrastructure for which they were responsible. For example, Ontrack were responsible for the Tangiwai Rail Bridge and the safety of it employees and

Genesis Energy were responsible for conserving an aqueduct that runs beneath the Whangaehu River. Further organisations were involved because of their involvement in a Civil Defence response (e.g. Police).

7.7.2 Evaluating/analysing the issue

All the issue management process models require that issues, once identified, are analysed (e.g. Chase, 1984; Ewing, 1997; Jaques, 2000; Renfro, 1987; Tucker & Broom, 1993; Tucker & Trumpfheller, 1993). DOC were the first organisation to begin analysis of the lahar. The evaluation began with the release of the Hancox et.al (1997) report confirming the potential for a dam-break lahar. This process continued with the stakeholder meetings held from April 1996 until October 1998. As Berkowitz and Turnmire (1994, p. 105) suggest, "an organisation must proactively build an understanding of a community's issue orientations". This was particularly important because during this time a draft Assessment of Environmental Effects (AEE) – a document containing the options for the lahar – was being developed. The AEE was released in October 1998 and this was followed by more public consultation – both through submissions and stakeholder meetings – followed by the release of the final AEE (1999), which confirmed the risks related to the lahar as "low to high" (Keys, 1999, p. 1). Further analysis on the lahar was conducted throughout the management process. A key piece of this analysis was the Taig Report (2002) commissioned by the Ministry of Civil Defence and Emergency Management. The analysis conducted on the lahar was important for developing the Emergency Response Plans. Further, it provided a strong base for communicating about the lahar.

7.7.3 Developing a response

For many issues management process models the next stage in the issues management process is the development of an issue response mainly through the development of policy (Ewing, 1997; Renfro, 1987). Developing an issue response involves setting objectives (Jaques, 2000). The primary objective for all organisations involved was to prevent anyone being killed when the lahar took place. However, all the organisations had a second objective. It was these differences in the secondary objectives that brought the organisations into conflict. For Ruapehu District Council, Horizons Regional

Council and the Ministry of Civil Defence and Emergency Management their second primary objective was to remove the risk to life. For the Department of Conservation, that secondary objective was preserving the integrity of the National Park. Organisations began developing their own lahar responses at varying times. DOC was the first. It began developing its response with the consultation process with stakeholders and the development and release of the AEE, which presented the options for dealing with the lahar. Ruapehu District Council began developing its lahar Emergency Response in 2000. This was rejected by council as being too expensive to be feasible. After debating with Central Government over the response, in 2003, the Southern Ruapehu Lahar Planning Group (SRLPG) was formed, which coordinated the emergency response. 2003 onwards saw the other organisations form their own lahar issue responses (e.g. Ontrack, Genesis Energy). The planning group was integral in coordinating the lahar emergency response. The Lahar Information Group (LIG) was set up as an offshoot of the Southern Planning Group to manage the release of lahar information. This group is discussed later in 7.9.2.

7.7.4 Implementing the response

The next stage in the issue management process is implementing the response (Tucker & Broom, 1993). Implementing the response began with the endorsement of the AEE by Conservation Minister, Sandra Lee, in May 2000. However, the implementation of a physical response - the installation of the bund and ERLAWS lahar warning system – did not take place until December 2001. The Emergency Response was implemented with exercises of the response plan that involved all the agencies. This response plan was trialled approximately six times. The first trial took place in September 2004.

7.7.5 Evaluating

The final stage in managing an issue is evaluating the management's results. The lahar's management was declared a success by the Conservation Minister and Minister of Civil Defence and Emergency Management (Binning, 2007). It was evaluated in the media and also by the lahar managers themselves in a meeting in September 2007. GNS Social Scientist, Julia Becker's study into the lahar response, along with this research is part of the ongoing evaluation of the lahar's management. The evaluations of the lahar's management have already resulted in changes to the structure of the lahar response. It has been decided that a combined group, made up of the Northern and Southern planning groups along with the group that controls the lahar response on the ski fields, will oversee any future lahar management.

7.8 Stakeholder communication tactics

This section looks specifically at how the Department of Conservation communicated with the many lahar stakeholders as part of managing the 'lahar issue'.

7.8.1 Consulting with stakeholders about options

Soon after DOC made the existence of lahar public a consultation with stakeholders began. The process was focused on the development of an Assessment of Enivironmental Effects (AEE) – a document which collated all the options for dealing with the lahar - as set down in the Resource Management Act (RMA). Keys said that from the beginning meetings were being held with stakeholders every three to four months. In total 23 meetings were held between May 1997 and August 1998 (Keys, 1999). Records show that DOC met frequently with Ngati Rangi, Ngati Tuwharetoa and met once with Ngati Apa and Ngati Hikairo - a subtribe of Ngati Tuwharetoa. In October 1998, the draft AEE was released for public consultation. The final AEE shows that nine stakeholder meetings were held between November 1998 and February 1999 (see Keys, 1999, p. 19). Table 22 lists the stakeholder organisations and individuals consulted with during this period. Apart from meetings, DOC also sought submissions from stakeholders on the draft report. In total, 45 submissions were received (see Keys, 1999, pp. 130-141).

Table 22: Stakeholders DOC consulted with regarding the lahar (November 1998-February 1999)

Bernard von Drost (World Heritage Centre)
Government agencies and local asset owners
New Zealand Conservation Authority
Ngati Rangi
Ruapehu District Council
Tongariro/Taupo Conservation Board
Tramping clubs and NGOs (Non-Government Organisations)
Tuwharetoa Maori Trust Board

SOURCE: Keys, 1999, p. 19

Greening and Gray (1994) found that issues management programmes are directed both by the organisation itself but also by external pressures. The 1953 Tangiwai Disaster was influential in shaping the consultation process. Former Department of Conservation Senior Issues Manager, Brian Sheppard, said that DOC understood that public consultation was important because of Tangiwai:

> It was understanding that there had been this terrible tragedy when all those people were killed when the train got hit before, you couldn't afford to be aware of the risk and put people's lives at risk later on. And so they went through this planning process, and it was being managed almost entirely at that local level, because that's where all the people were, and they were the experts.

Paul Green, Department of Conservation Conservator for Tongariro, said that the type of consulting used with lahar stakeholders was done because it was a unique situation:

> That approach was taken just because we realised how much public interest there would be. You know, there were a lot of risks involved. Yeah, and that some of the solutions would have significant environmental effects. So it was a

> combination of that sort of thinking. But, I mean, you wouldn't do that for every time you identify a risk.

Green said the organisations DOC invited to comment on the AEE fell into three groups:

> First, any group that had a legislative interest to do with emergency management, second, any group that had any assets that could be at risk from a possible lahar and, third, anyone in other groups that have an interest in the management of the National Park. So those three groups. That last one included iwi, of course. So, conservation board, iwi and environmental groups. Anyone we thought would have a view or an interest. There were some basic points to start from and those that have any legislative role like councils and Ministry of Civil Defence etc. And then there's the people with the assets like people with the roads and bridges and forests and powerlines. And then there are those that are involved with the management of the park including iwi.

Summing up the reasons for using an AEE, Green said it was "a good way to examine the risk fully and all the impacts of that risk and what the options were for mitigating that risk". However, he also highlighted that the consultation approach undertaken by DOC depends on the issue:

> There's a preference for getting around the table, but that's not always appropriate or possible. And sometimes you've got to be prepared to deal one-on-one, particularly with iwi – it's going to be one-on-one – that's their preference so that's the way we do it. We did that with most of the agencies over the years as well. But there's other occasions when it's good to be around the table. It will depend on the issue – how big an issue it is. So there's no standard 'one size fits all' approach.

7.8.2 Communicating with the community

Early on DOC and Ruapehu District Council identified that the community needed to be made aware of the lahar. Presentations were the main tool for achieving this objective. Schools, clubs and other special-interest groups could - and did - request a talk. Keys said he was "happy to talk to anyone" and he estimated that he did on average one talk a month during the 12 years: "We realised that getting the information out was important. But you can never do enough of that, you can never talk to everyone." Ohakune was the focus of the efforts to make the community aware, but Keys also did talks in Turangi, Taupo and Taihape. Keys was joined in his efforts by Dave Wakelin and Ruapehu District Council Emergency Management Coordinator, Annie Pedersen. Pedersen and

Keys together spoke to a number of groups, including local schools. Pedersen said the school talks reassured the children:

> Harry and I went around to all the schools in the local area near Ohakune and talked to them at their level, because they were starting to get stories that it was going to wipe-out Ohakune, and when you've got little kids like that it's pretty scary stuff. So by going out there like that, talking at their level, and showing them pictures, and things like that, it was better. It was done with PowerPoints – they were interested in the pictures. The kids weren't interested in a scientist standing up the front there talking in words they don't understand. So Harry found it easier to show them pictures and show them on maps where it was going to go, what happened at Tangiwai, and things like that.

Those living near the lahar's flow path were also regularly contacted. These people were given pagers to alert them when the lahar took place. Pedersen said that meetings were held annually to keep them informed:

> Every year we'd have an agencies meeting with everyone involved - the local communities up the Whangaehu Valley River, anyone that was highlighted as at high risk, we always kept up in communications with them to know where they were, running up probably to within the last 4 months of it, Dr Harry Keys came out and talked with them too.

In the months prior to the lahar taking place, media had run photos showing erosion on the tephra dam. Pedersen said it was those photos that prompted her and Keys to meet with stakeholders again:

> The media were starting to get hold of those sorts of things and pushing them out of proportion, that's when we got in touch with Harry, and said that we needed to show them exactly what was happening up there with pictures, and by doing that and communicating with them, and giving all those people pagers when it got up to a certain level, so they were always in the know, I think that made it a lot smoother.

Keys said that the result of the efforts by DOC and Ruapehu District Council was that people who were closer to the danger were less concerned about it:

> I started talking to the farmers in 2001. This is an example – the closer you are to the lahar, the less people are worried about it. The closer you are, the less people are concerned. There are still people concerned and that results from rumours. The further away you went, the less people needed to focus on it. They'd get their opinion from the paper. They had less need to really know

> about it, so that's why you had Invercargill people talking about bombing [the crater]. Around here, the locals were more informed – the farmers, in particular.

7.8.3 Websites and phone lines

Another way of getting information out to stakeholders was through the websites of DOC, Horizons Regional Council and Environment Waikato. Each website had a section containing information about the lahar as well as linking to the other sites. Horizon's website included a webcam, which was pointed on Ontrack's warning tower located in the Whangaehu River 11 kilometres upstream from the Tangiwai Road Bridge. Horizons also had a freephone number (0508 4 LAHAR) which provided lahar information. Bayley said that people could ring the freephone number and find out "what the current status of the crater lake warning level was and what that meant". The freephone number was also regularly used by Horizons staff who worked in the area.

7.8.4 Updating stakeholder agencies

The agencies involved with managing the lahar also needed to be kept up to date with the Crater Lake status. Pedersen said that stakeholder agencies were regularly updated on the situation:

> Everything that happened, we'd always communicate by email or letter, or if there was anything major happening, we'd have meetings with the major organisations. The Southern Ruapehu Lahar Planning Group were the major stakeholders, and we met every 6-7 weeks, especially when the levels started rising. The higher the level, the more we met. If anything significant happened, we'd get Harry, call a meeting, and he'd give a presentation.

Many of the interviewees cited Harry Key's crater lake status updates and photos, which he sent via email, as the main method they were kept informed. Inspector Dave White talked about the way he was updated by Keys:

> We got weekly updates on the lake level, they took photos, I've got a box of stuff, so as far as communication from DOC, you couldn't complain. Harry would email me photos – I had them all over the wall here, so when people came in here they could see. I went up to the crater myself once. DOC were great.

Genesis Energy Operations Manager for Renewable Energy, Doug Tucker, talked about Key's constant updates:

> DOC used to send out a routine mountain update thingee on what the level was doing and the temperatures. He'd send us photos. It was just ongoing.

He also said Keys talked to Genesis Energy staff:

> We have a monthly full staff meeting. And on several occasions we invited Dr Harry Keys to come and give us staff talks on what was happening on the mountain. So he'd give a big rundown. We held our own meetings. We actually did audits on the ERLAWS systems because we were part of the ERLAWS system so we wanted to make sure it was robust and all that sort of stuff as well. And they were involved with that. So then we would have regular meetings just to sort through the actions from that. So, yeah, the working relationship between us and DOC was fantastic. And there were dialogue meetings. It was just non-stop since 2003 basically.

When asked about how he was kept informed, Police Officer Mike Craig replied:

> Emails. Regular phone calls between myself and Harry. And full credit to Harry for that. He is a DOC scientist and some scientists you meet, they're generally really good guys and they're always interesting to talk to about their chosen profession. But Harry in particular had a way of dumbing-it-down so the layman could understand it.

He attributed the successful management of the lahar to being kept up to date:

> It's key people in the key roles, basically, was why it was successful. But it is those same guys who kept me informed.

Ontrack Rail Standards Specialist, Murray Marshall, thought the updates supplied by Harry Keys were excellent:

> The supply of information throughout the whole event was exceptionally brilliant, it really was. We knew exactly who the on-call people were. We knew exactly where the lake level was.

Horizons Regional Council Manager of Emergency Management, Shane Bayley, too thought that the emails were important for keeping people informed. However, he believed that it was "not necessarily the best way to do things" and that Horizons were looking at using collaboration software as a more-effective method to share information.

7.8.5 OPTN

OPTN was a text message system which was to have provided warning of the lahar to subscribers of the service. Ruapehu District Council Communications Manager, Paul Wheatcroft, said he heard about it after other councils had trialled it for other emergency situations such as tsunamis. Dave Wakelin said Police saw it as a good method for contacting media, alerting them to upcoming press releases and providing basic information. However, as talked about earlier, Wheatcroft discovered on the day that media did not need to be alerted by text message to know a lahar had taken place. However, media were not the only subscribers. After interest from users of Tongariro National Park, Wheatcroft suggested that OPTN be opened to the public. This was done in January 2007.

On March 18, 2007, the day the lahar took place Wheatcroft did not have a working pager. This meant he did not receive the first lahar warning, which meant he was late getting to Ohakune. It also meant that a text message warning of the lahar sent to the 1500 public subscribers was delivered late. The text message system was left for Wheatcroft to initiate, while he expected it to be picked up by the EOC, “because they were concentrating on dealing with the emergency rather than dealing with the media”. Eventually, when Wheatcroft sent the first message, which simply said “lahar”, it did get through to the subscribers. Wheatcroft said the idea was to send out frequent text messages updating subscribers on the lahar’s status. However, after the first message, the OPTN server crashed and no more messages were sent.

Later, the Ruapehu District Council was criticised for the failure of the system. However, Wheatcroft said he would use the service again because that he thought it “had value” and that “lessons had been learnt from the last time”. Further, he said he had been told by OPTN that they had fixed the problems. Wheatcroft said that in hindsight he would have got Dave Wakelin to act “as backup” for initiating the text message system. Bayley thought that it was irrelevant that the text message system did not work because the message got to the people who needed to know anyway:

> There were a few false starts with the warning system. And only some people got the first part of the warning. But the grapevine then takes over. And that worked spectacularly well.

7.9 Media and the 'lahar issue' management

This section looks at the role and influence of media coverage on the management of the 'lahar issue'.

7.9.1 The role of media

Overall, all the participants in this study believed that media were a key part of the strategy to get information out to the public. However, Wakelin said, initially, media was not considered an important part of the plan:

> We realised pretty early on that media are a crucial part of emergency response planning. However, there was resistance from some of the agencies. There was a feeling that came through that the media were an afterthought – you would feed them stuff later at your convenience and you didn't need them to get in the way of the emergency response.

