

## **Appendix 1: The Case Studies**

### **The Longford Gas Plant Accident**

On Friday, September 25<sup>th</sup>, 1998, at about 12.26pm, a vessel ruptured at one of three gas plants operated by Esso at Longford, 20 kilometers from Sale, to process product flowing from wells in Bass Strait. The rupture led to the release of vapours and liquid. Several major explosions and fires followed. Two Esso employees, Peter Bubeck Wilson and John Francis Lowery, were killed. Eight others at the site were injured. Fires and leaks continued at the plant until the last fires were extinguished at 5.30pm on Sunday, September 27<sup>th</sup> (Royal Commission 1999; EMA 2004).

As a result of the fires and explosions, all three gas plants were shut down. This led to an immediate cessation of processing of natural gas, liquid petroleum gas and crude oil. Supplies to all domestic, commercial and industrial consumers in metropolitan Melbourne and in several country areas were rapidly curtailed. Within 36 hours, all Victorian gas consumers had been instructed to turn off gas supply lines to homes and commercial premises. Gas company and emergency service personnel were mobilized to ensure the shut down was implemented.

With the Longford facility supplying 98 per cent of the state's gas needs, most Victorian gas consumers were left without gas for 19 days. A restart of the gas supply was commenced on Friday, October 2nd using the two undamaged processing plants, with the first gas sales to industry commencing two days later. (Royal Commission 1999) Restrictions on the use of gas for domestic heating were finally lifted on Tuesday October 13th and by 14<sup>th</sup> October the interruption to gas supplies was effectively over. The damaged gas plant was brought back on line in mid-1999.

The Longford accident demonstrated the vulnerability of the state's power infrastructure to accident, let alone intentional disruption through causes such as terrorist attack. It also opened a political debate as to whether privatization of formerly state-run utilities had been the root cause of the failure of supply (Hopkins 2001).

A royal commission of inquiry, headed by retired High Court judge Sir Daryl Dawson, was charged with investigating the causes of the accident and the failure of the gas supply, but not the social or economic consequences of the event. The commission pointed to a lack of operator and supervisor knowledge of how to deal with the shutdowns that precipitated the failure of the plant as a key cause of the accident. This was due to inadequate training on the part of Esso. It found insufficient evidence of a reduction in maintenance or reduced supervision on the part of Esso to form a causal link (Royal Commission 1999; Nichol 2001).

The Royal Commission noted: "It is unfortunate after a successful restart of the Longford facilities, the full restoration of gas supplies to consumers, especially domestic consumers, took another five days" (Royal Commission 1999:159). However, correspondence between Esso and the supply companies noted that the producer was unable to guarantee that there would not be production problems once the processors were restarted.

#### **Impacts**

The Longford gas plant accident and subsequent loss of supply is considered to have been one of Victoria's worst disasters, especially in terms of economic impact. In the short-term, there were multiple consequences

with potentially serious public health implications. The event was largely unanticipated and unplanned for as a wide area emergency.

Gas is the primary energy source for 80 per cent of Victorian households, 50 per cent of commercial enterprises and 25 per cent of industry (Hopkins 2001). It is estimated that 1.4 million households and 89,000 businesses were affected. In addition to directly affecting the daily lives of some 4 million Victorians for almost three weeks, the estimated cost of the accident to the Victorian economy was put at \$1.3 billion (Royal Commission 1999, International Petroleum Encyclopedia 1999)

The gas shutdown coincided with the AFL Grand Final and extended over a period of cool to mild weather. It also coincided with the final week of the 1998 federal election campaign. These concurrences ironically helped to cast the event as more of an inconvenience to many people than an economic or social crisis.

Sectors particularly affected included the car industry, plastics production, food and drink manufacturers and the hospitality sector. Tens of thousands of workers were temporarily stood down (Campbell 1999). Within days, several manufacturing industries were forced to shut down. The brewing and chemical manufacturing industries were affected, along with vehicle makers (there were 7000 layoffs in the vehicle industry alone) and building supplies manufacturers.

The Commonwealth Budget papers reveal that the federal government lost some \$300 million in resource taxes. (Yates 2003) The disaster spawned the largest class action in Australian legal history, with 10,000 litigants signed on. The Victorian Supreme Court later dismissed the action for purely economic loss, although in November 2004 it did allow for a \$32 million compensation package for businesses that suffered material damage. Meanwhile BHP Billiton, a joint venture partner, commenced a damages action against Esso in December 2004 for damages arising from the accident.

Immediate impacts included temporarily curtailed production of some basic consumables including bread, milk and other dairy products. Supply lines of basic consumables were quickly established from interstate sources to overcome local shortfalls.

There were temporary suspensions of cremations and also of elective surgery at some hospitals. Many tourist facilities such as hotels were unable to provide hot water for patrons. Shortages of bottled LP gas occurred within days, with rationing on an odds-and-evens systems being implemented. Retail supplies of small domestic electrical cooking appliances were quickly exhausted (Age 28.9.1998).

Heavy fines were introduced for domestic and industrial users caught flouting the gas shutdown, with penalties of up to \$10,000 for individuals and \$1 million for companies. There were subsequently nine prosecutions by the Office of Gas Safety (OGS) for such infringements. (OGS 2004)

### **Public health implications**

In general, impacts upon emergency medical care were minimal. Hospitals were exempt from the gas shutdown from the outset. Aged-care facilities, supported residential services and disability accommodation services were also exempted within a few days of the accident. Special provision was also made to support sufferers of incontinence.

Among the measures implemented immediately by the Department of Human Services (DHS) was the state's Medical Displan, partly aimed at ensuring continued resourcing of emergency medical services. The Australian

Military Forces were mobilized to provide assistance with specialist medical equipment. The department also activated its Disaster Support and Recovery Plan. When the extent to which the gas shutdown would affect domestic and industry consumers became clear, the DHS Public Health Emergency Plan was also activated.

More broadly, the crisis posed dangers to the community from:

- explosions and burns through inappropriate connection LP gas to natural gas equipment
- increased risk of burns from the use of unfamiliar cooking equipment
- increased risk of fire from improper use of portable cooking equipment
- children at greater risk of being scalded or burned due to use of electric kettles for baths
- inadequate or inappropriate cooking methods rendering food unfit for consumption
- maintaining a healthy diet without normal cooking facilities
- personal hygiene issues related to lack of hot water for washing
- lack of hot water for washing dishes
- lack of clothes washing facilities (especially baby nappies)
- stress related to the gas emergency

At least one serious incident, involving minor injuries, was recorded when an explosion destroyed the front of a suburban restaurant. This accident was attributed to a leaking gas cylinder.

### **Communications**

The extent of the emergency demanded a multi-agency, whole of government response. In practical terms, the immediate impacts of the explosion and fires were dealt with by the Country Fire Authority. Broader community impacts became the responsibility of the VENCORP (Victoria's gas transmission agency), the Department of Human Services and the OGS. The State Emergency Service, the CFA, the Metropolitan Fire Brigade and WorkCover also played a lesser role in issuing safety warnings and in the physical shutdown of the gas supply to consumers.

The key vehicles for the transmission of risk messages were:

- media (including television radio, print)
- telephone hotlines
- advertising
- Internet (web sites)
- press releases
- information sheets, brochures
- fax stream
- mailouts

Communications flowing from this event tended to be generic in nature, using broad distribution modes such as the media and advertising. Initial communications in relation to the safe shutting down of gas meters, improper use of LP gas equipment and issues such as fire safety were undertaken by VENCORP, the OGS and the fire

brigades. This advice was distributed via the news media and through specific advertisements. In addition, an LPG Safety hotline was established by the fire services to deal with industry queries about the use of liquid petroleum gas. Service personnel involved in the shutdown were able to deliver informal warnings about the dangers of attempting to reconnect to the gas system once individual premises had been shut off. (Age 28.9.1998, 29.9.1998, 3.10.1998)

DHS established a 24-hour emergency operations centre to manage its own response and provide advice to government. A public information centre was also established to provide public health advice. The DHS established a 1800 (free call) "Home Health Support" telephone hotline within 36 hours to deal with public enquiries. The call centre was staffed by health professionals and administrative staff and provided advice on health and related matters, referrals to support agencies and approvals for exemptions from gas restrictions. VENCorp set up a recorded information line, along with separate hotlines, including multi-lingual and hearing impaired services, to deal with gas-related enquiries.

The Public Health and Development Division of DHS along, with the gas companies, was active in disseminating information through the electronic and print media. DHS also produced 23 fact sheets for distribution to the public dealing with a range of health-related issues, such as safe use of water heating appliances and food preparation. The Longford event also represented an early use of Internet technology for the dissemination of public health warnings.

Some of the DHS response was channeled through local government in accordance with emergency management procedures. Several local councils also undertook activities such as providing food vouchers, electric barbecues, showering facilities and visiting isolated elderly residents to ensure to their welfare.

## **Outcomes and discussion**

### **General**

The Longford gas accident and its aftermath are considered to have significantly affected planning for future broad-scale emergencies in Victoria, as well as providing salutary lessons for other jurisdictions. In particular, the need for greater inter-agency co-ordination and a whole-of-government approach were highlighted by the accident and the flow-on crisis.

One of the outcomes was an attempt by the Victorian Government in 2001 to amend the law to introduce tougher penalties for workplace deaths by introducing an offence of "corporate manslaughter" into the Victorian criminal code. Legislation to this end was blocked in the Legislative Council. A subsequent review of the Occupational Health and Safety Act 1985 did not address the issue of the crime of industrial manslaughter and it would appear that the Bracks Government has abandoned its introduction, despite now having control of both houses of parliament (Haines 2004).