However, that attitude later changed when other members of the group realised the media's value. Said Wakelin:

> If you want to get correct and accurate and timely information out to the public to ensure public safety, how else are you going to do it apart from through the media? Once that was realised, things began to move slightly differently.

Ultimately, Keys said, the goal for media coverage was to "get accurate information out". He emphasised that, "the point of the coverage was not to make ourselves look good, but to get accurate information out because the media are our main conduit". Wheatcroft said Ruapehu District Council also realised the importance of the media:

> What we wanted from the media was for the public to be well-informed of what the issues were. We didn't want people to be complacent, but in that respect, there was no spin with it. We had nothing to spin. We were just putting the information out there. Every time we did a practice run we put out a communication about that. We were looking for every opportunity we could to keep it in front of the public.

Pedersen agreed that media played an important role, but thought that local media were more important for keeping locals informed:

> Good old media (laughs). They had their good roles – they got the message out to the public, but if it wasn't exciting news, they certainly made it exciting. In any emergency role like that, they have an important part to play, and I think a lot of us forget about the local media who could assist us more, instead of television. I think you think that by getting it out into the bigger picture, but I think you forget about the locals who need to know what is happening more readily than people in Auckland.

7.9.2 Lahar Information Group (LIG)

Around 2000/2001, it was realised that there was a need for a group to coordinate the release of lahar information. As a result, the Lahar Information Group (LIG) was formed as an offshoot from the Southern Planning Group. The group was comprised of representatives from DOC, Taupo District Council, Ruapehu District Council, Police, Horizons and the Ministry of Civil Defence and Emergency Management. Table 23 lists the organisations and the members of the group. These organisations were identified as key agencies in the lahar's response. However, Wakelin said there was always the ability to bring in other groups involved with the lahar's management – for example, Transit or Ontrack - although that never happened. Wakelin said the objective of the group was to disseminate "good, accurate, timely information on behalf of those key members of the group and to allow each of the members to speak on their own operational roles".

Table 23: LIG Group Members

Horizons	Emma Goodwin Colleen Atkinson
DOC	Dave Wakelin
Ruapehu District Council	Paul Wheatcroft
Taupo District Council	Susan Takiwa Phil Parker (Emergency Management Coordinator)
Police	Jon Neilson

Wheatcroft said that the LIG communication strategy was decided upon as a group: "What we wanted to do is speak with a common voice on key issues to ensure the information was accurate, timely and consistent". However, Wakelin thought the group could have met more. "Ideally, we should have met twice a year. Because of the length of the [lahar], we only ended up meeting once a year." However, Wheatcroft suggested that the group did meet regularly: "we met once a month".

The first project for the group was producing the lahar brochure, which was eventually branded as a Civil Defence publication. The brochure was distributed to Visitor's Centres, District Councils, Tramping Clubs and other special interest groups. The distribution focused mainly on the central North Island. In February 2007, when the group met for the last time, it was proposed that the brochure be re-done as it contained a prediction that the lahar would take place in 2004/2005. LIG was also responsible for installing warning signs, such as those placed on the Round the Mountain walking track that crosses through the lahar zone. Signs were also installed in the volcanic lahar paths on the Whakapapa and Turoa skifields.

Each member of the group could issue press releases. The releases were circulated among the LIG members, and if no feedback was received within a set timeframe, they would be sent out to the media. Wheatcroft said that Ruapehu District Council sent out the most press releases because it was the "lead agency" in the Emergency Response. However, there was an agreement that the other agencies could put information out when they needed to about their own activities. DOC were the other organisation who put out a lot of press releases. DOC took responsibility for issuing press releases regarding any events within the Tongariro National Park boundaries, including updates on the Crater Lake. Wakelin said this was because these releases were commenting on the management of the national park, which fell under DOC's mandate. While these press releases were DOC's responsibility, they were still circulated to the other LIG members "as a matter of courtesy". As the probability of a lahar increased, Wakelin said, it was ensured that the media releases being sent out mentioned the Emergency Response Plan:

> We started to make a point in the releases that the last paragraph would refer to the fact that there was this very robust, well-tested plan led by Ruapehu District Council that would clearly allow all emergency responses to be put into plan and to ensure public safety. This became the kind of safety message at the bottom.

7.9.3 Working with the media

Wakelin found that media were constantly interested in the lahar, but they would only cover it if there was a story: "The hard part with dealing with the media is they lose interest. [With the lahar] they stayed interested more-or-less, but they weren't going to cover it all the time." While DOC was actively courting media attention, Wakelin said they also had to be careful to prevent negative coverage:

> Working the media is a challenge. Because they're always looking for a new angle. They're looking for scuttlebutt. They're looking for controversy. They're looking for errors. They're looking for rumours – some good gossip. They're looking for stuff all the time. And if you're not careful, they'll take stuff out of context.

Wakelin said DOC actively provided information to the media:

> The media had a significant role to inform. We put out media releases, we put out fact sheets on our website – What is the lahar? What is the AEE? What are the mitigation options? What is the stance of the iwi? What will happen when a lahar happens? We then provided the media with maps and diagrams of what would happen when the lahar happens, alert levels.

A key part of DOC's media strategy was taking journalists to see the lahar path, the bund and the Crater Lake. Keys thought the first media trip to the crater took place in June 1997, when the report detailing the dam was released. He believed the media trips to the crater were good for establishing relationships with media. However, DOC was restricted in number of trips they could do for two reasons. First, DOC had limited funds to do such trips and, second, there were only a limited number of trips the media were prepared to take to the crater.

Wakelin thought that the first of these trips took place in 2002/2003 - after the building of the bund. He recalled the media trips from early 2007 when TV3 and Close Up were taken to the Crater Lake on separate occasions. On 18 January 2007, Keys took TV3,

Dominion Post and Radio New Zealand to the crater ("the three forms of media"). The Minister of Conservation, Chris Carter, and the Minister of Civil Defence and Emergency Management, Rick Barker were also present. Wakelin said that Carter, the Minister of Conservation at the time, was particularly disappointed TVNZ was unable to make the trip (they were later taken to the Crater in February 2007). Wakelin believed that the trips resulted in "particularly good coverage".

On one occasion, DOC helped TV One to obtain footage. In January 2007, after it had been announced that the tephra dam was eroding, Wakelin took a camera to the crater on behalf of One News. Keys was going to the crater to inspect the erosion, however, it was decided that taking a reporter would be inconvenient. Taking the camera was "the next best thing" and the footage that Wakelin shot was shown on the news.

Ruapehu District Council also held its own media day. Wheatcroft said this was in response to one of the "big issues" in communicating the lahar – complacency:

> [The lahar] was a real danger, but it was the sort of thing where you can get complacency. At one stage, what we did is organise an information day for the press [in December 2004]. We invited them along and we talked to them about what our response was and we gave them a tour of where the lahar was likely to go.

Dempsey said that media went away with a "really good understanding" so the Council "knew they wouldn't be making stuff up". She said an added benefit of the media day was repeated coverage of the emergency response plan exercises.

7.9.4 Reporting accuracy

Interviewees held a range of views on the accuracy of media coverage. Sheppard found that at some points, coverage was "overly sensational for what was happening". While Bayley thought "media did okay": "There were some questions around whether they'd hype it up and I don't think they did." Wheatcroft suggested reading media reports "with a grain of salt". In particular, reports about the relationship between the Ruapehu District Council and DOC:

> For the most part [the relationship between RDC and DOC] was okay. Media want to create a story and they're after an issue so they want a human face to it. They'll often create – or report on something – which will give an impression, where it isn't necessarily the case.

Wheatcroft said that media pressure meant that many of the figures attributed to Ruapehu District Council for the costs of the lahar were estimates rather than the real costs as the actual figures were unknown:

> The papers were really pushing us for a figure. That's what I mean about the media – they'll just push you. They said, "So what is it?", and if you can't tell them exactly then they'll say, "Guess". And if you just guess – you say, "Oh well, it might be $100,000 – I'm not sure", they'll say "Paul Wheatcroft says the cost of lahar is $100,000". People will read that as gospel, but it's not gospel.

Wakelin and Keys found that some reporters were more accurate in their coverage of the lahar than others. They both cited Waikato Times reporter Kate Monahan as someone who gave accurate and fair coverage of the lahar. However, on occasions, Keys had to find ways to deal with reporters who badly misreported the 'lahar issue'. He gave the example of a newspaper reporter from one of the major dailies. DOC provided her with accurate information, but, Keys said, he was disappointed with the sensational angles she chose for her stories. Rather than continue on providing information and support, Keys instead focused his attention on another of the paper's reporters who lived in the region. Keys gave him stories and took him to the crater. Meanwhile, the other reporter was starved of information. Eventually, Keys said, the 'other' reporter was shut out.

Keys talked about how the "scoop mentality" drove some reporting. He gave the example of a reporter – "one of the more accurate ones" – who asked Keys to comment on the politics of the lahar. Keys declined and said that the politics was being dealt with by the Minister, because that was the way responsibilities had been divided. The reporter responded, "Oh, you've been gagged". Later, Keys found out that she was planning to run an article using the 'gagged' angle. He rang her and explained that if she went ahead with the story, DOC would not be as cooperative with her in future. As a result, she withdrew the story. Overall, Keys believed the quality of the reporting depended on the newspaper:

> Some [reported] it better than others. The local papers [reported] it better. The further away you went – the national papers –they dumbed it down and they lost detail and made errors. So they lost the complexity and that's what they have to do, because of the way the media works. So they over-simplified it. The reasons for bulldozing and not bulldozing were not clear. And it was the same with the Maori stuff - they clearly presented the wrong idea. Some parts of that is because the public are ready for that kind of misperception. Other parts of that is because the media also have some of those biases. And then there are the politicians, who also have some of those biases.

7.9.5 Continued misunderstandings

A theme throughout many of the interviews was the continued misunderstanding of the lahar by both the public and the media. Overall, Wakelin felt that media never grasped the lahar completely:

> The media, no matter how hard you tried, never seemed to get it 100% correct in terms of some of the data and some of the information put forward. I know that with print media we've often said, "Hey, look, if you've got a problem, we're quite happy to check your information for factual content, not editorial content". But that never quite happens.

Green suggested that sometimes media did not want to understand, which resulted in negative coverage:

> As I know from numerous discussions with media, sometimes people don't want to accept some things or don't really want to understand. So it was very frustrating that some media commentators who would, in spite of so much media and some very good media stories, still come up with the idea that the lahar was going to wipe the ski field out or something. In spite of spending countless hours on media work there would still be some commentator still saying that the ski fields would be wiped out, Turangi would be wiped out. That gets a bit frustrating.

Department of Conservation Senior Issues Manager, Herb Christophers, also felt that people never fully comprehended the lahar and that related to the difficulties in communicating the technical details:

> People just didn't understand the whole lahar thing. They'd say, "well, it could happen again tomorrow". No, it can't happen again tomorrow. "Why not?" Because there's no lake for it to happen with. You need another eruption before you can get another lahar of that type. Describing it is difficult.

Another barrier Wakelin identified was that people had to have an interest in the lahar to be motivated to understand it:

> That's sometimes the frustration. You can only tell people and inform people about any aspect – it doesn't have to be about the lahar, it can be whatever. And you then come up against the barrier of comprehension and interest. If someone's got no interest – like someone in the South Island - why would they care about a lahar?

Media misunderstandings about lahars surfaced again in media coverage in September 2007. On September 29, William Pike, a climber, had his legs crushed when an eruption took place at Mt Ruapehu, sending a torrent of rocks and water through the roof of Dome Shelter, a hut close to the Crater Lake, where Pike and his climbing companion were sleeping. According to Wakelin:

> There was a good piece about William Pike in the Sunday Star-Times about three weeks ago. But they're still saying he was hit by a lahar, rather than an eruptive blast of water and rocks. It was the lahar that flowed down the mountain. What came through that door of the hut was just a blast from the eruption. But unfortunately, some of the media have not seen the distinction between truly what a lahar is and what an eruption is. Those guys were in the path of an eruption. And I noticed that several of the other papers picked up the Sunday Star-Times article and wrote their modified stories almost based on that, saying that he was hit by a lahar. That's how errors get perpetuated.

GNS Scientist and Volcano Surveillance Coordinator, Brad Scott, as someone who was not involved with informing the public about the lahar, also encountered misunderstandings:

> Overall, I think [DOC] did a pretty good job [of informing people]. However, there was still a lot of public misconception. And I guess the best example of that was meeting people as the lahar got closer and more and more information was being put out there. The flow was only going to go down the Whangaehu Valley. And there's nothing, bar one walking bridge on the mountain track, down there. But I had encountered people who said, well, should we or should we not buy a season pass for skiing this year. They were people who regularly visited the mountain and that's how poor their understanding of the issue was. Personally, I believe that reflects a lot of people.

He attributed some of these misunderstandings to DOC's reporting of the level of the Crater Lake. Scott gave the example that once the lake began to fill behind the tephra dam the lake was being reported as 108% full. He also felt that the predictions for when

the lahar would take place were confusing due to the use of extrapolation. DOC would extend (extrapolate) the trend line for the filling of the Crater Lake to give an indication of when the lahar would take place. Sudden increases in the lake level would bring the estimated date for the lahar forward, while drops in the lake level would push the date out further. Said Scott:

> The lake would fill during summer - the melt - and towards the end of summer when there's no melt, it would actually evaporate and go down again. If you extrapolated that, you never would have reached overflow.

DOC, it seems, was aware of these issues. Wakelin too felt the levels were confusing:

> Alert levels were something else the media got a little bit confused with, because there was a volcanic alert level, which relates to the status of the volcano. But then we had our alert levels which related to the water level behind the dam. Those key levels that were calculated were really designed for internal use by the agencies. And the media picked up on those at times and I don't think they fully understood what they were about.

Because media misunderstood the figures, Wakelin felt that "they were probably to-some-extent meaningless". To address the confusion, Wakelin changed the way DOC reported the levels:

> At the start, we were tagging the lake level behind the dam to the lake outlet with 1 metre about, 1 ½ metres above. So it was started to get up 3-3 ½ metres above the outlet and then starting to get closer to the top, I found it easier to swing that round and say we were now 2 ½ metres from the top of the dam, cause it really didn't matter how far you were from the bottom of the dam. In most people's minds, trying to visualise this, trying to say it was 2531 metres above sea level – most people have no idea. I can't usually remember those measurements anyway. But in most people's minds, if you say, "it's two metres from the top of the dam", in people's minds, they know how far 2 metres is and they know how far it is down to the water from the top. And I think that was an important thing in terms of comprehension for a lot of them. And the media started to use it.

Wakelin said Keys also had his own method for improving comprehension of the levels:

> The general public just wanted to know where was the water, how far was it from the top and when was the dam likely to go. I think Harry did a good thing in equating the erosion of the flow from the dam that Summer [2006-2007] to Olympic swimming pools. And I forget the exact numbers, but he had worked out that the volume coming out each day was the equivalent to so many Olympic

swimming pools. There's a parameter that more people can understand, rather than telling them it's coming out in so-many cumecs.

7.10 Conclusion

This chapter has discussed the results of the content analysis along with the results of the interviews. It began by looking at the issue lifecycle of the lahar issue. It then discussed the lahar issue's salience and the role of framing and sources in the coverage. The lahar's management was then compared with a summary model of the issue management process. The final two sections of this chapter looked at the communication aspects of the lahar's management. The first looked at the tactics used to communicate with the many lahar stakeholders. The second looked at how media coverage influenced management of the 'lahar issue'. The next chapter brings together the conclusions from this study.