In emergency management terms, Longford highlighted the need for closer co-ordination of response and particularly recovery issues including communication to the community. Information flow to the community, especially during the first 24-hours was largely uncoordinated and left to the media.

### **Communications**

The Longford emergency led to a major DHS review of emergency management procedures. A key outcome of this process was the formulation of the DHS State Level plan for the management of emergencies and other critical events. As part of those arrangements, an Information and Communication Strategic Plan was developed.

Key elements of the communications plan include recognition of a central distribution point for information dissemination and a greater recognition of the cultural and linguistic diversity of the Victorian community (DHS 1999b). Risk communications developed during the gas crisis were adapted for future emergencies. The plan also provides for the establishment of community and industrial call centres.

The Information and Communication Strategic Plan notes that “the best possible information and communication system ... is one that quickly alerts the key stakeholders and those in imminent danger prior to an event actually occurring”, while noting that this will in most cases not be possible.

Despite the extent of the risk communications involved in the aftermath of the Longford explosions, there has been remarkably little analysis of this aspect of the event. The focus of the Royal Commission and of most emergency service analyses of the event were on issues such as response, engineering and management failures. In the case of the Royal Commission, the terms of reference were so narrowly framed as to limit investigation of wider issues beyond the accident itself and the immediate failure of gas supply.

There has been, however, scope to test the procedures in the preparations for Y2K contingencies at the end of 1999 and also subsequent disaster events

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## **The 2002-03 Victorian bushfires**

Bushfires are arguably the dominant natural disaster event in south-eastern Australia. In Victoria alone, on average just over 100,000 hectares are burnt each year (Wareing and Flinn 2003). In dollar terms over the past 40 years major Australian bushfires have cost \$2.5 billion, or just 10 per cent of the cost of all major natural disasters. But over the same period bushfires have claimed some 250 lives — the greatest loss of life associated with any category of natural disaster in Australia (COAG 2004). Around three-quarters of all of Australia's recorded bushfire deaths since European settlement have occurred in Victoria.

The summer of 2002-03 was marked by the most extensive bushfires in Victoria since 1939, involving more than 1.3 million hectares of public and private land. The fires followed six consecutive years of drought affecting much of the state.

In December 2002, fires burnt through 181,400 hectares of public and private land in and around the Big Desert Wilderness Park in north-west Victoria. On January 7 and 8, 2003, lightning strikes associated with dry storm activity sparked more than 80 fires across forested and alpine areas of north-east Victoria and Gippsland. Some of these fires eventually joined to form complexes that burnt approximately 1.1 million hectares, including 108,000 hectares of private land. In total, some 1.3 million hectares of public and private land were affected in Victoria between December 2002 and March 2003.

Over 3000 fires burned between December and March. Some 35 agencies were involved in fighting the fires and in support roles, as well as firefighters from interstate and overseas. The total number of personnel directly engaged in the north-east and Gippsland fires was 15,725 (Wareing & Flinn 2003, Esplin 2003).

The most significant public health risk in a bushfire is that of being killed or seriously injured directly as a result of the fire. In recent years, mortality among fire fighters has been more of an issue than among civilians, although the recent fires (January 2005) on South Australia's Eyre Peninsula have again highlighted the vulnerability of ordinary community members.

In Victoria, risk communication associated with bushfires is primarily the responsibility of the emergency services, in particular the Country Fire Authority, the Melbourne Fire and Emergency Services Board and the Department of Sustainability and Environment. The extent to which those risks are understood and to which communities and individuals will appropriately respond has been the subject of fairly extensive research (Rohrmann 1995, Rohrmann 1999, Carey 2003).

Issues relating to bushfire risk communication were recently raised by the Victorian Auditor-General, who undertook research ahead of the 2002-03 outbreaks into fire prevention and preparedness across the state. This included a survey of 800 Victorian households in fire-prone areas (the Dandenong Ranges and Gippsland). The survey found that 79 per cent of respondents believed the prospect of a fire in their area was at least likely within the next five years. Some 51 per cent acknowledged the likelihood of damage to their own property. The difficulty of conveying risk information that was specific to a given area rather than generic to the whole of the state was discussed (Auditor-General 2003).

The Auditor-General's report also pointed to the difficulty of information flow during a bushfire event. While the focus of the research into community information flows related to information of an impending threat of fire, it also points to broader the problems of circulating information through channels such radio and television.

Moreover, while the community education programs implemented in Victoria were found to be effective, their implementation was regarded as inconsistent (Auditor-General 2003).

### **Impacts**

No lives were lost as a direct result of the fires, although one firefighter was killed in a flash flood towards the end of the event while in the course of a vehicle retrieval. Serious injuries were also minimal.

Given the extent of the fires, property damage was considered well below what might have been expected from a disaster on this scale. In total, 41 houses and 213 other structures were destroyed, along with more than 3000 kilometres of fencing and 9100 head of stock. This compares with a Victorian death toll of 47 and more than 2000 homes during the 1983 Ash Wednesday fires of 1983 (Miller 1983). The differences were defined largely by geography, patterns of human settlement and the timeframes which defined each event. Nevertheless, in relation to the 2002-03 fires, the Esplin Inquiry concluded: "The levels of loss were relatively low given the length of the fire campaign and its severity." (Esplin 2003:41)

It is worth noting that the 2002-03 summer saw over 4 million hectares of land affected by bushfire in eastern Australia. Fires in NSW and the ACT destroyed almost 600 homes and claimed 7 lives. Much of this was as the result of single fire event in Canberra. In Western Australia, one firefighter was killed, while six houses were destroyed in Tasmania (Nairn 2003).

Wareing & Flinn (2003) pointed to the range of impacts of the 2003 alpine fires beyond physical fire damage, such as the effects upon regional tourism, town water supplies, timber resources, biodiversity and landscape values. The impact on the quality of town water supplies was also identified by the Interim Report of the Ministerial Taskforce on Bushfire Recovery (2003).

The long-term implications for some communities — especially those in more remote alpine areas and those dependent upon tourism will take longer to discern.

### **Public health implications**

The broad health impacts of bushfires are reasonably well understood and include both physical and psychological impacts (Sim 2002).

In general terms, the events of 2002-03 posed dangers to the community from:

- fatalities and injuries, particularly burns, caused directly by the fires
- respiratory illnesses
- water contamination
- longer-term mental health issues

In particular, the impact of adverse air quality due to bushfire smoke has come under increasing scrutiny both in Australia and overseas (Johnston 2002, Corbett 2002, Glover 1999, Mott 2002). Other impacts such as contamination of water supplies and longer term impacts from loss of biodiversity have also been noted (Coghlan 2004).

Bushfire smoke can affect human health through the increase in the quantity of particles, carbon monoxide, air toxics and volatile organic carbons to air sheds (COAG 2004:117). In terms of reported health impacts, attendance by patients for minor ailments at general practices in fire-affected areas "all but ceased" according to

one account. Presentations with respiratory or asthma conditions did not increase. Such presentations as did occur were for trauma and more acute conditions. Most GPs reported a massive downturn in practice attendances over a two-month period from early January (Robinson 2003). This is in line with previous studies of smoke-related illnesses in fire affected areas (Lewis & Corbett 2002).

The Department of Human Services reported to the Esplin inquiry that there was “no conclusive trend in relation to possible direct health impacts of the fires” in relation to smoke inhalation or other illnesses. DHS reported that state-wide hospital admissions during the fire-affected period were down by five per cent on the previous year. There were also slightly fewer respiratory disease admissions than for the comparable period (Esplin 2003:43).

The longer-term implications of significant smoke exposure and degraded water quality, together with the emotional and psychological trauma, have yet to be assessed (Robinson 2003). The preliminary results of a post-fire survey of residents conducted by the Centre for Public Health of the Greater Murray Area Health Service found some 72 per cent of (328) respondents experienced “some health problem associated with the smoke”. These were largely minor symptoms such as throat or eye irritation (GMAHS 2003).

### **Communications**

The DSE and the CFA assumed broad responsibility for keeping local communities informed of both the progress of fires in the affected areas and other associated issues. The Esplin inquiry found that, in general, the efforts of the agencies had established a new standard of community communication. Risks associated with the fires were communicated through a suite of means, including:

- community meetings
- telephone trees
- public radio (ABC, community radio)
- other media
- community information units
- Internet
- press releases
- information sheets, brochures

Given the long lead times involved in the spread of the Alpine fires in particular, the use of community meetings to disseminate detailed information about the fires and their attendant risks proved particularly effective. Other agencies were able to “piggy back” onto these meetings as a means of disseminating information in various forms. In many circumstances, this will not be possible due to the speed with which bushfire events unfold, even on a broad scale. The 1983 Ash Wednesday fires are a good example of such an event (Miller 1984).

The Esplin Inquiry commended the setting up on “Community Information Units” within the Incident Management Teams (IMTs) as “an effective way to provide accurate and timely information to communities that could be affected by the passage of the fires”. In 2003, senior IMT members spoke directly to the public at community meetings, rather than via spokesmen/women. This has become a routine part of CFA practice over the past decade. Where possible, CFA will use an incident controller or operations officer or other senior operational officer to speak to the media or the community rather than someone from public affairs about ongoing fire

situations. This adds to the credibility of the information delivered and helps eliminate possible misinformation. It does, however, place time pressures on the IMT members. It also found that the use of the Internet as a means of disseminating detailed time-sensitive information was a significant advance that should be developed. The report also noted “a small number” of critical comments in relation to information flow, especially in relation to fire location and efforts to contain it (Esplin: 212). Wareing & Flinn (2003) acknowledged that much of this adverse commentary related to DSE, Department of Primary Industry and Parks Victoria personnel, especially in the post-impact period.