Chapter 8:
Conclusions

8.1 Introduction

The focus of this research has been how the public service organisations involved communicated about the issue of a dam break lahar on Mt Ruapehu. The lahar issue, which spanned 11 years (1996-2007), provided a unique opportunity to investigate how public service organisations dealt with an issue. As outlined in Chapter One, the broad research question which guided this study asked, "How did the public service organisations involved communicate about the issue of a dam break lahar on Mt Ruapehu?".

The interviews attempted to answer these questions:

- What issues management processes were employed by the public service organisation to respond to the issue of the lahar?
- What tactics were used to communicate with the many lahar stakeholders?
- What influence - if any - did media coverage have on the lahar's management?
- Did the lahar managers recognise any of the phases the media coverage went though?

The content analysis attempted to answer these questions:

- How much attention (salience) did media give the issue?
- How did this 'attention' change over time?
- What frames did media use when reporting the lahar and its management?
- Which sources – if any – could be seen as "driving" media coverage?

When combined the above questions provide an answer to the question: "How was the lahar managed?". This research also had two objectives: first, to explore how the lahar

management process developed over time and, second, to assess how the lahar management aligned with models of issues management. These two objectives were achieved through the process of answering the above questions.

Chapters Two and Three provided the background for this thesis. Chapter Two gave a historical overview of lahars on Mount Ruapehu, the Tangiwai Disaster and the events of the eleven year period during which the lahar was an issue. Chapter Three provided the theoretical background. It began by looking at other lahar issue research, which has focused on risk and the development of a lahar emergency response. It then looked at the origins and evolution of the issues management literature, followed by the introduction of issues management process models and the issue lifecycle. The second part of the chapter introduced three related concepts - salience, framing and sources – which were three elements of the media coverage examined by the content analysis. Chapter Four set out the methodology for this research. It looked at how content analysis was used in this study and how the interviews were conducted. Chapter Five provided the results of the content analysis. The results were compiled into the three sections of the coverage examined: salience, framing and sources. Chapter Six compiled the results of interviews to give an overview of how the lahar issue was managed. Chapter Seven examined the questions posed by this study in terms of theory and brought together data from both the interviews and content analysis. It looked first at the issue lifecycle of the lahar. It then discussed salience, framing and sources. The following section aligns the management of the lahar issue with a generalised issue management process model. The two concluding sections of the chapter look at the tactics used to communicate with the many lahar stakeholders and then the influence media coverage had on the lahar's management. This chapter pulls together the conclusions from this study. But first, the following section outlines the overall limitations of this research.

8.2 General Limitations

The limitations of content analysis (see Chapter Four, 4.2.8) and interviews (see Chapter Four, 4.3.11) have been discussed earlier. However, it is necessary to note the general limitations of this study. The primary limitation of this study not previously dealt with is the influence of researcher bias. The researcher brought with him to this study biases gained from his social and ethnic background. These biases will have influenced how the interviews and content analysis were conducted and interpreted and how this thesis was written. This bias is acknowledged by the researcher.

8.3 Overall Conclusions

This section brings together the overall conclusions from this study to answer the research questions set out at the beginning of this chapter.

Data from the interviews showed that five issues management process stages were employed to manage the 'lahar issue' although they were not referred as such. A key difference between the process suggested by issues management process models and the way that the lahar issue was managed was how the issue was identified. The process models suggest that issues are identified through scanning or monitoring the environment for developing trends and issues. However, the lahar was identified as an issue according to the legislation guiding the various organisations. The lahar became an issue for the Department of Conservation because it has the responsibility for managing the Tongariro National Park, while the lahar became an issue for the Ruapehu District Council, Horizons Regional Council and Environment Waikato because they are responsible for Civil Defence emergencies that occur within their boundaries. Analysis of the lahar issue began with the release of the Hancox et al. report (1997), which confirmed the potential for another dam-break lahar similar to the one that caused the Tangiwai Disaster in 1953. DOC's development of an Assessment of Environmental Effects (AEE) – a document that covered the options to deal with the lahar – also played a key role in the analysis. Another important document was the Taig Report, which established the risk level for the lahar. Overall, analysis of the lahar was a continual part of the lahar management process, which contributed to the emergency response. Department of Conservation began developing its response soon after the announcement

of the lahar's discovery in April 1996. The product of this response development was the AEE. Ruapehu District Council began its response in 2000. Later, after a period of debate, all the agencies were brought together with the formation of the Southern Ruapehu Lahar Planning Group (SRLPG). The planning group saw greater coordination of the 'lahar issue' response. The response to the lahar was both physical (e.g. the installation of the ERLAWS lahar warning system) and through the implementation of an Emergency Response Plan (ERP). Since the lahar took place it has been evaluated both by the lahar managers themselves and also through academic research.

Data from the interviews was also used to identify the tactics used to communicate with the many lahar stakeholders. Initially, the Department of Conservation identified lahar stakeholders as those groups or people who had an interest in Mt Ruapehu. Consultation began as options were being developed to deal with the lahar. The decision to consult was influenced by the 1953 Tangiwai Disaster. Because the disaster still resonated with many people it was felt that the consultation process should be open to anyone who wanted to be involved. Consultation took place from April 1996 when the lahar was announced until October 1998 when a draft Assessment of Environmental Effects (AEE) – the document which contained the options for dealing with the lahar – was released. DOC consulted again before the release of the final AEE in April 1999.

Later in the lahar's management, lahar stakeholders fell into two categories: internal - those involved with the mitigation and response - and external - the public, in particular, locals living in the area and near the lahar flow path. Internal stakeholders were communicated with through meetings, in particular, meetings of the Southern Ruapehu Lahar Planning Group (SRLPG) and email. External stakeholders were communicated with through local media. Another important method of communication was through a series of talks and meetings conducted by DOC and the Ruapehu District Council. Stakeholders could also access information via the websites of DOC, Horizons Regional Council and Environment Waikato. Later the OPTN text message system was setup to offer lahar warning messages to subscribers. The basis for the communication efforts was that an adequate lahar response had been put in place. If the response had been weak, then the efforts to communicate the lahar would also have been weak.

The Southern Ruapehu Lahar Planning Group (SRLPG) realised the importance of media in informing the public – particularly locals in the Ruapehu region – about the lahar. This realisation meant that resources and effort were put into making information available for media and for coordinating the release of information. The influence of media on the lahar response was demonstrated by the setting up of the Lahar Information Group (LIG) to coordinate the release of lahar information. It was also reflected in the efforts of the various organisations to provide information about the 'lahar issue' to media.

Some of those involved with managing the 'lahar issue' were able to identify the phases of media coverage. This is perhaps because they were heavily involved in putting out information which formed the basis for many news stories. Another possible reason was that their role saw them responding to coverage, in particular, negative coverage. The lahar managers noted, in particular, the varying levels of attention given to the lahar issue. They observed that the media interest in the lahar was sustained, however, the issue only received coverage when lahar-related events took place.

Content analysis was used to assess the salience given to the lahar, in particular, the attention it received. Overall, it was concluded that media gave substantial attention to the lahar issue over the eleven year period. The salience of the lahar was confirmed by its recurring coverage. This study confirmed the observation by issues lifecycle theorists (e.g. Peters & Hogwood, 1985) that there needs to be continual issue activity for an issue to received sustained attention. Media only covered the lahar when there were 'lahar issue'-related events taking place (e.g. rises in the Crater Lake level, installation of infrastructure). Further the lahar was considered by media to be very newsworthy. This newsworthiness was initially derived from history of the 1953 Tangiwai disaster. Later, during the lahar debate period between Government, the Local and Regional Councils and Opposition MPs, (2001-2004) conflict gave the issue's added newsworthiness. Visualness was also an important factor in the lahar's coverage.

This study identified ten frames that media employed when reporting the lahar. The most-frequently used frames were those focusing on the response (lahar response), describing the lahar (diagnosing causes of problem(s)) and discussing the potential impacts from a lahar (definition of problem(s)). These information centred frames were

frequently associated with DOC sources. Conflict-orientated frames were associated with political sources: members of the Local and Regional Councils and Opposition MP, Nick Smith.

Department of Conservation Scientist, Dr Harry Keys, was shown to be a primary definer – an influential source. The results suggest he defined coverage because he is an official source and that he was regularly drawn upon as a source over the entire period of the 'lahar issue' coverage. Keys and the other frequently-cited individuals were influential in framing media coverage. However, the results of this study showed that other top sources were influential in framing coverage during parts of the debate. They did not receive the same sustained coverage as Keys. Primarily, the most-cited sources were official and/or authoritative. In general, the most-cited sources could be described as being from Local or Central Government sources, political parties or state-owned enterprises.

8.5 Conclusion and future research

Finally, the findings of this study are perhaps summed-up by Heath (2002a, p. 206) who says, "issues management is a process, but is one that requires people, stewards, to make it work". This was certainly true of the lahar. This research has brought together elements of issues management, the issues lifecycle, salience, framing and sources to answer the question 'how was the lahar managed'. The challenge for other researchers is further investigation in the application of issues management to manage risk issues and the modelling of the lifecycle of non-socially occurring issues. Another potential area of investigation is into the salience of issues in broadcast news – radio and television, with possible comparison with print sources (e.g. newspapers and magazines). A further salience-related topic is investigation of issue salience in comparison to other issues being reported at the same time as the one that is the focus of the study. Also, while this research looked at the tactics used to communicate with stakeholders it did not assess the effectiveness of these tactics. The potential is for research into risk situations and the effectiveness of the various stakeholder communication tactics. Finally, this research has provided some answers about how public service organisations manage issues, but the challenge remains for more research to be conducted in this area.

APPENDIX A:
Key events in the lahar's management

1887 - 1995

1887	Horonuku Te Heuheu Tukino, paramount chief of Ngati Tuwharetoa, gifts the Tongariro park area to the nation.
1953, December 24	The Wellington-Auckland Express carrying 285 passengers goes into the Whangaehu River after a lahar washes out the rail bridge at Tangiwai. 151 people are killed. It is the fifth-worst disaster in New Zealand history.
1990	Tongariro National Park awarded World Heritage status.
1993	Tongariro National Park's Maori cultural associations awarded World Heritage status.
1995, November	Volcanic eruptions on Mt Ruapehu leave a dam over the Crater Lake's natural outlet. Scientists note that the dam appears to be eroding.

1996

March	After more eruptions, the dam has stopped eroding. At this point, scientists realise that a dam-break lahar is likely.
April	The presence of the tephra dam is made public. Consultation with stakeholders begins.

1997

June	Hancox et al. (1997) publish a report identifying the potential for a lahar on Mt Ruapehu as a result of a tephra dam blocking the crater lake's outlet, which formed during the 1995/1996 eruptions.

1998

October	DOC releases draft 'Assessment of Environmental Effects (AEE)' for public consultation. 46 submissions received from local government agencies, State Owned Enterprises, environmental and recreation groups, iwi, and members of the public.

1999

April	The final report is released, detailing the options for dealing with the lahar.
1999/2000	Labour wins the 1999 election. With the change in Government, the Alliance party's Sandra Lee becomes the new Minister of Conservation. She orders another report into the options for the lahar.

2000

May	Sandra Lee actions the installation of alarm warning system and formalization of emergency response and contingency plans.
December	Minister of Conservation requests that the Tongariro National Park Management Plan be amended to permit the construction of a 'bund' - an embankment – to prevent overflow into the Tongariro River.

2001

April	Lahar receives attention when it is revealed the crater lake has filled at twice the normal rate over summer. Tranzrail offers to sell lahar warnings from its alarm system in Whangaehu River.
May	Work begins on the design of the ERLAWS warning system.
June	Nick Smith makes the first in a series of political attacks on the decision not to intervene, saying it is the fault of political correctness. Horizons and Ruapehu District Council publicly oppose the Government's plans for managing the lahar.
October	The building of a bund (stopbank) is discussed to divert the lahar's flow to prevent it flowing into the Tongariro River.
	Ministry of Civil Defence and Emergency Management becomes involved in lahar's management. Previously, the lahar risk had been the responsibility of the Ruapehu District Council and Horizons.
November	Ministerial committee set up to work with the Minister of Conservation to coordinate the lahar response.
	An advisory panel of 'lahar experts' is set up to guide the Minister of Conservation's response to the lahar. DOC granted permission to build the bund.
December	Sandra Lee rules out intervention at the crater, after reviewing the decisions made up to the point and gives her support for the bund and ERLAWS warning system.
2001/2002	Spring and summer. Eastern Ruapehu Lahar Alarm and Warning System (ERLAWS) installed at Dome Shelter (Site1), Taiping (Site 2), and Tukino Road (Site 3).

2002

February	Construction of the bund completed.
October	The 'Taig report' (2002) commissioned by Civil Defence is released internally. It suggests that the Tangiwai Bridge is as safe as any other stretch of New Zealand road and puts the risk to human life at 10%.
November	The Taig report is made public after media speculation about its contents.
December	Ruapehu District Council rejects the emergency response plan developed to deal with the lahar. The council says the lahar is a national issue and that it does not have the funds to provide an adequate response.

2003

January	DOC scientist, Harry Keys, predicts the lahar will take place in 2005.
March	Ruapehu District Council and Horizons lobby the Government to intervene at the crater rim.
April	Harry Keys announces that monitoring and surveying work conducted on the dam, suggest the lahar will be smaller than first thought.
May	RDC Mayor, Sue Morris and Horizons Chairman, Chris Lester, meet with Conservation Minister, Chris Carter in Wellington. The meeting lasts half-an-hour and the pair's suggestion for intervention is rejected.
September	Horizons Chairman, Chris Lester, seeks protection from any lawsuits that might result from the lahar.
	Conservation Minister, Chris Carter, announces financial support for the Ruapehu District Council to assist their handling of the lahar.

October	A second meeting between Morris, Lester and Carter is cancelled. Morris claims to have been "fobbed off".
	Genesis Energy agrees to provide warnings to the Taupo District Council from sensors located in the Whangaehu River, Waikato Stream and Managatoeteonui River
November	Horizons CEO, Peter Davies, says that 2003-2004 summer is the last chance for intervention at the crater. Soon after another meeting is scheduled between Morris, Lester and Carter as well as local MP Mark Burton and Minister of Civil Defence, George Hawkins. The meeting takes place at the end of November. The councils again request intervention.
December 24	50th Anniversary of the Tangiwai Disaster. A ceremony is held on December 21 to mark the event. The Prime Minister, Helen Clark, and Governor General, Dame Silvia Cartwright attend.
	Opposition MPs accuse the Government of "putting political correctness ahead of lives".

2004

March	The water in the crater lake reaches warning level 1. Harry Keys says the lahar is not expected until April 2005 at the earliest. Nick Smith and Horizons Chairman, Chris Lester, appeal for intervention at the crater and protection from legal liability for the council.
April	Cabinet decides to raise and reinforce the Tangiwai Road Bridge on advice given by Ministry of Civil Defence and Emergency Management Director, John Norton.
May	Transfund approve funding for the Tangiwai Road Bridge alterations.
June	Ruapehu District Council demands that the Government pay for more of the lahar response costs.

July	Planning starts on a brochure to provide information about the lahar hazard. The Government announces it will reimburse Ruapehu District Council for some of the costs of the lahar's management. MP Mark Burton presents the council with a cheque for $64,000. Nick Smith brands the payment "guilt money".
September	The lahar emergency response plan is tested.
November	An announcement is made that extra police will be stationed on the Desert Road from February 2005 in response to the lahar risk.

2005

March	The 'lahar information brochure is published and distributed.
	MP Mark Burton reopens the newly raised and reinforced Tangiwai Road Bridge. The work costs $4.1 million dollars.
	Police Deputy Commissioner, Steve Long, is forced to defend the police officers stationed at Waiouru after Nick Smith criticises them for issuing speeding tickets to motorists on the Desert Road.
May	The 'lahar cops' are stood down after the lahar risk drops due to cooler temperatures.
October	The emergency response plan is tested.
	DOC workers create a false alert when they set off ERLAWS when connecting a new battery.

2006

January	The ERLAWS warning alarm is set off by high winds.
October 4	A volcanic earthquake triggers a small eruption, setting off the ERLAWS warning system.
December	Crater lake rises to 3.8 metres above the hard rock rim. Probability of a lahar occurring estimated to be 1-2%, although it was not expected to take place at that time. Alert level raised to level 2.

2007

January 2	The tephra dam begins to erode. Harry Keys predicts the lahar will take place in February or March.
January 18	Conservation Minister, Chris Carter, Civil Defence Minister, Rick Barker along with Ruapehu District Mayor, Sue Morris, and Civil Defence and Emergency Management Director, John Hamilton, visited the crater lake to inspect the dam.
January 27	Ruapehu District Council announces that the OPTN text message system will deliver lahar updates to subscribers.
January 29	Alert level raised from two to three as water level reaches 1.5 metres below the top of the tephra dam.
March 18	After a period of heavy rain, water from the crater lake breaches the tephra dam, sending a lahar down the mountainside. The lahar plan works ''like clockwork'. There are no deaths. The lahar's management is hailed as a success.
March 19	Harry Keys confirms that the tephra dam has been cleared from the crater lake outlet.

APPENDIX B:
Coding schedule – main version

APPENDIX C:
Coding schedule – individuals

APPENDIX D:
Newspaper articles used in the content analysis

$340,000 lahar cost. (2007, April 4). *Dominion Post*, p. A4.

50 years on... we remember Tangiwai. (2003, December 17). *Ruapehu Press*, p. 1.

Adams, D. (2002, January 12). Giant stopbank aims to avoid lahar disaster. *Waikato Times*, p. 5.

Adams, D. (2002, January 21). Will we be safe when Ruapehu roars again? *Waikato Times*, p. 7.

Adams, D. (2002, January 26). Ruapehu: Threat tamed or a disaster in the making? *The Dominion*, p. 16.

Alerts worked. (2007, March 19). *Dominion Post*, p. A1.

All about lahars. (2005, March 9). *Ruapehu Press*, p. 2.

Analysing the lahar threat - crater lake emergency. (2001, November 14). *Ruapehu Press*, pp. 2, 4.

Andrew, K. (2004, July 15). Millions being wasted on PC lahar plan, says Smith. *Dominion Post*, p. A2.

Andrew, K. (2004, March 22). DOC defends lahar work. *Dominion Post*, p. A4.

Anger directed at Govt over lahar issue. (2004, March 24). *Ruapehu Press*, p. 1.

Anxious eyes on Mt Ruapehu. (2003, February 19). *Ruapehu Press*, p. 3.

Autumn lahar warning. (2002, September 14). *NZ Herald*, p. A19.

Avalanche, lahar warning on Ruapehu. (1996, June 24). *Waikato Times*, p. 3.

Awestruck! (2007, March 21). *Ruapehu Press*, p. 1.

Backing for warning system. (2006, October 26). *Waikato Times*, p. 3.

Beattie, S. (1998, October 22). Huge Mt Ruapehu lahar predicted within six years. *Evening Post*, p. 2.

Bell, C. (1997, June 16). Scientists warn of disastrous lahar. *The Dominion*, p. 1.

Binning, E. (2007, March 19). 'Oh my god, look at it now'. *NZ Herald*, p. A1.

Black, E. (2000, November 17). Crater risk warning for town at last. *NZ Herald*, p. A10.

Brochure aims to address public concerns about Mt Ruapehu lahar. (2004, July 7). *Ruapehu Press,* p. 2.

Brown, J.-M. (2002, March 14). Red alert on lethal flow. *NZ Herald,* p. A18.

Brown, J.-M. (2003, January 24). Ruapehu mudslide risk as crater lake rises. *NZ Herald,* p. A5.

Brown, J.-M. (2003, June 6). Clash over mudflow threat. *NZ Herald,* p. A11.

Brown, J.-M. (2003, March 27). Councils seek help on volcano safety. *NZ Herald,* p. A9.

Brown, J.-M. (2003, September 8). Lahar lawsuit protection sought. *NZ Herald,* p. A8.

Brown, J.-M. (2004, March 10). Lahar meddling ruled out. *NZ Herald,* p. A8.

Brown, J.-M. (2004, March 17). Brimming crater lake ready to burst its bank. *NZ Herald,* p. A1.

Brown, J.-M. (2004, March 19). Scientists want to film breach of crater lake. *NZ Herald,* p. A4.

Bulldozers to move on Ruapehu. (2001, November 16). *The Dominion,* p. 6.

Bund in place in time for lahar action. (2002, February 20). *Ruapehu Press,* p. 16.

Burgess, D. (2007, June 30). Kapiti beaches polluted by lahar. *Dominion Post,* p. A13.

Call for study of Ruapehu crater danger. (1996, May 3). *The Dominion,* p. 8.

Campbell, N., & NZPA. (2001, December 19). Lee's lahar ruling upsets. *Manawatu Standard,* p. 1.

Chalmers, A. (2006, October 9). Visitors warned after crater lake level rises. *Dominion Post,* p. A3.

Chances of lahar low. (2005, March 10). *Waikato Times,* p. 4.

Check on Ruapehu. (1996, June 25). *Waikato Times,* p. 1.

Checks on lahar risk. (2005, February 9). *Dominion Post,* p. A7.

Cheng, D. (2007, January 3). Ruapehu's crater lake close to bursting. *NZ Herald,* p. A5.

Cheng, D. (2007, January 8). Crater lake's rise slowed by seepage. *NZ Herald,* p. A3.

Chief defends using lahar patrol on road. (2005, March 11). *Dominion Post,* p. A6.

Claims over lahar decision. (2004, March 11). *Manawatu Standard,* p. 2.

Clean up bill just $100,000. (2007, March 28). *Ruapehu Press,* p. 1.

Collins, S. (2004, December 11). 50 years on, Tangiwai braces for destruction. *NZ Herald*, p. A16.

Collins, S. (2004, December 11). Living under the volcano. *NZ Herald*, p. B5.

Corry, L. (2002, January 26). Safeguards placed on Mt Ruapehu. *The Dominion*, p. 3.

Council lahar plea to Government delayed due to war in Iraq. (2003, April 2). *Ruapehu Press*, p. 2.

Council opt for 'conditional basis' with lahar emergency plan. (2004, June 16). *Ruapehu Press*, p. 2.

Council push issue of lahar. (2004, March 10). *Ruapehu Press*, p. 1.

Councils air lahar concerns to Govt. (2003, December 3). *Ruapehu Press*, p. 2.

Crater lake concerns ease. (2003, April 30). *Waikato Times*, p. 8.

Crater Lake decision draws closer. (1999, April 14). *Ruapehu Press*, p. 1.

Crater lake ebbs. (2005, January 21). *Dominion Post*, p. A4.

Crater lake eroded. (1996, May 8). *Ruapehu Press*, p. 1.

Crater lake level drops. (2004, April 14). *NZ Herald*, p. A3.

Crater lake level reaches rim. (2005, January 19). *Ruapehu Press*, p. 2.

Crater lake open. (1996, January 10). *Ruapehu Press*, p. 1.

Crater update. (2007, February 14). *Ruapehu Press*, p. 1.

Criticism over late lahar text warning. (2007, March 28). *Ruapehu Press*, p. 6.

'Dam break' success. (2006, October 27). *Manawatu Standard*, p. 3.

Danger not over on rumbling Ruapehu. (1996, June 21). *The Dominion*, p. 3.

DOC warnings issued. (1998, February 18). *Ruapehu Press*, p. 1.

Eames, D. (2003, June 28). Row erupting over lahar prevention. *Manawatu Standard*, p. 1.

Eames, D. (2003, June 28). Sides differ on work. *Manawatu Standard*, p. 1.

Easton, P. (2007, May 14). Kiwi exports the lessons of Mt Ruapehu's lahar. *Dominion Post*, p. A4.

Emergency services test lahar plan. (2004, November 3). *Ruapehu Press*, p. 4.

English, P. (1997, June 16). Crater threat: Safety will dictate action. *NZ Herald*, p. A3.

Eruption on Ruapehu. (2006, October 5). *Waikato Times*, p. 3.

Eruptions linger. (1996, March 27). *Ruapehu Press,* p. 5.

Exercise on lahar. (2006, October 25). *Waikato Times,* p. 2.

Experts are saying it's a matter of 'when' not 'if' with the lahar. (2003, October 15). *Ruapehu Press,* p. 5.

Fairfax, & NZPA. (2007, March 20). Ruapehu vents a little pressure. *Waikato Times,* p. 3.

Fairfax. (2007, March 20). Historic debris unearthed by latest lahar. *Waikato Times,* p. 1.

Feedback wanted by DOC. (1998, November 25). *Ruapehu Press,* p. 2.

Field, M. (2007, February 22). TV firms compete for lahar footage. *Dominion Post,* p. A5.

Finnegan, A. (1997, July 29). No-go zone imposed around Ruapehu crater. *Evening Post,* p. 3.

First lahar level. (2004, March 1). *Waikato Times,* p. 2.

Funding approved for Tangiwai bridge. (2004, May 19). *Ruapehu Press,* p. 1.

Government payout may not cut it when lahar arrives. (2004, July 21). *Ruapehu Press,* p. 1.

Govt lahar reply angers council. (2004, June 10). *Waikato Times,* p. 13.

Govt says no to lahar prevention. (2004, March 17). *Ruapehu Press,* p. 1.

Green, S. (1997, June 16). Ruapehu outlet safe - report. *Evening Post,* p. 3.

Gregory, A. (2003, December 22). Tangiwai rail disaster - 50 years on: Families remember shocking day. *NZ Herald,* p. 1.

Gregory, A. (2003, December 24). In memory of our darkest night. *NZ Herald,* p. A12.

Gregory, A. (2003, December 24). Tangiwai 50 years on: Disaster's unsung heroine. *NZ Herald,* p. A2.

Growing threat of Ruapehu lahar. (2007, January 2). *Dominion Post,* p. A2.

Heffield, J. (2004, December 6). Lahar-proof bridge soon for Tangiwai. *Waikato Times,* p. 5.

Heffield, J. (2004, November 19). Crater lake at highest level in years. *Waikato Times,* p. 4.

Heffield, J. (2005, February 10). Crater lake's level rises but lahar risk stays low. *Waikato Times,* p. 5.

Heffield, J. (2005, January 15). Lahar risk grows as melting snow raises crater lake level. *Waikato Times*, p. A3.

Heffield, J. (2005, May 6). Police withdraw as lahar risk fades. *Waikato Times*, p. 4.

Hopkins, S. (2004, July 10). Govt doubles funds for lahar planning. *Waikato Times*, p. A4.

Johnston, M. (2007, February 3). On the brink. *NZ Herald*, p. A1.

Johnston, M. (2007, February 3). Tranquil scene gives few hints of danger. *NZ Herald*, p. A7.

Kavanagh, D. (2001, April 11). Ruapehu mudslide disaster warning. *Manawatu Standard*, p. 1.

Kavanagh, D. (2002, October 25). Report backs lahar warning. *Manawatu Standard*, p. 3.

Kiong, E. (2007, January 30). Crater lake watch steps up at lahar threat mounts. *NZ Herald*, p. A3.

Kiong, E. (2007, March 20). After the big lahar, a swarm of earthquakes. *NZ Herald*, p. A1.

Kiong, E., & O'Rourke, S. (2007, March 19). Scientists plan trip to crater lake for close look. *NZ Herald*, p. A3.

Kitchin, P. (2003, April 29). Lahar less likely to pour into Tongariro. *Dominion Post*, p. A10.

Lahar alarm defended. (2001, June 9). *Waikato Times*, p. 3.

Lahar alert rises. (2006, December 1). *Manawatu Standard*, p. 3.

Lahar alert tested. (2004, September 30). *Dominion Post*, p. A4.

Lahar alert. (2005, January 5). *Dominion Post*, p. A3.

Lahar alert. (2006, January 5). *Manawatu Standard*, p. 3.

Lahar exercise a 'success'. (2006, November 1). *Ruapehu Press*, p. 2.

Lahar from afar. (2007, March 31). *Dominion Post*, p. A18.

Lahar gains support. (2003, September 10). *Ruapehu Press*, p. 2.

Lahar meeting on mountain. (2001, July 4). *Ruapehu Press*, p. 1.

Lahar meeting rescheduled. (2003, November 5). *Ruapehu Press*, p. 6.

Lahar opinions sought. (2001, June 27). *Ruapehu Press*, p. 1.

Lahar path tracked txt. (2007, January 27). *Waikato Times*, p. A3.

Lahar plan approved. (2001, November 16). *Waikato Times,* p. 3.

Lahar plan goes to RDC. (2002, November 20). *Ruapehu Press,* p. 2.

Lahar planning under fire. (2001, June 13). *Ruapehu Press,* p. 1.

Lahar plea refused. (2003, June 4). *Ruapehu Press,* p. 1.

Lahar response tested. (2004, October 13). *Manawatu Standard,* p. 3.

Lahar risk confirmed. (2002, November 27). *Manawatu Standard,* p. 3.

Lahar risk forces bridge raising. (2004, May 6). *NZ Herald,* p. A10.

Lahar risk lessens. (2005, May 4). *Dominion Post,* p. A3.

Lahar risk reduced. (2002, November 26). *Waikato Times,* p. 3.

Lahar sirens test skiers' awareness. (2005, October 13). *Dominion Post,* p. A4.

Lahar slide likely but no risk to public. (2004, December 8). *Ruapehu Press,* p. 1.

Lahar stopbank proposal. (2001, October 18). *The Dominion,* p. 2.

Lahar system tested. (2004, May 5). *Ruapehu Press,* pp. 1, 2.

Lahar system tested. (2006, October 26). *Dominion Post,* p. A5.

Lahar threat to fishery feared. (2001, June 11). *The Dominion,* p. 2.

Lahar warning delayed. (2002, July 9). *Waikato Times,* p. 3.

Lahar warning tested. (2004, September 30). *NZ Herald,* p. A8.

Lahar warning working. (2004, September 30). *Waikato Times,* p. 2.

Lahar warning. (2002, November 27). *Waikato Times,* p. 2.

Lahar warning. (2003, October 30). *Dominion Post,* p. 7.

Lake changing. (1997, April 16). *Ruapehu Press,* p. 5.

Lake level raises lahar alert level. (2006, December 6). *Ruapehu Press,* p. 2.

Lake report sent. (1999, August 4). *Ruapehu Press,* p. 1.

Latz, A. (2005, October 5). Response to lahar gets put to test. *Waikato Times,* p. 3.

Lee satisfied with lahar risk response management. (2002, January 9). *Ruapehu Press,* p. 10.

Let's do it again. (2007, March 24). *Waikato Times,* p. A14.

Level declines. (1997, November 5). *Ruapehu Press,* p. 2.

Malpass, W. (1996, June 19). Skies darken for ski season. *Ruapehu Press,* p. 1.

Manson, B. (2003, December 22). Clock turns back 50 years to Tangiwai crash. *Dominion Post,* p. A3.

Mayor grateful for support on lahar. (2001, June 20). *Ruapehu Press,* p. 1.

Memorial site half repair cost. (2007, March 24). *Dominion Post,* p. A5.

Mercer, B. (2007, March 20). Lahar leaves mud flows in its wake. *Waikato Times,* p. 10.