Communications tended to be direct, either verbal or using a combination of verbal and generic printed material. Some specific information in relation to health risks associated with bushfires was generated by DHS. This built on responses to previous recent bushfire events, such as those in the Dandenong Ranges in 1997 (DHS 1997). Information sheets relating to bushfire smoke, water tanks and contamination and post-fire hazards on properties were disseminated at the time of the fires and have since been incorporated into the Department of Health website (Health 2003).

Wareing & Flinn (2003) noted that “the range and nature of community links established during the fires, including the use of the Internet, was unprecedented in Australia”. They also noted that community engagement on the part of the fire agencies was highly effective during the fires, but less so afterwards. These means of communication were especially relevant to the spread of information about the fire, but not always to related issues such as public health.

Robinson (2003) notes that general practitioners in fire affected areas were in close communication with combating authorities such as the CFA, ambulance and SES. Local GP knowledge was also important in determining which residents needed to be moved to shire-run evacuation centres.

The Esplin inquiry concluded that community expectations in Victoria have changed considerably in terms of the service delivery they expect from government and also the level of information they demand during an emergency. This was seen as a flow-on from the Longford gas crisis and also the September 11, 2001 terrorist attacks in the United States, which had both highlighted the importance and value of providing accurate and timely information to affected or threatened communities. While the inquiry had some deficiencies, such as the need to consider those with special needs including hearing impairment or non-English speaking background, in general the state of communication between the authorities and the public was considered sound (Esplin 2003: 213-215). This is in marked contrast to the situation in some other jurisdictions, as the inquiry into the 2003 Canberra bushfires indicated (McLeod 2003).

The Centre for Public Health in Albury reported that 76 per cent of people interviewed in a local post-fire survey reported having heard health messages and of these, 55 per cent changed their daily activities to avoid smoke (GMAHS 2003).

## **Outcomes and discussion**

### **General**

The bushfire risk in Victoria is likely to get worse rather than better. A number of factors will influence this. Increased population growth within fire-prone environments is occurring as part of the “sea-change”

phenomenon. In addition, the fringe areas of cities and towns are also extending into bushland areas. It is estimated that up to 1.6 million suburban Australian homes are at direct risk from bushfire damage (Chen & McAneney 2004, 2005).

Wareing & Flinn (2003) suggest that "if global warming becomes more of a reality, there is likely to be an increased risk for the occurrence of more frequent and severe bushfires". They also counsel against dismissing such extreme events as "1 in 100 year" occurrences.

Interestingly, much of the focus of post-fires inquiry was upon traditional responses and blame apportionment. No fewer than six substantial inquiries into bushfires were conducted during the 12 months immediately after the fires. Interestingly, much of the attention was upon "traditional" issues of land management and technological response. Social and behavioural issues received scant attention. The House of Representatives select committee of inquiry devotes just two pages of its 465-page report to the issue of community awareness (Nairn 2003).

The Esplin report noted that one of the shortcomings of the Victoria's existing fire management approach was its seasonal focus, with particular emphasis on "bad fire years". This was seen as detracting from an integrated, cyclical approach to the community awareness and engagement (Esplin: 230).

### **Communications**

In terms of disseminating information to the community, CFA programs were seen as leading the way in terms of preventative measures, with the possibility of these being adapted for public health purposes (Robinson 2003). At present, there appears little by way of centralized dissemination of public health information in relation to health issues related to bushfires. Some information is available from the Commonwealth Department of Health and other information from the Victorian Department of Human Services.

The Esplin report examined the issue of communications with the community in some detail, making a number of recommendations. Perhaps the most important of these in this context relate to the premium placed upon communication with the public being understood as a primary responsibility of incident management, rather than a subsidiary issue. It noted that the model of community engagement, especially through the use of Community Information Units within the emergency management structure, could have applications among other crisis response organizations.

Importantly, it found that DSE and CFA engaged in a process that not only told communities what had occurred, but was designed to assist them in preparing for what might happen next. The Esplin report recommended that the model of community engagement developed during the fires be further developed and refined so that it could be applied to short duration and rapidly escalating incidents. One of the outcomes to flow from this has been the engagement of community liaison officers by DSE tasked with the specific role of opening and maintaining a dialogue between the department and the community. A similar role is already undertaken by the Community Safety directorate within CFA.

While noting that the scale, location and duration of the emergency had tested current arrangements, the report also pointed to the opportunities to further improve the communication process. In surveys conducted by the CFA in May 2003, 96.3 per cent of respondents felt they were "well prepared" or "very well prepared" by the time the fire was a threat to their property (Esplin: 212).

Some problems with the communication of inaccurate risk information via the media persist. In February 2004, the Victorian Government and the Australian Broadcasting Corporation signed a memorandum of understanding formalising protocols for the broadcasting of emergency information by the ABC. Under the MoU, the ABC will interrupt normal programming and broadcast emergency information exactly as required by the emergency services (OESC 2004).

The emphasis until now has been upon a holistic approach in which the quality of the information being transmitted to the community is paramount. However, a more recent focus has rested upon the technology with which information is delivered. Within the Office of the Emergency Services Commissioner this has found expression in projects focused less upon the pre-emptive communication of risk, than upon the issuing of warnings once an emergency event is already underway.

This was the approach adopted in trials of siren-based warning systems flowing from bushfires in the Dandenong Ranges in 1997 and in the fuel storage complex at Coode Island in 1991 (Betts 1993). A further measure of this approach is a current trial of a telephone-based Community Information and Warning System in the Shire of Yarra Ranges and in the Northern Grampians Shire (Justice 2005). As Handmer (2000) suggests, there is more to successfully communicating risk than simply issuing a warning, not in the least being common agreement between the issuing authority and the recipients as to what amounts to a successful communication.

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## Appendix 2: Newspaper project

### Descriptive analysis

#### 1. Overview of newspapers included in this survey

A total of 516 newspapers was analysed for content about health, and environmental health in particular. All available copies of the three major metropolitan newspapers in Victoria, together with local daily and weekly newspapers from a selection of areas in metropolitan Melbourne, East Gippsland and the Shepparton areas were collected (see Table 1). The period of collection was May, June and July 2004.

Overall 180 papers were daily publications (*The Age* and *Herald Sun*), 157 were published from Monday to Saturday (*The Australian* and the *Border Mail*), the *Shepparton News* (66 papers) from Monday to Friday, and the remaining 113 papers were published weekly, usually on Wednesdays but sometimes Monday or Tuesday).

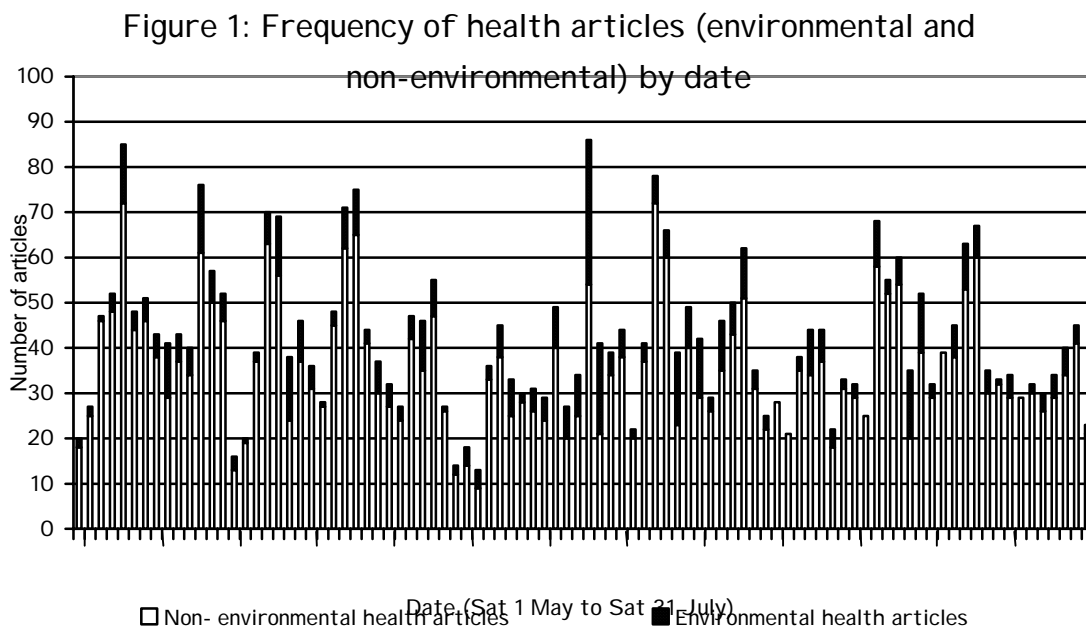
Between 2 and 10 papers were published on any one date. Almost a quarter of the newspapers were published on a Wednesday (24.6%) followed by Tuesday (19.4%).

#### 2. Health reporting in the newspapers

Articles related to an aspect of health issues appeared on most days (range 0-32 articles) with no health news at all in only eight papers (1.6%). Environmental health articles appeared less frequently (range 0-14), with none in 207 papers (40.1%). There were more than 5 articles related to environmental health in only 10 papers (2%).