Millions spent to avert disaster. (2007, March 19). *Dominion Post,* p. A2.

Minister backs councils in seeking engineering solution. (2003, December 24). *Ruapehu Press,* p. 3.

Monahan, K. (2007, January 13). The crater cracks. *Waikato Times,* pp. E1-E2.

Monahan, K. (2007, March 22). Lahar expert receives special Erebus gong. *Waikato Times,* p. 1.

Monahan, K. (2007, March 24). Mountain man. *Waikato Times,* p. E3.

Morgan, J. (2001, April 12). Huge lahar building on Mt Ruapehu. *The Dominion,* p. 3.

Mount Ruapehu crater lake lahar. (2006, October 7). *NZ Herald,* p. A15.

Mountain mudslide as close as next year. (2001, April 18). *Ruapehu Press,* p. 1.

Mt Ruapehu multi million dollar lahar warning system a success. (2004, October 6). *Ruapehu Press,* p. 1.

Myers, J. (2003, November 4). Time running out for quick fix. *Manawatu Standard,* p. 3.

New equipment to monitor lahar. (2006, November 15). *Ruapehu Press,* p. 2.

New lahar txts. (2007, January 31). *Ruapehu Press,* p. 2.

Newton, J. (1996, June 18). Lahars expected to cause problems. *Manawatu Standard,* p. 1.

Newton, J. (1996, June 24). River erosion threatens road. *Manawatu Standard,* p. 2.

Next lahar not for a decade. (2007, March 28). *Ruapehu Press,* p. 7.

Nichols, L. (2007, March 19). Warning system hailed as success. *Dominion Post,* p. A2.

No change. (2007, February 7). *Ruapehu Press,* p. 1.

No link to tremors. (2007, March 22). *Dominion Post,* p. A6.

Novel stirs Tangiwai memories. (2006, October 18). *Ruapehu Press,* p. 5.

NZPA. (1998, October 22). Dam may help avert Ruapehu catastrophe. *Waikato Times,* p. 2.

NZPA. (1998, October 23). Ruapehu Maori oppose lahar plan. *Evening Post,* p. 11.

NZPA. (1999, August 6). Crater lake disaster options document. *Waikato Times,* p. 14.

NZPA. (2001, April 12). Ruapehu mudslide predictions stepped up. *Waikato Times,* p. 2.

NZPA. (2001, April 20). Lahar would hit trout fishery. *Evening Post,* p. 17.

NZPA. (2001, April 24). Lahar warning system available. *Manawatu Standard,* p. 2.

NZPA. (2001, April 24). Willing to share lahar info. *Evening Post,* p. 2.

NZPA. (2001, August 31). Lee may review Mt Ruapehu lahar plan. *The Dominion,* p. 11.

NZPA. (2001, December 20). Ruapehu lahar plans approved by Lee. *Evening Post,* p. 28.

NZPA. (2001, July 18). Lahar diversion to protect Tongariro. *Evening Post,* p. 2.

NZPA. (2001, July 18). Ruapehu embankment planned to divert lahars. *The Dominion,* p. 10.

NZPA. (2001, June 11). Scientist suspects lahar may strike sooner. *Waikato Times,* p. 9.

NZPA. (2001, June 15). Mud flies in scrap over lake spill risk. *NZ Herald,* p. A6.

NZPA. (2001, June 8). Delays to Ruapehu work labeled risk. *Waikato Times,* p. 2.

NZPA. (2001, June 8). Lahar scare alarmist, says DOC. *Evening Post,* p. 2.

NZPA. (2001, November 2). Ministers to deal with lahar danger. *NZ Herald,* p. A9.

NZPA. (2001, November 2). Mt Ruapehu to be monitored by ministers. *The Dominion,* p. 2.

NZPA. (2001, November 2). Volcanic action watched. *Waikato Times,* p. 10.

NZPA. (2002, December 19). Ruapehu plan rejected. *Waikato Times,* p. 2.

NZPA. (2002, July 10). Teething problems delay Ruapehu lahar warning system. *Dominion Post,* p. A6.

NZPA. (2002, November 26). Action cuts lahar risk. *Manawatu Standard,* p. 3.

NZPA. (2002, September 12). Lahar risk next autumn - DOC. *Manawatu Standard,* p. 3.

NZPA. (2003, November 5). Last chance to beat lahar. *NZ Herald,* p. A11.

NZPA. (2003, October 21). Lahar meeting off. *NZ Herald,* p. A10.

NZPA. (2004, December 6). Ruapehu lahar expected in weeks. *NZ Herald,* p. A9.

NZPA. (2007, March 19). Alarm systems worked well: Minister. *NZ Herald,* p. A3.

NZPA. (2007, March 19). Govt lucky, says man who prophesised 1953 lahar danger. *Waikato Times,* p. 3.

O'Rourke, S. (2003, September 10). Tangiwai rescuer's plea. *Waikato Times,* p. 2.

O'Rourke, S. (2006, September 2). Spectacular glacier slide on Ruapehu. *NZ Herald,* p. A15.

O'Rourke, S. (2007, February 3). Scientists polish crisis response plan to counter mountain-top threat. *NZ Herald,* pp. A6-A7.

O'Rourke, S. (2007, March 20). Painful Tangiwai memories recalled. *NZ Herald,* p. A2.

O'Rourke, S. (2007, March 20). Scientists delighted after verifying textbook result. *NZ Herald,* p. A2.

O'Rourke, S. (2007, March 21). Now it's Ngauruhoe rumbling into life. *NZ Herald,* p. A5.

O'Rourke, S. (2007, March 23). Lahar larger but lacked the force of '53. *NZ Herald,* p. A7.

Path of destruction. (2007, March 19). *Manawatu Standard,* p. 2.

Patterson, C. (2003, December 22). Ruapehu plan 'playing with people's lives'. *Dominion Post,* p. A1.

Patterson, C., & NZPA. (2006, October 6). Lahar warning still a big mystery. *Dominion Post,* p. A4.

Pickering, S. (2003, December 13). Tangiwai escape. *Waikato Times,* pp. D3, D4.

Pickering, S. (2003, October 24). Minister says lahar claims 'politicking'. *Waikato Times,* p. 26.

Plans to cut lahar risks. (2001, December 19). *NZ Herald,* p. A7.

Police lahar watch criticism shows complacency a potential issue. (2005, March 16). *Ruapehu Press,* pp. 6, 7.

Praise for 'clockwork' success of lahar plan. (2007, March 28). *Ruapehu Press,* p. 7.

Quirke, M. (2003, October 29). Trip to recall Tangiwai disaster. *Dominion Post,* p. A6.

Rasmussen, W. (2007, March 20). City firms kept close eye on lahar. *Waikato Times,* p. 13.

RDC to move Tangiwai memorial for safety. (2004, December 8). *Ruapehu Press,* p. 7.

RDC to receive lahar cheque. (2004, July 14). *Ruapehu Press,* p. 1.

RDC turns down lahar plan. (2002, December 18). *Ruapehu Press,* p. 2.

Region wants barrier to be trenched. (2001). *Ruapehu Press,* p. 5.

Rendle, S. (2001, April 11). Lahar threat a time bomb. *Evening Post,* p. 1.

Review gives lahar response top marks. (2007, April 4). *Ruapehu Press,* p. 2.

Revington, M. (1997, June 17). Residents unmoved by menacing mountain. *Waikato Times,* p. 1.

Rowan, J. (2006, October 6). Climbers warned to steer clear. *NZ Herald,* p. A3.

Rowan, J. (2006, October 7). Quake triggers alarm. *NZ Herald,* p. A15.

Rowan, J., & Johnston, M. (2007, January 29). Lahar alert rises as crater lake swells. *NZ Herald,* p. A3.

Ruapehu crater lake eruption suspected. (2006, October 5). *New Zealand Herald,* p. A3.

Ruapehu crater lake level 'low to normal'. (2005, January 1). *Dominion Post,* p. A9.

Ruapehu crater's activity 'minor'. (2006, October 11). *Ruapehu Press,* p. 1.

Ruapehu decision risks lives - Smith. (2001, June 8). *Manawatu Standard,* p. 8.

Ruapehu eruption study. (1998, May 20). *Ruapehu Press,* p. 1.

Ruapehu flood plan in iwi hands. (1997, June 16). *Waikato Times,* p. 1.

Ruapehu lahar threat looms. (2001, May 26). *Waikato Times,* p. 3.

Ruapehu lahar. (2007, March 19). *NZ Herald,* p. A2.

Ruapehu lake alert. (2006, October 7). *Dominion Post,* p. A3.

Ruapehu lake level high. (2006, December 1). *Dominion Post,* p. A4.

Ruapehu puts ski season on hold. (1996, July 10). *Ruapehu Press,* p. 1.

Ruapehu risk: Chances of repeat tragedy are slim. (1997, June 17). *Waikato Times,* p. 7.

Rumours about lahar flow out of control. (2004, February 25). *Ruapehu Press,* p. 10.

Ruscoe, K. (2004, April 12). $4 million to raise bridge. *Dominion Post,* p. A4.

Ruscoe, K. (2004, April 3). Danger from above. *Dominion Post,* pp. E1-E2.

Ruscoe, K. (2004, April 3). Risky business. *Dominion Post,* p. E2.

Ruscoe, K. (2004, March 17). Lahar could be eight months off. *Dominion Post,* p. A9.

Ruscoe, K. (2004, March 30). Threat of big lahar recedes. *Dominion Post,* p. A3.

Samson, A. (1996, April 23). Lahar flows on Mt Ruapehu. *The Dominion,* p. 1.

Samson, A. (1998, January 22). Ruapehu warning systems could prove inadequate. *The Dominion,* p. 8.

Samson, A. (1998, October 23). Destruction, deaths likely if crater collapses - report. *The Dominion,* p. 1.

Samson, A. (1998, October 24). Mountain safety trench cost analysed. *The Dominion,* p. 3.

Samson, A., & Guyan, C. (1997, June 17). Options for crater lake work bring warning. *The Dominion,* p. 7.

Sargent, E. (2003, December 22). Emotion still raw at Tangiwai rites. *Manawatu Standard,* p. 1.

Sargent, E. (2003, December 22). Mementos for a grieving family. *Manawatu Standard,* p. 1.

Saunders, A. (2005, March 9). Lahar police dish out tickets. *Dominion Post,* p. A1.

Saunders, J. (1996, June 19). Memorial threatened. *Manawatu Standard,* p. 2.

Saunders, J. (1996, June 19). Wind shift: Don't panic. *Manawatu Standard,* p. 1.

Saunders, J. (1996, June 20). Mountain fallout will have marginal impact. *Manawatu Standard,* p. 3.

Saunders, J. (1998, April 23). Crater ash dam raises lahar danger concerns. *Manawatu Standard,* p. 2.

Saunders, J., & NZPA. (1997, June 16). No danger of sudden crater-lake collapse. *Manawatu Standard,* p. 1.

Saunders, J., & NZPA. (1997, October 10). Ski operators relaxed over alert. *Manawatu Standard,* p. 1.

Schouten, H. (1996, June 17). Ruapehu erupts. *Evening Post,* p. 1.

Schouten, H. (1996, June 18). Volcano fallout prompts rush for medication. *Evening Post,* p. 1.

Schouten, H. (2007, February 14). Laser measures crater lake dam. *Dominion Post,* p. A3.

Scientist not convinced about mayor's comments on dam. (2003, October 29). *Ruapehu Press,* p. 1.

Share lahar safety costs: Report. (2002, December 4). *Ruapehu Press,* p. 7.

Slower filling of crater lake. (2002, August 6). *Dominion Post,* p. A4.

Smale, A. (2003, November 1). Disaster looms. *Manawatu Standard,* p. 1.

Smale, A. (2003, November 1). Shattered euphoria. *Manawatu Standard,* p. 23.

Staff Reporters, & NZPA. (2003, November 12). Tangiwai group gathers. *NZ Herald,* p. A5.

Staff Reporters. (2007, January 10). Crater lake drops, but lahar still likely. *Ruapehu Press,* pp. 1, 3.

Staff Reporters. (2007, March 19). 'The earth trembled'. *Dominion Post,* p. A1.

Steam-powered crane to be fired up for Tangiwai commemorations. (2003, November 12). *Ruapehu Press,* p. 16.

Support for lahar stance. (2001, July 25). *Ruapehu Press,* p. 3.

Symes, F. (2003, November 1). Day of carnage. *Manawatu Standard,* pp. 21-22.

Tahana, Y. (2007, January 13). Lahar warning system ready to go. *Waikato Times,* p. A7.

Tahana, Y. (2007, January 13). Weather upsets monitoring. *Waikato Times,* p. A7.

Tahana, Y. (2007, January 26). Lake nears higher warning level. *Waikato Times,* p. 5.

Take the chance to experience the lahar for yourself. (2003, November 5). *Ruapehu Press,* p. 16.

Tangiwai disaster commemorations. (2003, December 24). *Ruapehu Press,* p. 3.

Tangiwai eyewitness can never forget. (1997, June 17). *Waikato Times,* p. 7.

Taumaranui author probes lahar event. (2006, May 31). *Ruapehu Press,* p. 5.

Taylor, K. (2001, June 30). Mountains of mud ignite trench warfare. *NZ Herald,* p. A19.

Team funded for lahar research. (2005, September 14). *Ruapehu Press,* p. 7.

Torbit, M. (2007, March 20). Ruapehu lets off a little steam. *Dominion Post,* p. A1.

Tranz Rail offers to sell lahar warnings. (2001, April 24). *The Dominion,* p. 2.

Tunnah, H. (2004, November 22). Police meet lahar threat. *NZ Herald,* p. A7.

Upgrade at Tangiwai. (2004, May 6). *Waikato Times,* p. 2.

Venter, N. (2000, May 9). Mt Ruapehu to get lahar warning system. *The Dominion,* p. 2.

Volcanic activity peaked Saturday. (1997, October 15). *Ruapehu Press,* p. 5.

Volcano alert downgraded. (2006, October 9). *NZ Herald,* p. A4.

Vos, I. (2004, August 6). Ruapehu to focus on eruption awareness. *Waikato Times,* p. 4.

Waikato Times reporters, & NZPA. (2007, March 19). After the lahar. *Waikato Times,* p. 1.

Waikato Times reporters, & NZPA. (2007, March 19). Raging lahar a terrifying, awesome sight. *Waikato Times,* p. 1.

Wallis, A. (2001, August 22). Movement on lahar issue. *Manawatu Standard,* p. 5.

Wallis, A. (2001, August 30). Lee to look again at stance on lahar threat. *Manawatu Standard,* p. 1.

Wallis, A. (2001, June 13). Rift opens over lahar warning system. *Manawatu Standard,* p. 1.

Wallis, A. (2001, June 20). Mt Ruapehu lahar is a 'minefield'. *Manawatu Standard,* p. 1.

Wallis, A. (2001, June 28). Lahar work may require new law. *Manawatu Standard,* p. 3.

Wallis, A. (2001, November 21). Lahar problem now with conservation minister. *Manawatu Standard,* p. 3.

Wallis, A. (2001, November 7). Lahar work still council priority. *Manawatu Standard,* p. 2.

Wallis, A. (2001, October 17). Ruapehu lahar work possible. *Manawatu Standard,* p. 1.

Wallis, A. (2004, December 3). Mt Ruapehu lahar watch gears up. *Manawatu Standard,* p. 3.

Warning reduced. (1997, October 1). *Ruapehu Press,* p. 11.

Watkins, T. (2001, June 8). Dropped: Plan to control Ruapehu lahar. *The Dominion,* p. 1.

Watkins, T. (2001, June 9). Lahar warning system will be adequate say officials. *The Dominion,* p. 2.

Watkins, T. (2004, March 10). Ruapehu risk: Govt rejects call to act. *Dominion Post,* p. A1.

Watson, M. (2004, December 29). Lake creeps higher. *Dominion Post,* p. A1.

Watson, M. (2005, January 14). Lahar 'unlikely till next summer'. *Dominion Post,* p. A5.

Watson, M. (2005, March 5). Tangiwai bridge reopens. *Dominion Post,* p. A7.

Watson, M. (2005, May 5). Police on lahar duty stood down. *Dominion Post,* p. A5.

Watson, M. (2006, October 27). Recent volcanic quakes puzzle scientists. *Dominion Post,* p. A3.

Watson, M. (2007, January 11). Lawyers offer advice on lahar. *Dominion Post,* p. A2.

Watson, M. (2007, January 19). Public 'safe from lahar'. *Dominion Post,* p. A7.

Watson, M. (2007, January 24). Fears lahar scaring tourists. *Dominion Post,* p. A3.

Watson, M. (2007, January 27). Free texts to warn of lahar risk. *Dominion Post,* p. A18.

Watson, M. (2007, January 5). Crater lake seepage doubles in five days. *Dominion Post,* p. A2.

Watson, M., & Torbit, M. (2007, March 20). Lahar unlikely for years. *Dominion Post,* p. A2.

Watson, M., & Williams, B. (2006, February 18). Lahar path tracked by laser. *Dominion Post,* p. A5.

Watt, E. (2007, January 2). Dam on the brink of bursting. *Dominion Post,* p. A1.

What does the future hold for the lahar? (2003, October 15). *Ruapehu Press,* p. 1.

What happened? (2007, March 19). *Dominion Post,* p. A2.

Wilson, M. (2007, March 22). Mud, not so glorious mud. *Manawatu Standard,* p. 2.

Wilson, N. (2007, March 19). Drama, but little danger. *Manawatu Standard,* p. 1.

Workers trip lahar alarm. (2005, October 25). *Dominion Post,* p. A5.

Wotherspoon, N. (2007, February 21). Lahar measures erosion. *Ruapehu Press,* p. 3.

Wotherspoon, N. (2007, March 21). Spectacular lahar leaves local officials awestruck. *Ruapehu Press,* pp. 2-3.

Young, A. (2003, December 22). Govt risking lives, MPs claim. *NZ Herald,* p. A6.

APPENDIX E:
Suggested options for intervention

	Option	Practicality*	Description**
1.	**No intervention**	High	The lahar is left to occur naturally. No attempts are made to release water from the crater or divert/contain the lahar's flow.
2.	**Intervention in the lahar run-out zones**		
2A	Containment dams/bunds	High	Earth or concrete dams are constructed across lahar channels to slow the flow or divert their path.
2B	Individual asset protection + hazard avoidance	Medium	Structures such as dams, bunds and containment ponds are built to protect assets such as bridges, power pylons and parts of the highway.
2C	Containment basins	Low/ Medium	Basins with canals leading to them are constructed to contain, slow or reduce the severity of a lahar.
3	**Harden or perforate tephra barrier**		
3A	Cement grouting	Low/ Medium	Attempt to strengthen tephra dam by drilling holes in it and filling them with cement. Theoretically, when the lake fills to the top of the dam, a new outflow will develop, resulting in a larger crater lake.
3B	Concrete pipe culvert made by excavator (driven in)	Medium	A hydraulic excavator is used to dig a V-shaped channel in the tephra, into which a concrete pipe is placed. The channel is then filled in again. The water from crater the lake flows out through the pipe, preventing a lahar, at least initially.
3C	Concrete pipe culvert made by excavator (flown in)	Medium	Same as 3C, except in this version, the excavator is flown on to the mountain, instead of being driven on and two excavators are used instead of one.
3D	Horizontal tunnelling	Low/ Medium	A horizontal tunnel is made through the tephra, using "state-of-the-art horizontal tunnelling systems".
3E	Concrete weir at outlet	Low	A weir, a small concrete dam built at the outflow point to regulate flow, is constructed in front of or behind the tephra dam.
3F	Spencer clay bio-hardening	Low	Biological agents are used to solidify the tephra dam, preventing it from breaking.
4	**Trench through 1995-1996 tephra**		
4A	Fly in light bulldozers	High	Three light bulldozers are air-lifted onto the dam by a Russian MIL 8 helicopter. The bulldozers excavate a trench through the tephra down to

			the hard lava layer below.
4B	Drive in heavy bulldozer	Medium/ High	Three heavy bulldozers are driven up from the Top of the Bruce. The bulldozers excavate a trench through the tephra down to the hard lava layer below.
4C	Drive in heavy hydraulic excavators	Medium/ High	Same as 4B, except this version involves heavy hydraulic excavators driven up from the Top of the Bruce.
4D	Fly in light excavators	High	Same as 4A, except this version involves light hydraulic excavators being flowing in by a Russian MIL 8 helicopter.
4E	Pumping and sluicing	Low/ Medium	Water from the crater lake is pumped to create a high pressure flow that is directed onto the tephra to excavate a trench.
4F	Aerial delivery of low explosive	Medium	High-precision laser-guided missiles are fired at the dam to destroy it before the water behind it reaches a dangerous level.
4G	Ground delivery of lower low explosive	Low/ Medium	Ground-placed explosives are used to blast a trench or to weaken the dam to allow a new channel to form.
4H	Manual digging	Low	"Human muscle power" is used to dig a trench through the tephra.
5	**Excavate trench into underlying lava at crater outlet**		
5A	Drive in heavy plant plus explosives	Medium	Following options 4B and 4C, explosives are used to loosen the lava and other solid material.
5B	Fly in light plant plus explosives	Low/ Medium	Following option 4D, explosives are used to loosen the lava and other solid material.
5C	Aerial delivery of high explosives	Low	Following option 4F, explosives are used to cut into the underlying lava.
6.	**Other options**		
6A	Siphoning	Not rated	A pipe is used to extract water from the crater lake. The idea is to keep the water level in the lake low so the tephra can erode.
6B	Barrier truss	Not rated	A truss, a "high tensile fabric membrane", attached between two long poles that go down to the crater lake's floor, catch the water when the tephra dam breaks. The lahar is then released slowly via this construction.

* As stated in the Department of Conservation's Assessment of Environmental Effects (1999). Refer to pages 90 and 91 for an unabridged version of the table.

** The original descriptions, along with a discussion of their advantages and disadvantages, can be found on pages 70-86.

References

50 years on... we remember Tangiwai. (2003, December 17). *Ruapehu Press*, p. 1.

ACT New Zealand. (2003, December 22). Tangiwai: History set to repeat. *Scoop.co.nz*.

Adams, D. (2002, January 12). Giant stopbank aims to avoid lahar disaster. *Waikato Times*, p. 5.

Allen, S. (2004, May 1). Lahar warning system passes test. *Dominion Post*, p. 10.

Anderson, A. (1997). *Media, culture and the environment*. London: UCL Press.

Andrew, K. (2004a, March 22). DOC defends lahar work. *Dominion Post*, p. A4.

Andrew, K. (2004b, July 15). Millions being wasted on PC lahar plan, says Smith. *Dominion Post*, p. A2.

Ansoff, H. I. (1980). Strategic issue management. *Strategic Management Journal, 1*(2), 131-148.

Arrington, C. B., & Sawaya, R. N. (1984). Issues management in an uncertain environment. *Long Range Planning, 17*(6), 17-24.

Ashwell, D. (1998). Horses and hydro lakes: The reporting of environmental issues. *New Zealand Journal of Sociology, 13*(1), 1-28.

Awestruck! (2007, March 21). *Ruapehu Press*, p. 1.

Beattie, S. (1998, October 22). Huge Mt Ruapehu lahar predicted within six years. *Evening Post*, p. 2.

Bell, C. (1997, June 16). Scientists warn of disastrous lahar. *The Dominion*, p. 1.

Berger, A. A. (2000). *Media and communication research methods: An introduction to qualitative and quantitative approaches*. Thousand Oaks, California: Sage Publications, Inc.

Berkowitz, D., & Turnmire, K. (1994). Community relations and issues management: An issue orientation approach to segmenting publics. *Journal of Public Relations Research, 6*(2), 105-123.

Beston, A. (2000, May 9). Action on mudslide threat. *NZ Herald*, p. A13.

Binning, E. (2007, March 19). 'Oh my god, look at it now'. *NZ Herald*, p. A1.

Birch, M., & Watkins, T. (2001, June 11). Axing of trench plan alarms mayor. *The Daily News,* p. 3.

Boon, K. (1999). *The Tangiwai rail disaster*. Wellington: Nelson Price Milburn Ltd.

Bowen, S. A. (2002). Elite executives in issues management: The role of ethical paradigms in decision making. *Journal of Public Affairs, 2*(4), 270-283.

Bridges, J. A. (2004). Corporate issues campaigns: Six theoretical approaches. *Communication Theory, 14*(1), 51-77.

Brochure aims to address public concerns about Mt Ruapehu lahar. (2004, July 7). *Ruapehu Press,* p. 2.

Bronn, P. S., & Bronn, C. (2002). Issues management as a basis for strategic orientation. *Journal of Public Affairs, 2*(4), 247-258.

Brown, J.-M. (2003a, June 6). Clash over mudflow threat. *NZ Herald,* p. A11.

Brown, J.-M. (2003b, March 27). Councils seek help on volcano safety. *NZ Herald,* p. A9.

Brown, J.-M. (2003c, September 8). Lahar lawsuit protection sought. *NZ Herald,* p. A8.

Brown, J.-M. (2003d, January 24). Ruapehu mudslide risk as crater lake rises. *NZ Herald,* p. A5.

Brown, J.-M. (2004, March 10). Lahar meddling ruled out. *NZ Herald,* p. A8.

Buchholz, R. A. (1988). Adjusting corporations to the realities of public interests and policy. In R. L. Heath (Ed.), *Strategic issues management* (pp. 50-72). San Francisco: Jossey-Bass Inc., Publishers.

Buchholz, R. A. (1992). *Public policy issues for management* (2nd ed.). Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Bulldozer at crater intrusion, say clubs. (1997, June 18). *The Dominion,* p. 10.

Bund in place in time for lahar action. (2002, February 20). *Ruapehu Press,* p. 16.

Call for study of Ruapehu crater danger. (1996, May 3). *The Dominion,* p. 8.

Campbell, N., & NZPA. (2001, December 19). Lee's lahar ruling upsets. *Manawatu Standard,* p. 1.

Carroll, C. E., & McCombs, M. (2003). Agenda-setting effects of business news on the public's images and opinions about major corporations. *Corporate Reputation Review, 6*(1), 36-46.

Chase, W. H. (1977). Public issues management: The new science. *Public Relations Journal, 33*(10), 25-26.

Chase, W. H. (1982a). Issues management. In J. S. Nagelschmidt (Ed.), *The public affairs handbook* (pp. 104-109). New York: AMACOM.

Chase, W. H. (1982b). Issues management conference - A special report. *Corporate Public Issues and Their Management, 7*(23), 1-2.

Chase, W. H. (1984). *Issue management: Origins of the future*. Stamford, Conneticut: Issue Action Publications, Inc.

Checks on lahar risk. (2005, February 9). *Dominion Post*, p. A7.

Cheng, D. (2007, January 3). Ruapehu's crater lake close to bursting. *NZ Herald*, p. A5.

Chief defends using lahar patrol on road. (2005, March 11). *Dominion Post*, p. A6.

Comrie, M. (2005). Gaining government support: Life Sciences Network and the GE issue. In C. Galloway & K. Kwansah-Aidoo (Eds.), *Public relations issues and crisis management* (pp. 25-40). Southbank, Victoria: Thomson/Social Science Press.

Conly, G., & Stewart, G. (1986). *Tragedy on the track: Tangiwai and other New Zealand railway accidents*. Wellington: Grantham House.

Coombs, W. T. (1992). The failure of the task force on food assistance: A case study of the role of legitimacy in issue management. *Journal of Public Relations Research, 4*(2), 101-122.

Coombs, W. T. (2002). Assessing online issue threats: Issue contagions and their effect on issue prioritisation. *Journal of Public Affairs, 2*(4), 215-229.

Corry, L. (2002, January 26). Safeguards placed on Mt Ruapehu. *The Dominion*, p. 3.

Cottle, S. (2003). News, public relations and power: Mapping the field. In S. Cottle (Ed.), *News, public relations and power* (pp. 3-24). Thousand Oaks, California: SAGE Publications.

Councils air lahar concerns to Govt. (2003, December 3). *Ruapehu Press*, p. 2.

Crable, R. E., & Vibbert, S. L. (1985). Managing issues and influencing public policy. *Public Relations Review, 11*(2), 3-16.

Critcher, C. (2003). *Moral panics and the media*. Buckingham: Open University Press.

Cronin, S. J., Hodgson, K. A., Neall, V. E., Palmer, A. S., & Lecointre, J. A. (1997). 1995 Ruapehu lahars in relations to the late Holocene lahars of Whangaehu River, New Zealand. *New Zealand Journal of Geology and Geophysics, 40*, 507-520.

Culbertson, H. M., Jeffers, D. W., Stone, D. B., & Terrell, M. (1993). *Social, political, and economic contexts in public relations: Theory and cases*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Dansker, B., Hansen, J. S., Loftin, R. D., & Veldwisch, M. A. (1987). Issues management in the information planning process. *MIS Quarterly*, *11*(2), 223-230.

Daymon, C., & Holloway, I. (2002). *Qualitative research methods in public relations and marketing communications*. London: Routledge.

Dempsey, B. (2002). Planning for a lahar event. *Tephra*(19), 18-19.

Department of Conservation. (1999). *Environmental and risk assessment for mitigation of the hazard from Ruapehu crater lake: Assessment of environmental effects*. Turangi: Department of Conservation.

Downs, A. (1972). Up and down with ecology: The "issue-attention cycle". *The Public Interest, 28*, 38-50.

Durant, J., Bauer, M. W., & Gaskell, G. (Eds.). (1998). *Biotechnology in the public sphere: A European sourcebook*. London: The National Museum of Science and Industry.

Eames, D. (2003, June 28). Row erupting over lahar prevention. *Manawatu Standard*, p. 1.

Edelstein, A. S., Ito, Y., & Kepplinger, H. M. (1989). *Communication and culture: A comparative approach*. New York: Longman.

Ehling, W., & Hesse, M. (1983). Use of 'issue management' in public relations. *Public Relations Review, 9*(2), 18-35.

Eley, P., & Lee, A. (1996). *An introduction to newspaper editing and design*. Wellington: New Zealand Journalists Training Organisation.

English, P. (1997, June 16). Crater threat: Safety will dictate action. *NZ Herald*, p. A3.

Entman, R. M. (1993a). Framing: Towards clarification of a fractured paradigm. *Journal of Communication, 43*(4), 51-58.

Entman, R. M. (1993b). Framing: Towards clarification of a fractured paradigm. *Journal of Communication*, 51-58.

Ewing, R. P. (1979). The uses of futurist techniques in issues management. *Public Relations Quarterly*, *24*(4), 15-19.

Ewing, R. P. (1997). Issues management: Managing trends through the issues life cycle. In C. L. Caywood (Ed.), *The handbook of strategic public relations and integrated communications* (pp. 173-188). New York: McGraw-Hill.

Experts are saying it's a matter of 'when' not 'if' with the lahar. (2003, October 15). *Ruapehu Press,* p. 5.

Field, M. (2007, February 22). TV firms compete for lahar footage. *Dominion Post,* p. A5.