The peak of articles seen in early May can be attributed to discussion of health implications of the State and Federal Budgets. Water and energy policy debates following government announcements boosted relevant reporting at later dates.

Figure 1 shows the total number of health articles, both environmental health and non-environmental health, for each date.



Overall almost one in eight health-related articles (14.78%) related to environmental health. The proportion of these devoted to environmental health varied considerably, both within and between categories of newspaper. Over one quarter of articles in *The Australian* (26.45%) related to environmental health compared with 8.67% from the *Herald Sun*, by far the lowest proportion of all papers.

Amongst the eleven weekly metropolitan papers six devoted more than a fifth of their health articles to environmental health, as did two of the three regional papers. Table 1 summarises the percentage of each type of article identified in each newspaper.

**Table 1: Number of articles about health**

NEWSPAPER	Number of newspapers	Non-environmental health articles (%)	Number of articles on an environmental health issue (%)	Total number of articles about health
<b>Daily metropolitan</b>				
The Age	92	745 (88.37%)	98 (11.63%)	843
The Australian	78	317 (73.55%)	114 (26.45%)	431
Herald Sun	88	1233 (91.33%)	117 (8.67%)	1350
<b>Weekly metropolitan local</b>				
Diamond Valley Leader (Banyule edition)	1	5 (83.33%)	1 (16.67%)	6
Diamond Valley Leader (Nillumbik edition)	12	28 (66.67%)	14 (33.33%)	42
Ferntree Gully & Belgrave Trader Mail	2	6 (75.00%)	2 (25.00%)	8
Free Press Leader	12	35 (76.09%)	11 (23.91%)	46
Heidelberg Leader	11	57 (87.69%)	8 (12.31%)	65
Manningham Leader	12	44 (75.86%)	14 (24.14%)	58
Melbourne Weekly	3	2 (66.67%)	1 (33.33%)	3
Progress Leader	13	51 (86.44%)	8 (13.56%)	59
Ranges Trader Mail	12	29 (70.73%)	12 (29.27%)	41
Whitehorse Leader	12	75 (86.21%)	12 (13.79%)	87
Whittlesea Leader	9	51 (80.95%)	12 (19.05%)	63
<b>Regional</b>				
Border Mail	79	336 (84.42%)	62 (15.58%)	398
East Gippsland News	14	53 (79.10%)	14 (20.90%)	67
Shepparton News	66	209 (75.45%)	68 (24.55%)	277
<b>Total</b>	<b>516</b>	<b>3276 (85.22%)</b>	<b>568 (14.78%)</b>	<b>3844</b>

Figure 2 presents a ranking of environmental health articles by newspaper. Care must be exercised in interpreting this Figure because the percentage of environmental health articles is relative to the number of health articles for a particular paper, thus distorting the amount of environmental health reporting in papers with an overall low number of health articles.

Figure 2: Ranked percentage of articles about environmental health

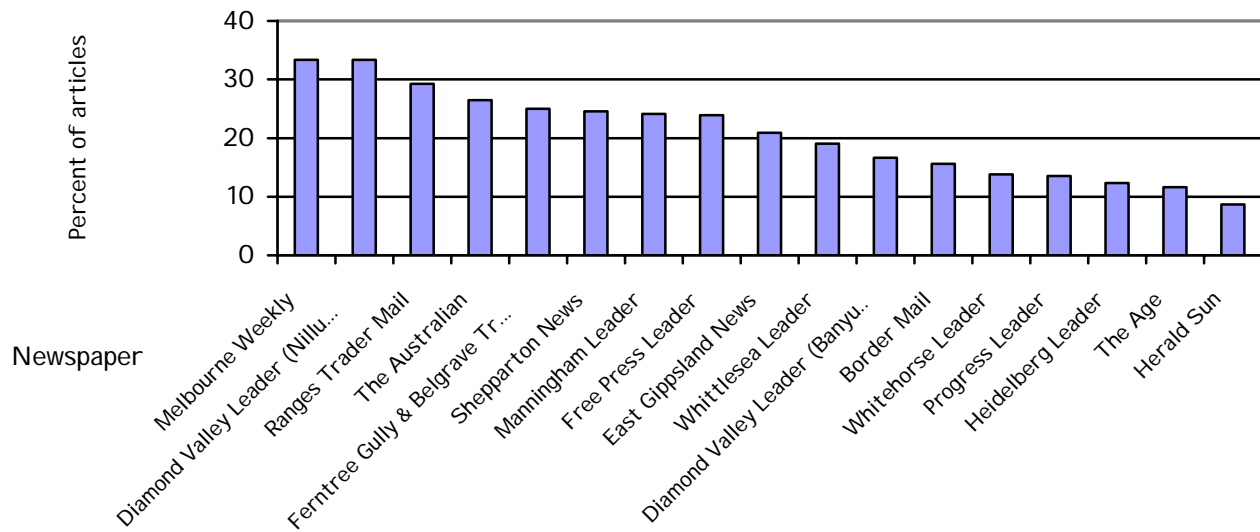


Table 2 shows the analysis of articles according to the day of the week. Of the weekdays, fewer health articles were appeared on Thursday compared with the other days. There were fewer Sunday papers and therefore few health articles.

Table 2: Number of articles about health & environmental health by week day

DAY	Non-environmental health articles (%)	Number of articles about environmental health (%)	Total number of articles about health
Monday	498 (88.45%)	65 (11.55%)	563
Tuesday	596 (86.25%)	95 (13.75%)	691
Wednesday	671 (82.64%)	141 (17.36%)	812
Thursday	388 (79.51%)	100 (20.49%)	488
Friday	436 (86.00%)	71 (14.00%)	507
Saturday	368 (85.78%)	61 (14.22%)	429
Sunday	319 (90.11%)	35 (9.89%)	354
<b>Total</b>	<b>3276 (85.22%)</b>	<b>568 (14.78%)</b>	<b>3844</b>

Articles on environmental health constituted 14.78% of all health related articles in the newspapers we reviewed. There were significant differences in the proportion of articles on environmental health by day of the week ( $P < .01$ ), with the lowest proportion of articles on Sundays (9.89%) and highest on Thursdays (20.49%)(Table 3). In order to exclude the local effects of papers that were only published once a week, the analysis was repeated to include only daily papers. There were 403 daily newspapers available: 92 copies of *The Age* (one unavailable), 78 of *The Australian* (one unavailable), 88 of the *Herald Sun* (four unavailable), 79 of the *Border*

*Mail* and 66 of the *Shepparton News*. Each weekday there was between 64 and 66 papers available, 53 from Saturday and 26 from Sunday. These data are summarised in Table 3.

**Table 3: Number of available newspapers**

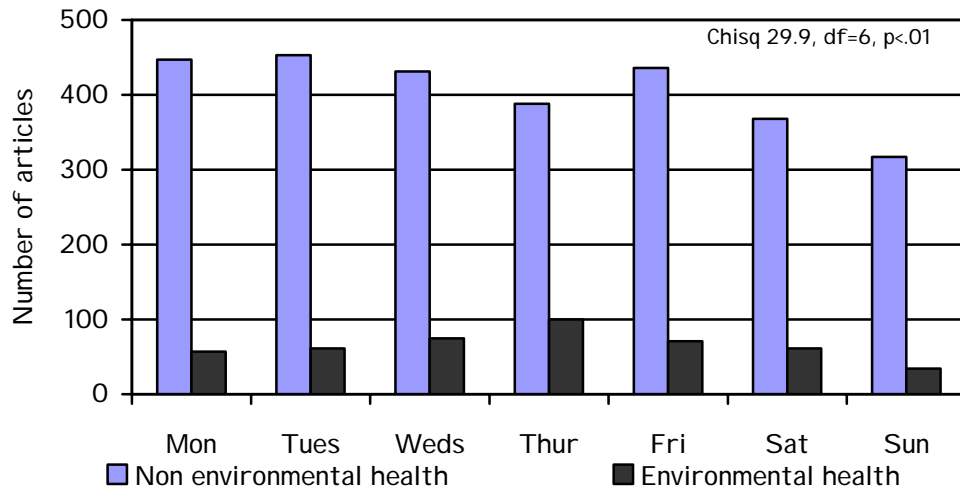
DAY (total)	The Age	The Australian	Border Mail	Herald Sun	Shepparton News	Total papers
Monday (13)	13	13	13	13	13	65
Tuesday (13)	13	13	13	13	14	66
Wednesday (13)	13	13	13	12	13	64
Thursday (13)	13	13	13	13	13	65
Friday (13)	13	13	13	12	13	64
Saturday (14)	14	13	14	12	13	53
Sunday (13)	13	0	0	13	0	26
<b>Total (92)</b>	92	78	79	88	66	403

There were 3299 articles on health published in these papers, 459 of them about environmental health. There was uneven reporting of environmental health issues, still with significantly more environmental health issues reported on Thursdays than the other days ( $p < .001$ ) whether or not the weekend was taken into account. Table 4 shows how these articles were distributed across the week, while Figure 3 shows this graphically.

**Table 4: Health, and environmental health articles, by day of week**

DAY	Non- environmental health articles (%)	Number of articles about environmental health (%)	Total number of articles about health
Monday	447 (88.69%)	57 (11.31%)	504
Tuesday	453 (88.13%)	61 (11.87%)	514
Wednesday	431 (85.18%)	75 (14.82%)	506
Thursday	388 (79.51%)	100 (20.49%)	488
Friday	436 (86.00%)	71 (14.00%)	507
Saturday	368 (85.78%)	61 (14.22%)	429
Sunday	317 (90.31%)	34 (9.69%)	351
<b>Total</b>	2840 (86.09%)	459 (13.91%)	3299

Figure 3: Non-environmental and environmental health articles by day, excluding weekly papers



### 3. Environmental health reporting

All the articles on an environmental health issue were examined for general content and categorised firstly into a major subject category, and then into a sub-category.

A summary of this analysis can be found in Appendix 2.1, and shows the newspapers in which each category of article occurred, and the number of articles in each category.

It can be seen that there is a mix of state-wide and localised reporting of issues. Communicable diseases and food contamination were only reported in the regional press, despite being of state-wide and indeed national concern, and only one article on fire (on burning off) found its way into a metropolitan daily.

In this series, the *Herald Sun* and local papers are most likely to report dramatic incidents such as burst water mains or tornadoes ('twisters'), often stories with a strong presentation of individual or family distress.

In order to look in more closely at environmental health reporting, 250 articles from the 459 categorised above were selected for more detailed analysis. Excluded were those relating to policy issues (water and energy were the two biggest groups here), general articles on environmental issues, and minor or localised incidents such as house fires.

Table 5 outlines the distribution of environmental health articles analysed, by newspaper.

**Table 5: Number of environmental health articles selected for detailed analysis, by newspaper**

<b>NEWSPAPER</b>	<b>Articles on environmental health</b>
<b>Daily metropolitan</b>	
The Age	38
The Australian	33
Herald Sun	63
<b>Weekly metropolitan local</b>	
Diamond Valley Leader (Banyule edition)	0
Diamond Valley Leader (Nillumbik edition)	6
Ferntree Gully & Belgrave Trader Mail	0
Free Press Leader	2
Heidelberg Leader	4
Manningham Leader	8
Melbourne Weekly	0
Progress Leader	1
Ranges Trader Mail	3
Whitehorse Leader	7
Whittlesea Leader	6
<b>Regional</b>	
Border Mail	47
East Gippsland News	5
Shepparton News	27
<b>Total</b>	<b>250</b>

While the *Herald Sun* printed almost twice as many environmental stories as the other major metropolitan dailies, it should be remembered that environmental health constituted a lower proportion of its general health articles than for other papers. Its coverage should be interpreted in conjunction with an analysis of the type of story, and the ways in which the narratives are constructed in evaluating its usefulness as a source of environmental health information. The *Border Mail* also had a relatively large number of environmental health articles, in part reflecting the controversy over the location of a toxic waste dump during the period of newspaper surveillance, as well as the larger number of environmental health events in rural Victoria and higher reportage of general environmental health issues.

There was an uneven distribution by month, with 40.4% of the articles appearing in May, 30.8% in June and 28.8% in July. This in part reflects our initial perception that there were few environmental health issues reported during the period. Winter is clearly less hazardous than summer for flood or wildfire; however, there were a number of other relevant issues that arose during the period. Of these, 63.8% or nearly two-thirds were reported on one of the first ten pages of the newspapers, 24% of these in the first three pages, with a peak of 13.4% on page 3. There was thus a quite high visibility for these issues in the overall news content of the papers.

#### 4. Detailed description of the environmental health articles

The mean size of the articles was 233.095 square centimeters, including accompanying pictures. There were 10% of articles smaller than 36.8 sq.cm. and 10% larger than 528 sq. cm.

Slightly fewer than half the articles were accompanied by photos (45%) with most having just one (31%) although the number ranged up to 6 (just one article).

Six of the articles were accompanied by a small cartoon (which were classified as pictures as they were not stand-alone statements), and one 'comment' just consisted of a cartoon, therefore classified separately as a cartoon. Table 6 shows how the different newspapers used photographs.

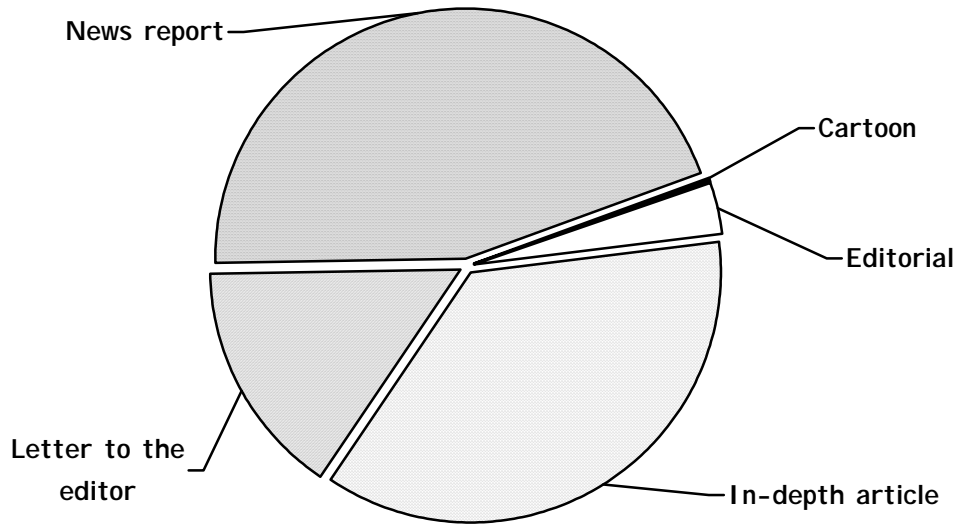
The mean size of the photos was 158.293 square centimeters, over half the size of the articles. The smallest 10% was under 16.65 sq. cm and the largest 10%, over 364.56 sq. cm. The *Herald Sun* had fewest articles with no photos (48%) among the daily metropolitan papers and was the only paper with articles accompanied by more than three (3) photos. The *Border Mail* had few un-illustrated articles, but only 25% of articles compared to nearly 50% for the *Herald Sun* had more than one photo. Of note, a number of the articles in the *Border Mail* were on page 1, which normally had a large accompanying photo which included local people. A similar style of illustration was found in the local weekly newspapers. The majority of articles (55% overall) however were not illustrated (61% of both *The Age* and *The Australian* articles, 67% of the *Shepparton News* articles, and there were no illustrations at all with any of the articles in the *East Gippsland News*).

**Table 6: Distribution of accompanying pictures**

NEWSPAPER	Number of accompanying pictures							Total
	None (%)	1	2	3	4	5	6	
<b>Daily metropolitan</b>								
The Age	23 (61%)	12	0	3	0	0	0	38
The Australian	20 (61%)	9	2	2	0	0	0	33
Herald Sun	30 (48%)	17	10	3	0	2	1	63
<b>Weekly metropolitan local</b>								
Diamond Valley Leader (Nillumbik ed'n)	3 (50%)	1	2	0	0	0	0	6
Ferntree Gully & Belgrave Trader Mail	1 (50%)	1	0	0	0	0	0	2
Heidelberg Leader	2 (50%)	1	0	1	0	0	0	4
Manningham Leader	3 (37%)	5	0	0	0	0	0	8
Progress Leader	1	0	0	0	0	0	0	1
Ranges Trader Mail	3	0	0	0	0	0	0	3
Whitehorse Leader	2 (29%)	5	0	0	0	0	0	7
Whittlesea Leader	4 (67%)	2	0	0	0	0	0	6
<b>Regional</b>								
Border Mail	22 (47%)	20	2	3	0	0	0	47
East Gippsland News	5	0	0	0	0	0	0	5
Shepparton News	18 (67%)	5	4	0	0	0	0	27
<b>Total (%)</b>	137 (55%)	78 (31%)	20 (8%)	12 (5%)	0	2 (<1%)	1 (<1%)	250

Five types of article were distinguished: cartoons without accompanying text (CA), editorials (ED), in-depth reports (ID) which included articles by named experts and journalists' investigations, letters to the editor (LE), and straight-forward news reports (NR). Figure 4 shows the distribution of articles over these categories.

**Figure 4: Proportion of types of articles**



The most common article type was news report, followed by in-depth article. Over one-third of the letters to the editor were about the one topic, toxic waste disposal.

The ways in which different newspapers allocate article type to environmental health issues is seen in Table 7. There were significant differences in the distribution of types of article between the different newspapers ( $p < .01$  level). The *HeraldSun* is the only daily paper where the number of in-depth articles was almost equal to the number of news reports, reflecting a different style of environmental health reporting. Again, this should be interpreted in conjunction with the analysis of article narrative style: a number of sources were consulted but reported quite simply with little or no analysis by the journalists (see section 14 for more detail). For the three metropolitan dailies, around 20% of items were readers' letters to the editor, only reflected in rural Victoria in the *Shepparton News*.