First lahar level. (2004, March 1). *Waikato TImes,* p. 2.

Fox, J. (1983). Communicating on public issues: The CEO's changing role. *Public Relations Journal, 9*(1), 11-23.

Funding approved for Tangiwai bridge. (2004, May 19). *Ruapehu Press,* p. 1.

Galley, I., Leonard, G., Johnston, D., Balm, R., & Paton, D. (2004). The Ruapehu lahar emergency response plan development process: An analysis. *Australasian Journal of Disaster and Trauma Studies, 1,* http://www.massey.ac.nz/~trauma/issues/2004-2001/galley.htm.

Galley, I., Paton, D., Johnston, D. M., & Becker, J. (2003). *Lahar response management at Whakapapa Ski Field, Ruapehu: Staff development and public safety*. Lower Hutt: Institute of Geological & Nuclear Sciences Limited.

Galloway, C., & Kwansah-Aidoo, K. (2005a). Getting to grips with issues management and crisis communication. In C. Galloway & K. Kwansah-Aidoo (Eds.), *Public relations issues and crisis management* (pp. 1-12). Southbank, Victoria: Thomson/Social Science Press.

Galloway, C., & Kwansah-Aidoo, K. (Eds.). (2005b). *Public relations issues and crisis management*. Southbank, Victoria: Thomson/Social Science Press.

Galtung, J., & Ruge, M. (1973). Structuring and selecting news. In C. Stanley & J. Young (Eds.), *The manufacture of news* (pp. 62-71). London: Constable.

Gans, H. J. (1979). *Deciding what's news: A study of CBS Evening News, NBC Nightly News, Newsweek and Time*. New York: Pantheon Books.

Gaunt, P., & Ollenburger, J. (1995). Issues management revisited: A tool that deserves another look. *Public Relations Review, 21*(3), 199-210.

Gerde, V. W., & White, C. G. (2001). The taxation of married couples: An issue life cycle approach. *Business & Society, 40*(1), 31-58.

Govt lahar reply angers council. (2004, June 10). *Waikato Times,* p. 13.

Greening, D. W., & Gray, B. (1994). Testing a model of organizational response to social and political issues. *Academy of Management Review, 37*(3), 487-498.

Gunter, B. (2002). The quantitative research process. In K. B. Jensen (Ed.), *A handbook of media and communication research: Qualitative and quantitative methodologies* (pp. 209-234). London: Routledge.

Hainsworth, B. E. (1990a). The distribution of advantages and disadvantages. *Public Relations Review, 16*(1), 33-39.

Hainsworth, B. E. (1990b). Issues management: An overview. *Public Relations Review, 16*(1), 3-5.

Hainsworth, B. E., & Meng, M. (1988). How corporations define issue management. *Public Relations Review, 14*(4), 18-30.

Hall, S., Critcher, C., Jefferson, T., Clarke, J., & Robert, B. (1978). *Policing the crisis: Mugging, the state, and law and order*. London: Macmillan.

Hancox, G. T., Nairn, I. A., Otway, P. M., Webby, G., Perrin, N. D., & Keys, J. R. (1997). *Stability assessment of Mt Ruapehu crater rim following the 1995-1996 eruptions*. Lower Hutt: Institute of Geological and Nuclear Sciences Limited.

Harrower, T. (2002). *The newspaper designer's handbook* (5th ed.). New York: McGraw-Hill Higher Education.

Heath, R. L. (1990). Corporate issues management: Theoretical underpinnings and research foundations. In L. A. Grunig & J. E. Grunig (Eds.), *Public Relations Research Annual* (Vol. 2, pp. 29-66). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Heath, R. L. (1997). *Strategic issues management: Organizations and public policy challenges*. Thousand Oaks, California: SAGE Publications, Inc.

Heath, R. L. (1998). New communication technologies: An issues management point of view. *Public Relations Review, 24*(3), 273-288.

Heath, R. L. (2002a). Editorial. *Journal of Public Affairs, 2*(4), 206-208.

Heath, R. L. (2002b). Issues management: Its past, present and future. *Journal of Public Affairs, 2*(4), 209-214.

Heath, R. L. (2006). A rhetorical theory approach to issues management. In C. H. Botan & V. Hazleton (Eds.), *Public relations theory II* (pp. 63-99). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

Heath, R. L., & Bowen, S. A. (2002). The public relations philosophy of John W. Hill: Bricks in the foundation of issues management. *Journal of Public Affairs, 2*(4), 230-246.

Heath, R. L., & Cousino, K. (1990). Issues management: End of first decade progress report. *Public Relations Review, 16*(1), 6-18.

Heffield, J. (2004a, November 19). Crater lake at highest level in years. *Waikato Times,* p. 4.

Heffield, J. (2004b, December 6). Lahar-proof bridge soon for Tangiwai. *Waikato Times,* p. 5.

Heffield, J. (2005a, February 10). Crater lake's level rises but lahar risk stays low. *Waikato Times*, p. 5.

Heffield, J. (2005b, January 15). Lahar risk grows as melting snow raises crater lake level. *Waikato Times*, p. A3.

Heffield, J. (2005c, May 6). Police withdraw as lahar risk fades. *Waikato Times*, p. 4.

Henry, G. T., & Gordon, C. S. (2001). Tracking issue attention: Specifying the dynamics of the public agenda. *Public Opinion Quarterly, 65*, 157-177.

Heugens, P. P. M. A. R. (2002). Strategic issues management: Implications for corporate performance. *Business & Society, 41*(4), 456-468.

Heugens, P. P. M. A. R. (2006). Environmental issue management: Towards a multi-level theory of environmental management competence. *Business Strategy and the Environment, 15*, 363-376.

Hopkins, S. (2004, July 10). Govt doubles funds for lahar planning. *Waikato Times*, p. A4.

Houghton, B., Neall, V., & Johnston, D. (1996). *Eruption: Mount Ruapehu awakes*. Auckland: Penguin Books (NZ) Ltd.

Hutt, A., & James, B. (1989). *Newspaper design today: A manual for professionals*. London: Lund Humphries Publishers Ltd.

Ihlen, O. (2002). Rhetoric and resources: Notes for a new approach to public relations and issues management. *Journal of Public Affairs, 2*(4), 259-269.

Illia, L., Schmid, E., Fischbach, I., Hangartner, R., & Rivola, R. (2004). An issues management perspective on corporate identity: The case of a regulatory agency. *Corporate Reputation Review, 7*(1), 10-21.

Jaques, T. (2000). *Don't just stand there: The do-it plan for effective issue management*. Southbank, Victoria: Issue Outcomes.

Jaques, T. (2002). Towards a new terminology: Optimising the value of issue management. *Journal of Communication Management, 7*(2), 140-147.

Jaques, T. (2004a). Issue definition: The neglected foundation of effective issue management. *Journal of Public Affairs, 4*(2), 191-200.

Jaques, T. (2004b). New language needed to help move issue management onto the offensive. *Asia Pacific Public Relations Review, 5*(1), 43-53.

Jaques, T. (2005). Using best practice indicators to benchmark issue management. *Public Relations Quarterly, Summer*, 8-11.

Jaques, T. (2006). Issue management: Process versus progress. *Journal of Public Affairs, 6*(1), 69-74.

Jaques, T. (2007). Issue management and crisis management: An integrated, non-linear, relational construct. *Public Relations Review, 33*(2), 147-157.

Jensen, K. B. (2002). The complementarity of qualitative and quantitative methodologies in media and communication research. In K. B. Jensen (Ed.), *A handbook of media and communication research: Qualitative and quantitative methodologies* (pp. 254-272). London: Routledge.

Johnson, J. C., & Weller, S. C. (2002). Elicitation techniques for interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 491-514). Thousand Oaks, California: Sage Publications, Inc.

Johnson, J. M. (2002). In-depth interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 103-120). Thousand Oaks, California: Sage Publications, Inc.

Jones, B. L., & Chase, W. H. (1979). Managing public policy issues. *Public Relations Review, 5*(2), 3-23.

Kaid, L. L., & Wadsworth, A. J. (1989). Content analysis. In P. Emmert & L. L. Barker (Eds.), *Measurement of communication behaviour* (pp. 197-217). New York: Longman.

Kavanagh, D. (2002, October 25). Report backs lahar warning. *Manawatu Standard*, p. 3.

Keys, H. (1999). *Environmental and risk assessment for mitigation of the hazard from Ruapehu crater lake: Assessment of environmental effects*. Turangi: Department of Conservation.

Keys, H. (2007). Lahars of Ruapehu volcano, New Zealand: Risk mitigation. *Annals of Glaciology, 45*, 155-162.

Keys, H., & Green, P. (2002). The crater lake issue - a management dilemma. *New Zealand Alpine Journal*, 118-120.

Keys, H., & Green, P. (2004). The crater lake issue - a management dilemma: Mt Ruapehu crater lake lahar threat response [Electronic Version]. Retrieved October 21, 2007 from http://www.doc.govt.nz/templates/MultipageDocumentPage.aspx?id=41782.

Kiong, E. (2007, March 19). Scientists plan trip to Crater Lake for close look. *NZ Herald*, p. A3.

Kiousis, S. (2004). Explicating media salience: A factor analysis of New York Times issue coverage during the 2000 U.S. Presidential Election. *Journal of Communication*, 71-87.

Kitchin, P. (2003, April 29). Lahar less likely to pour into Tongariro. *Dominion Post*, p. A10.

Kitto, J. A. (1999). The evolution of public issues management. *Public Relations Quarterly, 43*(4), 34-38.

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (2nd ed.). Thousand Oaks, California: Sage Publications, Inc.

Kvale, S. (2007). *Doing interviews*. London: SAGE Publications Ltd.

Lahar alert. (2006, January 5). *Manawatu Standard*, p. 3.

Lahar alert rises. (2006, December 1). *Manawatu Standard*, p. 3.

Lahar from afar. (2007, March 31). *Dominion Post*, p. A18.

Lahar gains support. (2003, September 10). *Ruapehu Press*, p. 2.

Lahar meeting rescheduled. (2003, November 5). *Ruapehu Press*, p. 6.

Lahar pamphlet. (2005, March 1). *Dominion Post*, p. 5.

Lahar risk reduced. (2002, November 26). *Waikato Times*, p. 3.

Lahar warning. (2003, October 30). *Dominion Post*, p. 7.

Lahar warning system not suitable for DOC. (2001, April 25). *NZ Herald*, p. A15.

Lahar warning tested. (2004, September 30). *NZ Herald*, p. A8.

Lahar warning working. (2004, September 30). *Waikato Times*, p. 2.

Lamertz, K., Martens, M. L., & Heugens, P. P. M. A. R. (2003). Issue evolution: A symbolic interactionist perspective. *Corporate Reputation Review, 6*(1), 82-93.

Latz, A. (2005, October 5). Response to lahar gets put to test. *Waikato Times*, p. 3.

Lauzen, M. M., & Dozier, D. M. (1994). Issues management mediation of linkages between environmental complexity and management of the public relations function. *Journal of Public Relations Research, 6*(3), 163-184.

Lawrence, R. G. (2000). *The politics of force: Media and the construction of police brutality*. Los Angeles: University of California Press.

Lecointre, J. A., Hodgson, K. A., Neall, V. E., & Cronin, S. (2004). Lahar-triggering mechanisms and hazard at Ruapehu volcano, New Zealand. *Natural Hazards, 31*, 85-109.

Lee happy with plans to lower lahar risks. (2001, December 20). *The Dominion*, p. 6.

Leonard, G. S., Johnston, D. M., & Paton, D. (2004). *Mitigating the lahar risk at Whakapapa Ski Area, Mt Ruapehu: Public perceptions and the effectiveness of the new warning system*. Lower Hutt: Institute of Geological & Nuclear Sciences Limited.

Logsdon, J. M., & Palmer, D. R. (1988). Issues management and ethics. *Journal of Business Ethics, 7*(3), 191-198.

Mahon, J. F., & Waddock, S. A. (1992). Strategic issues management: An integration of issue life cycle perspectives. *Business & Society, 31*(1), 19-32.

Manson, B. (2003, December 22). Clock turns back 50 years to Tangiwai crash. *Dominion Post,* p. A3.

McGregor, J. (2002). Terrorism, war, lions and sex symbols: Restating news values. In J. McGregor & M. Comrie (Eds.), *What's news: Reclaiming journalism in New Zealand* (pp. 111-125). Palmerston North: Dunmore Press.

McQuail, D. (2005). *McQuail's mass communication theory* (5th ed.). London: SAGE Publications.

Meng, M. (1992). Issue life cycle has five stages. *Public Relations Journal, 48*(3), 23.

Mercer, B. (2007, March 20). Lahar leaves mud flows in its wake. *Waikato Times,* p. 10.

Miller, K. (1999). Issues management: The link between organization reality and public perception. *Public Relations Quarterly, Summer,* 5-11.

Ministry for Culture and Heritage. (2008). New Zealand disasters timeline. Retrieved May 2, 2008, from http://www.nzhistory.net.nz/culture/new-zealand-disasters/timeline

Minnis, D. L. (2001). Issue management: Part and parcel of wildlife management. *Wildlife Society Bulletin, 29*(3), 988-994.

Moore, R. (1979). Planning for emerging issues. *Public Relations Journal, November,* 42-46.

Morgan, J. (2001, April 12). Huge lahar building on Mt Ruapehu. *The Dominion,* p. 3.

Myers, J. (2003, November 4). Time running out for quick fix. *Manawatu Standard,* p. 3.

Nash, T., & NZPA. (2004, March 1). Two wet weeks later... *Manawatu Standard,* p. 1.

Nasi, J., Nasi, S., Phillips, N., & Zyglidopoulos, S. (1997). The evolution of corporate social responsiveness: An exploratory study of Finnish and Canadian forestry companies. *Business & Society, 36*(3), 296-321.

Neall, V. E., Houghton, B. F., Cronin, S. J., Donoghue, S. L., Hodgson, K. A., Johnston, D. M., Lecointre, J. A., & Mitchell, A. R. (2001). *Volcanic hazards at Ruapehu volcano*. Wellington: Ministry of Civil Defense.

Nelson, R. A. (1990). Bias versus fairness: The social utility of issues management. *Public Relations Review, 16*(1), 25-32.

New lahar txts. (2007, January 31). *Ruapehu Press,* p. 2.

New Zealand Government. (2000, May 8). Managing hazards from future Ruapehu lahars [Press Release]. *Scoop.co.nz*.

New Zealand Government. (2001a, November 1). Coordinated management of Ruapehu lahar issue [Press Release]. *Scoop.co.nz*.

New Zealand Government. (2001b, December 18). Lee satisfied with Ruapehu lahar risk response [Press Release]. *Scoop.co.nz*.

New Zealand Government. (2001c, June 8). Smith "recklessly alarmist" says Lee [Press Release]. *Scoop.co.nz*.

New Zealand Government. (2002, November 26). CD and DOC action reduces Ruapehu lahar risk [Press Release]. *Scoop.co.nz*.

New Zealand Government. (2007, March 18). Ruapehu lahar goes according to plan. *Scoop.co.nz*.

New Zealand National Party. (2001, June 7). Political correctness risks repeat of Tangiwai [Press Release]. *Scoop.co.nz*.

New Zealand National Party. (2004a, May 5). $4.5m price of PC on Ruapehu lahar [Press Release]. *Scoop.co.nz*.

New Zealand National Party. (2004b, March 10). PC-ness put ahead of safety with Ruapehu decision [Press Release]. *Scoop.co.nz*.

New Zealand National Party. (2005, March 9). Lahar police: More nonsense from Labour [Press Release]. *Scoop.co.nz*.