**Table 7: Newspaper by type of article**

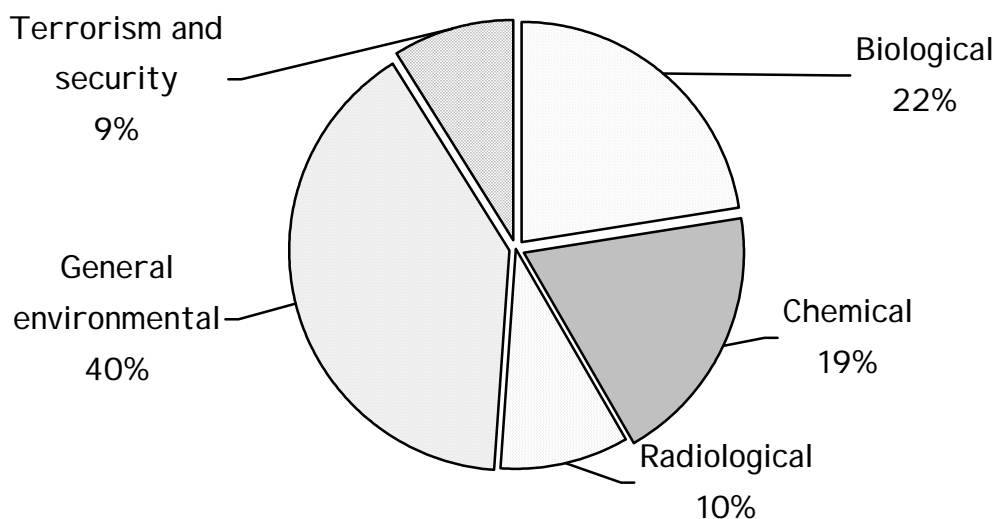
<b>NEWSPAPER</b>	<b>Cartoon*</b>	<b>Editorial</b>	<b>In-depth article</b>	<b>Letter</b>	<b>News report</b>	<b>Total</b>
<b>Daily metropolitan</b>						
The Age	1	1	18	9	9	38
The Australian	0	1	14	7	11	33
Herald Sun	0	2	23	13	25	63
<b>Weekly metropolitan local</b>						
Diamond Valley Leader (Banyule edition)	0	0	0	0	0	0
Diamond Valley Leader (Nillumbik edition)	0	0	2	1	3	6
Free Press Leader	0	0	1	0	1	2
Heidelberg Leader	0	0	3	0	1	4
Manningham Leader	0	0	3	0	5	8
Progress Leader	0	0	0	0	1	1
Ranges Trader Mail	0	0	0	0	3	3
Whitehorse Leader	0	0	4	0	3	7
Whittlesea Leader	0	0	2	0	4	6
<b>Regional</b>						
Border Mail	0	4	16	3	24	47
East Gippsland News	0	0	0	0	5	5
Shepparton News	0	0	5	5	17	27
<b>Total</b>	<b>1</b>	<b>8</b>	<b>91</b>	<b>38</b>	<b>112</b>	<b>250</b>

\* Only one cartoon was clearly a stand-alone comment; there were 6 other cartoons incorporated into articles but which were not separately enumerated.

### **5. Specific content of the environmental health articles**

Examining the contents of the articles, five broad categories of environmental concern were used to classify each example. These were: biological (which included both micro-organisms and larger biological entities), chemical (including food contaminants), radiological (including nuclear waste), environmental (for example fires, floods, or pollutants) and terrorism and security-related issues. Figure 5 shows how the articles were distributed over these categories.

Figure 5: Hazard areas



General environmental articles accounted for 40% of all articles, with security issues closely followed by radiological having the lowest number. Table 10 explores some of these topics in greater detail.

The distribution of hazard category by article type and category totals are not co-terminous with those in Figure 7 since some of the topics were re-distributed, e.g. 'biological' included 'big nasties'<sup>1</sup>, communicable diseases, micro-organisms and food contaminants. Thus nuclear waste was initially included under 'toxic waste' rather than 'radio-active materials'. The articles were further divided into precise topics, which are found in Appendix 2.2.

Table 8 shows that vermin, waste, pollutants and rubbish are clearly the issues attracting most attention, evidenced by the number of in-depth articles and letters to the editor. Toxic waste stands out as an issue seen fit for editorial comment; of the two editorials on fire, both were from the one rural paper and were about smoke detectors.

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<sup>1</sup> 'Big nasties' is a shorthand way of categorizing large biological hazards. In the study period this refers mostly to vermin such as rats and pigeons, and included organisms such as frog found in a Airline passenger's salad during an overseas flight.

**Table 8: Hazard category by type of article**

SUBJECT	Cartoon	Editorial	In-depth article	Letter	News report	Total
<b>Biological (56)</b>						
'Big nasties'*	0	0	11	3	6	20
Biological hazard	0	0	0	1	1	2
Communicable disease	0	0	4	0	8	12
Other micro-organisms	0	0	6	0	10	16
Food contamination	0	0	2	1	3	6
<b>Chemical (48)</b>						
Chemical hazards	0	0	7	2	8	17
Toxic waste	0	3	12	6	10	31
<b>Radiological (24)</b>						
Nuclear waste	0	2	9	7	4	22
Radioactive material	0	0	0	0	2	2
<b>General environmental (100)</b>						
Natural hazard	0	0	4	0	15	19
Rubbish	0	0	4	6	2	12
Environmental issue	0	1	5	2	3	11
Pollutants	0	0	9	3	8	20
Fire	0	2	14	1	21	38
<b>Terrorism and security (22)</b>						
Security	1	0	4	6	11	22
<b>Total</b>	<b>1</b>	<b>8</b>	<b>91</b>	<b>38</b>	<b>112</b>	<b>250</b>

\*' Big nasties' is a shorthand way of categorizing large biological hazards (see footnote on previous page).

In order to identify major issues during the period, those topics attracting more than one article were coded for story subject, as shown in Table 9. This table suggests that the big stories for the quarter were clearly the location of toxic waste dumps, followed by a *Legionella* outbreak at Cobram in country Victoria, and Melbourne city's pigeon problem. A false alarm for a bomb scare on a departing Qantas plane in Sydney led to more letters to the editor, half facetious, than to serious articles, and included the one large cartoon. Overall, there were 106 separate issues covered in the 250 articles.

**Table 9: Number of articles associated with each story**

Category (total articles)	Subcategory	Number of articles associated with a story (% of total articles)	
<b>Biological (56)</b>	Rats	2 (4%)	
	Pigeons	12 (21%)	
	Frog in salad	3 (5%)	
	Avian influenza	3 (5%)	
	SARS	2 (4%)	
	Meningococcal meningitis	2 (4%)	
	Legionellosis	11 (20%)	
	Bairnsdale ulcer ( <i>Mycobacterium ulcerans</i> )	3 (5%)	
<b>Chemical (48)</b>	Gas blast & fire	2 (4%)	
	Mercury spill	2 (4%)	
	Acid soil	2 (4%)	
	Biofuel project	2 (4%)	
	Chemical spill	3 (6%)	
<b>Radiological (24)</b>	Radioactive loss	2 (8%)	
	Nuclear dump	22 (92%)	
<b>General environmental (100)</b>	Asbestos	5 (5%)	
	High tension powerlines	2 (2%)	
	Ocean pollution	2 (2%)	
	Tip controversy	2 (2%)	
	Beach smoking bans	5 (5%)	
	Cemetery pollutant	4 (4%)	
	Twisters	3 (3%)	
	Mornington flood	2 (2%)	
	Flood protection for kindergarten	2 (2%)	
	Burst water pipe	2 (2%)	
	Flood aftermath	2 (2%)	
	Smoke alarms	3 (3%)	
	Fire management plan	2 (2%)	
	VFF wildfire meeting	3 (3%)	
	Burning off debate	2 (2%)	
	Fire recovery	6 (6%)	
	Toxic waste dump	26 (26%)	
	Nowingi dump site	5 (5%)	
	<b>Terrorism and security (22)</b>	Plane bomb scare	7 (33%)
		Coode Is. gas store	2 (9%)
Transport security		5 (23%)	
Medical preparedness		3 (14%)	
<b>Total</b>		168 (67%)	

\* The percentage indicates the proportion of the data set included in the named story; in several cases, all items in the category were stories with more than one article; in others, there were mostly single-item articles.

## 6. How the issues were reported: stakeholders

In order to analyse constituency details of the reportage, the stakeholders named in each article were listed. The number of stakeholders was large and was not evenly distributed, with a mean number per article of 4.60, median 3.5 and mode 3, and range from 0 (only 6 articles) to 17 (16 articles or 5.2% listed more than 9). Table 10 shows the number of stakeholders in each category of stakeholder. Care is needed in interpreting these results as some very simplistic articles mentioned a number of stakeholders but provided no analysis of the situation, whereas some well-reasoned articles mentioned few stakeholders. Examination of particular stories and the personnel mentioned is more fruitful.

The following categories of stakeholder were distinguished: the community in general (including a single named community member, and defining 'community' in terms of those expected to be reading the paper, i.e. country newspapers addressing those in the municipality in general were placed under 'community', as were those addressing the population at large, either of a state or the country as a whole), a local community leader (including local councillors), a member of parliament, a government spokesperson, a professional, a local organisation (including NGOs), a private enterprise, a foreign government, a commonwealth government organisation, a state government organisation, and a local government organisation.

**Table 10: Numbers of each category of stakeholder**

Stakeholder group	Not mentioned	One or two	Three or more	Range
General community	76	130	44	0-9
Community leader	185	60	5	0-9
Local organisation	205	41	4	0-4
Company, business or other enterprise	189	56	5	0-4
Accredited professional	164	77	9	0-6
Overseas government	238	8	4	0-6
Commonwealth government	205	32	13	0-6
State government	114	105	31	0-5
Local government	199	46	5	0-9
<b>Total: any stakeholder</b>	6	60	184	0-17
<b>Specific government personnel</b>				
Inclusion of any state or federal MP	194	44	11	0-6
Inclusion of a government spokesperson	220	29	6	0-3

Members of the general community are significantly over-represented compared with community leaders and local organisations ( $p < .001$ ), and state governments are significantly over-represented compared with commonwealth and local government ( $p < .001$ ). Local papers tended to record interviews with a number of named local people affected by the issues, especially in the case of the waste dumps, inflating the numbers of stakeholders in this category. Each named person or family was counted as one, as the community in general was often also named in such articles, and we wished to get some idea of the different report styles. Again, since the focus was on Victoria, there was a tendency for a number of state government entities or

spokespersons to be consulted and named, as opposed to smaller numbers of local or federal government representatives.

Enlarging the profile of types of reporting in different articles, Table 11 expands on the numbers of stakeholders mentioned in the different types of article, while Table 12 shows the way stakeholders are distributed over the different subjects.

**Table 11: Type of article and number of stakeholders**

Stakeholders	Cartoon	Editorial	In-depth article	Letter	News report	Total
None	0	0	0	4	2	6
One or two	1	2	6	24	27	60
Three or more	0	6	85	10	83	184
<b>Total</b>	1	8	91	38	112	250
Range	1	2-6	1-15	0-10	0-17	0-17

There is a tendency for more stakeholders to be mentioned in in-depth articles and fewer in editorials and letters to the editor. News reports also include a number of stakeholders. It can be seen in Table 12 that the numbers of stakeholders could be a rough guide to the way in which the newspapers at least rate the interests of the public in particular issues. Food contamination, toxic waste, nuclear waste, natural hazards, pollutants, fires, and security are all reported within a web of interested parties, both public and relevant authorities and policy-makers. Fire and toxic waste involved the greatest mention of potential stakeholders. This may in part reflect local reportage, where people whom the readers may know were shown to be affected, and local identities from organisations and government instrumentalities were also named in detail as part of a process of personalising the potential harm and responsibilities.

**Table 12: Hazard category by number of stakeholders**

Hazard category	Not mentioned	One or two	Three or more	Range
<b>Biological (56)</b>				
'Big nasties'*	2	11	7	20
Biological hazard	1	0	1	2
Communicable disease	1	3	8	12
Other micro-organisms	0	3	3	6
Food contamination	0	1	15	16
<b>Chemical (48)</b>				
Chemical hazards	0	6	11	17
Toxic waste	0	4	27	31
<b>Radiological (24)</b>				
Radioactive material	0	0	2	2
Nuclear waste	1	3	18	22
<b>General environmental (100)</b>				
Natural hazard	0	5	14	19
Rubbish	0	5	7	12
Environmental issue	0	3	8	11
Pollutants	0	4	16	20
Fire	0	6	32	38
<b>Terrorism and security (22)</b>				
Security	1	6	15	22
<b>Total</b>	6	60	184	250

## 7. The role of experts

Whether or not the article cited any experts was also recorded, and the number of experts, if any, is summarised in Tables 13 and 14.

**Table 13: Articles and number of experts**

Type of article	Number of experts								Total
	0	1	2	3	4	5	6	7	
Cartoon	1	0	0	0	0	0	0	0	1
Editorial	7	1	0	0	0	0	0	0	8
In-depth report	28	33	20	5	3	1	1	0	91
Letter to the editor	33	3	1	0	0	0	0	1	38
News report	46	44	18	1	1	1	0	1	112
<b>Total</b>	115	81	39	6	4	2	1	2	250

Looking at topic area, there were similar patterns for citation of experts across the topics, with the exception of the small number of articles on general biological hazards, and rubbish (no experts for either). Despite the intensity of the issue of toxic waste disposal, there was a lower proportion of articles citing experts for this than for most other topics (22% compared to the average of 54%). Table 14 summarises these findings.

Almost half (46%) of the articles did not cite any experts, largely the news reports, letters to the editor, and editorials. Of those that did name experts, 48% cited one or two, with the most cited being 7 (two articles). The median number was 1.

**Table 14: Number of experts for main subject area**

Hazard category	Number of experts								
	0	1	2	3	4	5	6	7	Total
<b>Biological (56)</b>									
'Big nasties'*	9	6	3	1	1	0	0	0	20
Biological hazard	2	0	0	0	0	0	0	0	2
Communicable disease	2	6	3	1	0	0	0	0	12
Other micro-organisms	2	5	9	0	0	0	0	0	16
Food contamination	2	4	0	0	0	0	0	0	6
<b>Chemical (48)</b>									
Chemical hazards	5	5	4	1	1	0	1	0	17
Toxic waste	29	2	0	0	0	0	0	0	31
<b>Radiological (24)</b>									
Nuclear waste	12	8	1	0	0	0	0	1	22
Radioactive material	0	2	0	0	0	0	0	0	2
<b>General environmental (100)</b>									
Natural hazard	7	10	2	0	0	0	0	0	19
Rubbish	12	0	0	0	0	0	0	0	12
Environmental issue	4	3	3	0	1	0	0	0	11
Pollutants	8	6	5	1	0	0	0	0	20
Fire	13	17	4	2	1	1	0	0	38
<b>Terrorism and security (22)</b>									
Security	8	7	5	0	0	1	0	1	22
<b>Total</b>	115	81	39	6	4	2	1	2	250

## 8. Where the issues were located

The primary interest in this analysis of newspaper reporting was obviously events in Victoria. However, we included events in other locations with relevance to Victoria, including infectious diseases such as avian influenza and SARS. Table 15 shows how the different subjects were distributed over the different locations.

Over two-thirds (70.4%) referred to events in Victoria, with slightly more in rural than metropolitan Victoria (33.2% compared with 30.8%). Articles on Australia in general included Victoria, adding a further 11.2%.

**Table 15: Distribution of article subjects for each location**

Hazard category	Rural Victoria	City Victoria	All Victoria	All Australia	Other Australia	Elsewhere, world	Total
<b>Biological (56)</b>							
'Big nasties'*	0	17	1	0	1	1	20
Biological hazard	0	1	0	1	0	0	2
Communicable disease	1	0	1	1	3	6	12
Other micro-organisms	14	0	0	0	0	2	16
Food contamination	0	1	0	1	0	4	6
<b>Chemical (48)</b>							
Chemical hazards	5	9	0	3	0	0	17
Toxic waste	31	0	0	0	0	0	31
<b>Radiological (24)</b>							
Nuclear waste	0	0	0	4	18	0	22
Radioactive material	0	2	0	0	0	0	2
<b>General environmental (100)</b>							
Natural hazard	3	13	0	1	1	1	19
Rubbish	0	3	5	4	0	0	12
Environmental issue	0	6	3	0	2	0	11
Pollutants	3	12	1	2	0	2	20
Fire	25	11	2	0	0	0	38
<b>Terrorism and security (22)</b>							
Security	1	2	3	11	1	4	22
<b>Total</b>	<b>83</b>	<b>77</b>	<b>16</b>	<b>28</b>	<b>26</b>	<b>20</b>	<b>250</b>

## 9. Imputed causes and consequences

We applied three questions to each article in order to consider whether or not the reader would be able to make sense of the problem presented to them. The questions were designed to identify whether or not a cause of the problem or event was recorded, as well as any consequences, and also any actions which were suggested or had already been taken by stakeholders. These results are summarised in Table 16.

**Table 16: Causes, consequences and actions**

	<b>Yes</b>	<b>No</b>
Is a cause of the problem included in the article?	151 (60%)	99 (40%)
Is a consequence of the problem included in the article?	145 (58%)	105 (42%)
Does the article include mention of actions by stakeholders?	205 (82%)	45 (18%)

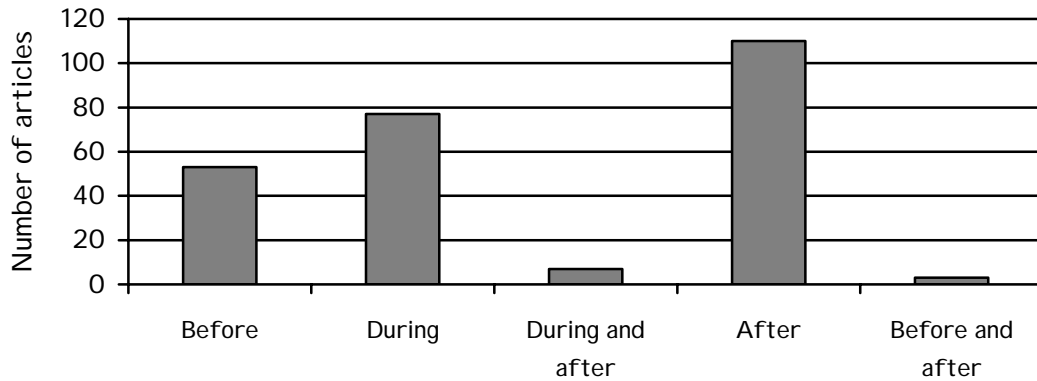
There are significant differences between the use of citation of causes, consequences and stakeholder actions ( $p < .001$ ). Slightly more consequences than causes were reported (42% vs 40%), which suggests reportage that does not attempt to explain how an event or how a problem occurred, or the result. A much higher percent (82%) of articles mentioned actions that were taken by stakeholders in relation to the problem. These findings suggest that newspaper reports of environmental health problems and events focus on what happened, rather than how or why they happen, or what might be done about them.

## 10. How the press addressed the general public

Nearly three-quarters of the articles were solely addressed to the general public (72.4%) and a further 16% were addressed both to the public and another stakeholder such as the government. A range of other stakeholders was also addressed, with only one, the state government, being the addressee of more than one article (4: 1.6%).

In order to consider the role of the press in emergency risk management communication, it is necessary to see when the public is being addressed in relationship to a problem or event. Figure 6 shows when the articles and letters were written in relation to the problem being addressed. The 'before and after' category includes articles where a major event such as a fire had happened, and was discussed together with future fire management strategies, and 'during and after' included an event and its aftermath.