Newig, J. (2004). Public attention, political action: The example of environmental regulation. *Rationality and Society, 16*(2), 149-190.

Newig, J., & Hesselmann, J. (2004). Modelling the dynamics of public attention towards environmental issues. In C. Pahl-Wostl, S. Schmidt & T. Jakeman (Eds.), *iEMSs 2004 International Congress: Complexity and integrated resources management* (pp. http://www.iemss.org/iemss2004/pdf/abm/newimode.pdf). Osnabrueck, Germany: International Environmental Modelling and Software Society.

Nichols, L. (2007, March 19). Warning system hailed as success. *Dominion Post,* p. A2.

Norton, J. (2002). Evaluating the risks and coordinating planning. *Tephra*(19), 20-21.

NZPA. (1998, October 23). Ruapehu Maori oppose lahar plan. *Evening Post*, p. 11.

NZPA. (1999, August 6). Crater lake disaster options documented. *Waikato Times*, p. 14.

NZPA. (2001a, June 8). Delays to Ruapehu work labeled risk. *Waikato Times*, p. 2.

NZPA. (2001b, June 8). Lahar scare alarmist, says DOC. *Evening Post*, p. 2.

NZPA. (2001c, April 24). Lahar warning system available. *Manawatu Standard*, p. 2.

NZPA. (2001d, April 20). Lahar would hit trout fishery. *Evening Post*, p. 17.

NZPA. (2001e, August 31). Lee may review Mt Ruapehu lahar plan. *The Dominion*, p. 11.

NZPA. (2001f, November 2). Mt Ruapehu to be monitored by ministers. *The Dominion*, p. 2.

NZPA. (2001g, April 12). Ruapehu mudslide predictions stepped up. *Waikato Times*, p. 2.

NZPA. (2001h, November 2). Volcanic action watched. *Waikato Times*, p. 10.

NZPA. (2002a, November 26). Action cuts lahar risk. *Manawatu Standard*, p. 3.

NZPA. (2002b, September 12). Lahar risk next autumn - DOC. *Manawatu Standard*, p. 3.

NZPA. (2002c, December 19). Ruapehu plan rejected. *Waikato Times*, p. 2.

NZPA. (2003, November 5). Last chance to beat lahar. *NZ Herald*, p. A11.

NZPA. (2004, December 6). Ruapehu lahar expected in weeks. *NZ Herald*, p. A9.

O'Rourke, S. (2007a, March 23). Lahar larger but lacked the force of '53. *NZ Herald*, p. A7.

O'Rourke, S. (2007b, February 3). Scientists polish crisis response plan to counter mountain-top threat. *NZ Herald*, pp. A6-A7.

Oomens, M. J. H., & van den Bosch, F. A. J. (1999). Strategic issue management in major European-based companies. *Long Range Planning, 32*(1), 49-57.

Palese, M., & Crane, T. Y. (2002). Building an integrated issue management process as a source of sustainable competitive advantage. *Journal of Public Affairs, 2*(4), 284-292.

Patterson, C. (2003, December 22). Ruapehu plan 'playing with people's lives'. *Dominion Post,* p. A1.

Patterson, C. (2004, May 6). Tangiwai road bridge gets lahar protection. *Dominion Post,* p. 7.

Patterson, C., & NZPA. (2006, October 6). Lahar warning still a big mystery. *Dominion Post,* p. A4.

Patton, M. Q. (1987). *How to use qualitative methods in evaluation.* Newbury Park, California: Sage Publications.

Peart, J. (2005). Issues planning - a structural approach. In C. Galloway & K. Kwansah-Aidoo (Eds.), *Public relations issues and crisis management* (pp. 13-24). Southbank, Victoria: Thomson/Social Science Press.

Peters, B. G., & Hogwood, B. W. (1985). In search of the issue-attention cycle. *Journal of Politics, 47*(1), 238-235.

Pickering, S. (2003a, October 20). Axed meeting over lahar danger upsets. *Waikato Times,* p. 3.

Pickering, S. (2003b, December 13). Tangiwai escape. *Waikato Times,* pp. D3, D4.

Plowman, K. D., ReVelle, C., Meirovich, S., Pien, M., Stemple, R., Sheng, V., & Fay, K. (1995). Walgreens: A study in health care issues and conflict resolution. *Journal of Public Relations Research, 7*(4), 231-258.

Post, J. E., Murray, E. A., Jr., Dickie, R. B., & Mahon, J. F. (1982). The public affairs function in American corporations: Development and relations with corporate planning. *Long Range Planning, 15*(2), 12-21.

Pratt, C. B. (2001). Issues management: The paradox of the 40-year U.S. tobacco wars. In R. L. Heath (Ed.), *Handbook of Public Relations* (pp. 335-346). Thousand Oaks, California: Sage Publications, Inc.

Quirke, M. (2003, October 29). Trip to recall Tangiwai disaster. *Dominion Post,* p. A6.

Ramsey, S. A. (1993). Issues management and the use of technologies in public relations. *Public Relations Review, 19*(3), 261-275.

RDC turns down lahar plan. (2002, December 18). *Ruapehu Press,* p. 2.

Rendle, S. (2001, April 11). Lahar threat a time bomb. *Evening Post,* p. 1.

Renfro, W. L. (1987). Issues management : The evolving corporate role. *Futures, 19*(5), 545-554.

Reynolds, C. (1997). Issue management and the Australian gun debate. *Public Relations Review, 23*(4), 343-360.

Riffe, D., Lacy, S., & Fico, F. G. (2005). *Analyzing media messages: Using quantitative content analysis in research* (2nd ed.). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

Roper, J., & Toledano, M. (2005). Taking in the view from the edge: Issues management recontextualized. *Public Relations Review, 31*, 479-485.

Rowan, J., & Johnston, M. (2007, January 29). Lahar alert rises as crater lake swells. *NZ Herald*, p. A3.

Ruapehu crater lake level 'low to normal'. (2005, January 1). *Dominion Post,* p. A9.

Ruapehu decision risks lives - Smith. (2001, June 8). *Manawatu Standard,* p. 8.

Ruapehu District Council. (2006, October 27). Sixth "dam break" lahar response exercise success. *Scoop.co.nz*.

Ruapehu flood plan in iwi hands. (1997, June 16). *Waikato Times,* p. 1.

Ruapehu lahar. (2007, March 19). *NZ Herald,* p. A2.

Rubin, H. J., & Rubin, I. S. (2005). *Qualitative interviewing: The art of hearing data* (2nd ed.). Thousand Oaks, California: Sage Publications Inc.

Ruscoe, K. (2004a, April 12). $4 million to raise bridge. *Dominion Post,* p. A4.

Ruscoe, K. (2004b, March 17). Lahar could be eight months off. *Dominion Post,* p. A9.

Ruscoe, K. (2004c, March 30). Threat of big lahar recedes. *Dominion Post,* p. A3.

Saiia, D. H., & Cyphert, D. (2003). The public discourse of the corporate citizen. *Corporate Reputation Review, 6*(1), 47-57.

Samson, A. (1998, October 23). Destruction, deaths likely if crater collapses - report. *The Dominion,* p. 1.

Samson, A., & Guyan, C. (1997, June 17). Options for crater lake work bring warning. *The Dominion*, p. 7.

Sargent, E. (2003a, December 22). Emotion still raw at Tangiwai rites. *Manawatu Standard*, p. 1.

Sargent, E. (2003b, December 22). Mementos for a grieving family. *Manawatu Standard*, p. 1.

Saunders, A. (2005, March 9). Lahar police dish out tickets. *Dominion Post,* p. A1.

Saunders, J., & NZPA. (1997, June 16). No danger of sudden crater-lake collapse. *Manawatu Standard,* p. 1.

Schouten, H. (2007, February 14). Laser measures crater lake dam. *Dominion Post,* p. A3.

Scientist not convinced about mayor's comments on dam. (2003, October 29). *Ruapehu Press,* p. 1.

Sethi, S. P. (1979). A conceptual framework for environmental analysis of social issues and evaluation of business response patterns. *Academy of Management Review, 4*(1), 63-74.

Sevilla, C. (2002). Page design: Directing the reader's eye. *Intercom, 49*(6), 6-9.

Shapiro, G., & Markoff, J. (1997). A matter of definition. In C. W. Roberts (Ed.), *Text analysis for the social sciences* (pp. 9-31). Mahway, New Jersey: Lawrence Erlbaum Associates, Inc.

Shuy, R. W. (2002). In-person versus telephone interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 537-556). Thousand Oaks, California: Sage Publications, Inc.

Slower filling of crater lake. (2002, August 6). *Dominion Post,* p. A4.

Smithsonian Institution. (2008). Global Volcanism Program | Ruapehu | Eruptive History. Retrieved May 2, 2008, from http://www.volcano.si.edu/world/volcano.cfm?vnum=0401-10=&volpage=erupt

Soroka, S. N. (2002). Issue attributes and agenda-setting by media, the public, and policymakers in Canada. *International Journal of Public Opinion Research, 14*(3), 264-285.

Staff Reporters. (2007, March 19). 'The earth trembled'. *Dominion Post,* p. A1.

Stewart, G. (2003). *The Tangiwai disaster: A Christmas Eve tragedy*. Wellington: Grantham House.

Stout, D. A. (1990). Roots of issues management: Internal process of corporate advocacy. *Public Relations Review, 16*(1), 52-62.

Support for lahar stance. (2001, July 25). *Ruapehu Press,* p. 3.

Symes, F. (2003, November 1). Day of carnage. *Manawatu Standard,* pp. 21-22.

Taig, T. (2002). *Ruapehu lahar residual risk assessment*. UK: TTAC Limited.

Take the chance to experience the lahar for yourself. (2003, November 5). *Ruapehu Press,* p. 16.

Tankard, J. W., Jr. (2001). The empirical approach to the study of media framing. In S. D. Reese, J. Oscar H Gandy & A. E. Grant (Eds.), *Framing public life: Perspectives on media and our understanding of the social world* (pp. 95-106). Mahway, New Jersey: Lawrence Erlbaum Associates, Inc.

Taylor, M., Vasquez, G. M., & Doorley, J. (2003). Merck and AIDS activists: Engagement as a framework for extending issues management. *Public Relations Review, 29*(3), 257-270.

Thomsen, S. R. (1995). Using online databases in corporate issues management. *Public Relations Review, 21*(2), 103-122.

Tilley, E. (2005). Media relations. In F. Sligo & R. Bathurst (Eds.), *Communication in the New Zealand workplace* (pp. 145-160). Wellington: Software Technology New Zealand Ltd.

Transfund. (2004, May 5). Funding to lift Tangiwai Bridge approved. *Scoop.co.nz*.

Trumbo, C. (1996). Constructing climate change: Claims and frames in US news coverage of an environmental issue. *Public Understanding of Science, 5*(3), 269-283.

Tuchman, G. (1978). *Making news: A study in the construction of reality*. New York: The Free Press.

Tucker, K., & Broom, G. (1993). Managing issues acts as bridge to strategic planning. *Public Relations Journal, 49*(11), 38-40.

Tucker, K., & Trumpfheller, B. (1993). Building an issues management system. *Public Relations Journal, 49*(11), 36-37.

Tunnah, H. (2004, November 22). Police meet lahar threat. *NZ Herald,* p. A7.

Tymson, C., Lazar, P., & Lazar, R. (2002). *The new Australian and New Zealand public relations manual*. Chatswood, Australia: Millenium Books.

United States General Accounting Office. (1982). *Content analysis: A methodology for structuring and analyzing written material*. Washington, D.C.: United States General Accounting Office.

Venter, N. (2000, May 9). Mt Ruapehu to get lahar warning system. *The Dominion,* p. 2.

Waikato Times reporters, & NZPA. (2007a, March 19). After the lahar. *Waikato Times,* p. 1.

Waikato Times reporters, & NZPA. (2007b, March 19). Raging lahar a terrifying, awesome sight. *Waikato Times,* p. 1.

Wallis, A. (2001a, November 21). Lahar problem now with conservation minister. *Manawatu Standard,* p. 3.

Wallis, A. (2001b, August 22). Movement on lahar issue. *Manawatu Standard,* p. 5.

Wallis, A. (2001c, June 20). Mt Ruapehu lahar is a 'minefield'. *Manawatu Standard,* p. 1.

Wallis, A. (2001d, October 17). Ruapehu lahar work possible. *Manawatu Standard,* p. 1.

Warren, C. A. B. (2002). Qualitative interviewing. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 83-102). Thousand Oaks, California: Sage Publications, Inc.

Wartick, S. L., & Heugens, P. P. M. A. R. (2003). Guest editorial: Future directions for issues management. *Corporate Reputation Review, 6*(1), 7-18.

Wartick, S. L., & Mahon, J. F. (1994). Toward a substantive definition of the corporate issues construct. *Business & Society, 33*(3), 293-311.

Wartick, S. L., & Rude, R. E. (1986). Issues management: Corporate fad or corporate function? *California Management Review, 29*(1), 124-140.

Watkins, T. (2001, June 8). Dropped: Plan to control Ruapehu lahar. *The Dominion,* p. 1.

Watkins, T. (2004, March 10). Ruapehu risk: Govt rejects call to act. *Dominion Post,* p. A1.

Watson, M. (2004, December 4). Ruapehu lahar may be delayed by El Nino. *Dominion Post,* p. 7.

Watson, M. (2005a, January 14). Lahar 'unlikely till next summer'. *Dominion Post,* p. A5.

Watson, M. (2005b, May 5). Police on lahar duty stood down. *Dominion Post,* p. A5.

Watson, M. (2005c, March 5). Tangiwai bridge reopens. *Dominion Post,* p. A7.

Watson, M. (2006, October 26). Lahar warning system passes test. *Dominion Post,* p. 4.

Watson, M. (2007a, January 5). Crater lake seepage doubles in five days. *Dominion Post,* p. A2.

Watson, M. (2007b, January 24). Fears lahar scaring tourists. *Dominion Post,* p. A3.

Watson, M. (2007c, January 27). Free texts to warn of lahar risk. *Dominion Post,* p. A18.

Watson, M. (2007d, January 11). Lawyers offer advice on lahar. *Dominion Post,* p. A2.

Watson, M. (2007e, January 19). Public 'safe from lahar'. *Dominion Post,* p. A7.

Watson, M., & Torbit, M. (2007, March 20). Lahar unlikely for years. *Dominion Post,* p. A2.

Watson, M., & Williams, B. (2006, February 18). Lahar path tracked by laser. *Dominion Post,* p. A5.

Watt, E. (2007, January 2). Dam on the brink of bursting. *Dominion Post,* p. A1.

Weaver, C. K., & Motion, J. (2002). Sabotage and subterfuge: Public relations, democracy and genetic engineering in New Zealand. *Media, Culture & Society, 24*(3), 325-343.

Weber, R. P. (1985). *Basic content analysis*. Beverly Hills, California: SAGE Publications, Inc.

What does the future hold for the lahar? (2003, October 15). *Ruapehu Press*, p. 1.

Williams, K. (1996). *Ruapehu erupts*. Auckland: Godwit Publishing Ltd.

Wilson, L. J. (1990). Corporate issues management: An international view. *Public Relations Review, 16*(1), 40-51.

Wilson, M. (2007a, March 22). Mud, not so glorious mud. *Manawatu Standard,* p. 2.

Wilson, N. (2007b, March 19). Drama, but little danger. *Manawatu Standard,* p. 1.

Work begins on lahar warning system. (2001, May 26). *The Dominion,* p. 8.

Workers trip lahar alarm. (2005, October 25). *Dominion Post,* p. A5.

Young, A. (2003, December 22). Govt risking lives, MPs claim. *NZ Herald,* p. A6.