**Fig 6: When people are being addressed**



Almost half of the articles were after the event (44%), and a further 30.8% described the event or problem while it was occurring. Just over twenty percent (21.2%) were about possible events or problems, including information about what to do should an event arise and risk management plans. Flood, fire, security and hygiene were the main topics dealt with in this latter manner.

Very few of the articles indicated the source of the information they contained. A high proportion (70.4%) had by-lines, all but two naming journalists; it is not clear from the articles whether the journalist or editor initiated the investigation resulting in the article.

Around 14% seemed to be based on ministerial, departmental or council press releases, while only seven were summaries of professional journal articles or conference reports. Overall, the source of 66% of the articles seemed to be an individual or individuals (e.g. several journalists), and 32% appear to have originated with an institution or institutions.

Although the number of articles by named journalists was high, very few of these were by accredited environmental or health reporters.

### 11. Fear, dread and uncertainty

All articles were rated for perceived evoked fear or dread and uncertainty about the likelihood of the event occurring. This was assessed by moderation between the two researchers. These results can be seen in Figures 7 and 8.

Figure 7: Perceived level of dread

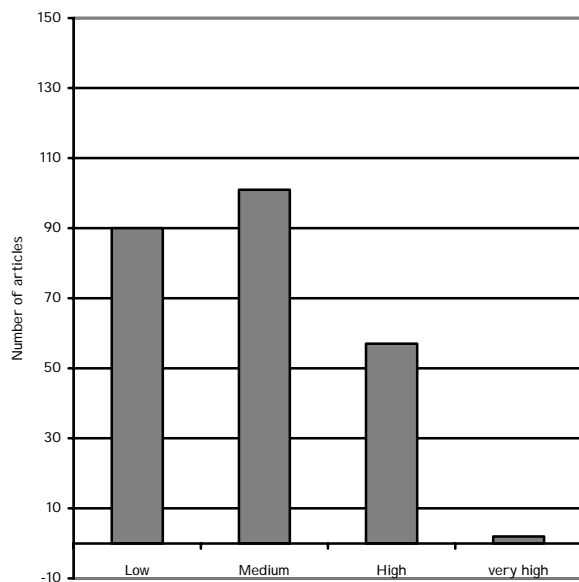
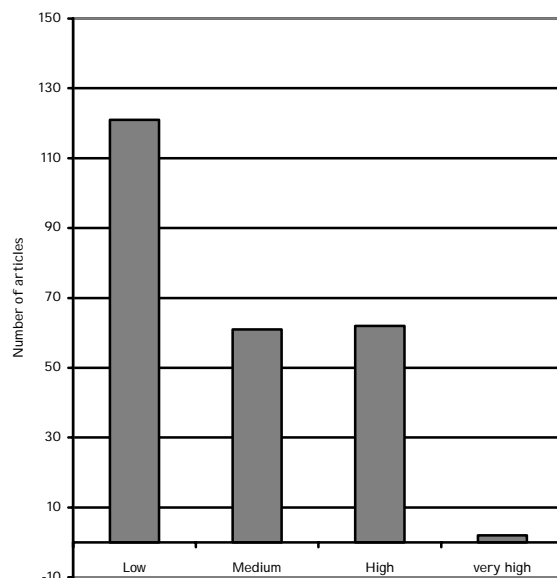


Figure 8: Perceived level of uncertainty



The overwhelming number of articles presented issues of low or medium dread (76.4%). The distribution of perceived fear level by subject matter is shown in Table 17. According to these articles, communicable disease is presented as the most fearful event (75% of the articles present it as high or very high), followed by fire, toxic waste, security and chemical hazards.

Similar, though not identical, results are found when examining the uncertainty level of the event or problem. The high proportion of low and medium levels can be accounted for by the fact that nearly half the articles were written after the event when the outcome was already known.

**Table 17: Dread and fear levels for different subjects**

Hazard category	Low	Medium	High	Very high	Total
<b>Biological (56)</b>					
'Big nasties'	8	8	4	0	20
Biological hazard	0	2	0	0	2
Communicable disease	1	2	7	2	12
Other micro-organisms	6	6	4	0	16
Food contamination	3	3	0	0	6
<b>Chemical (48)</b>					
Chemical hazards	3	7	7	0	17
Toxic waste	19	6	6	0	31
<b>Radiological (24)</b>					
Nuclear waste	9	10	3	0	22
Radioactive material	2	0	0	0	2
<b>General environmental (100)</b>					
Natural hazard	7	11	1	0	19
Rubbish	7	5	0	0	12
Environmental issue	2	8	1	0	11
Pollutants	8	7	5	0	20
Fire	9	18	11	0	38
<b>Terrorism and security (22)</b>					
Security	6	8	8	0	22
<b>Total</b>	90	101	57	2	250

Table 18 summarises the uncertainty levels portrayed. Low or medium was the level of uncertainty for 74.4% of the articles.

The ratio of articles reflecting high levels to low levels of uncertainty is less than 0.5 (50%) for all subjects except communicable disease, general environmental issues, food contamination, micro-organisms and security, indicating that these items are perceived as having the greatest degree of uncertainty of occurrence or outcome.

**Table 18: Uncertainty levels for different subjects**

Hazard category	Low	Medium	High	Very high	Total
<b>Biological (56)</b>					
'Big nasties'*	7	6	7	0	20
Biological hazard	1	1	0	0	2
Communicable disease	3	7	2	0	12
Other micro-organisms	4	3	8	1	16
Food contamination	1	3	2	0	6
<b>Chemical (48)</b>					
Chemical hazards	14	0	3	0	17
Toxic waste	20	7	4	0	31
<b>Radiological (24)</b>					
Nuclear waste	9	3	10	0	22
Radioactive material	2	0	0	0	2
<b>General environmental (100)</b>					
Natural hazard	13	2	4	0	19
Rubbish	8	2	2	0	12
Environmental issue	2	6	3	0	11
Pollutants	6	11	3	0	20
Fire	19	12	7	0	38
<b>Terrorism and security (22)</b>					
Security	12	2	7	1	22
<b>Total</b>	<b>121</b>	<b>61</b>	<b>62</b>	<b>2</b>	<b>250</b>

**12. For whom are the articles intended?**

While it was sometimes unclear just who was being addressed in the article, the following Tables 19 and 20 attempt to give an overview of addresses in relation to type of article, and subject-matter, respectively.

Table 19 shows that a decision-maker is more likely to be addressed in a letter to the editor (42%) than other article types (16% for both in-depth articles and news reports, 25% of the editorials).

**Table 19: Who is being addressed in which type of article**

Addressee	Type of article					
	Cartoon	Editorial	In-depth article	Letter	News report	Total
Commonwealth government	0	0	0	1	1	2
State government	0	0	0	1	0	1
Local council	0	0	0	1	0	1
Council; general public	0	0	0	0	1	1
Doctors; medical authorities; drug companies	0	0	0	0	2	2
General public	1	5	68	20	87	181
General public; federal government	0	0	2	0	1	3
General public; state government	0	0	3	1	5	9
General public; state politicians	0	0	2	0	0	2
General public; state premier	0	1	1	1	0	3
Local MP	0	0	0	1	0	1
Local communities	0	0	0	1	1	2
Other*	0	2	15	11	11	39
<b>Total</b>	1	8	91	38	112	250

\*The category 'other' includes the general public and various other organisations or individuals such as the prime minister (one article), a government department or a security expert (two articles), or an entity such as smokers or voters.

The general public is most frequently being addressed in the articles when analysed by hazard type, with the state government the next most common object. A range of 13% to 18% addressed 'other' entities. However, overall it seems that newspapers are overwhelmingly directed at the general public.

**Table 20: Ranked addressees and broad category of hazard**

Addressee	Type of hazard					Total
	Biological	Chemical	Radiological	Environmental	Terrorist/security	
General public	44	30	14	75	18	181
General public; state government	1	3	0	5	0	9
State government	0	2	0	2	0	4
General public; state premier	0	0	2	1	0	3
General public; federal government	1	0	0	1	1	3
General public; state politicians	0	2	0	0	0	2
Commonwealth government	0	0	2	0	0	2
Local communities	0	1	1	0	0	2
Council; general public	0	0	0	1	0	1
Doctors; medical authorities	1	0	0	0	0	1
Health authorities; drug companies	1	0	0	0	0	1
General public; state premiers	0	0	1	0	0	1
Local MP	0	1	0	0	0	1
Other	7	9	4	15	3	38
<b>Total</b>	56	48	24	100	22	250

**13. Who wrote the articles?**

Overall, 176 articles (just over 70%) included a by-line, although few were named as environmental or health reporters (see section 10, above). There were significant differences ( $p < .01$ ) in the attributing of article by by-line for the different type of hazard. Table 21 summarises the number of articles with by-lines in relation to the major hazards

**Table 21: Number and percentage of articles with by-lines by type of hazard**

Hazard type	By-line (%)	No by-line (%)	Total
Biological	33 (59%)	23 (41%)	56
Chemical	36 (75%)	12 (25%)	48
Radiological	21 (88%)	3 (13%)	24
General environmental	65 (65%)	35 (35%)	100
Terrorism and security	21 (96%)	1 (5%)	22
<b>Total</b>	70	30	250

Of the entire 250 articles, only two (0.8%) were written by a named expert from outside the newspaper (one about security and one about nuclear waste). Two further reports were based on a journalist's interview with an expert, and four were journalists' interpretations of published journal articles, while one was a journalist's interpretation of an overseas research centre's findings. A further two were reports of an overseas medical conference.

The highest number of articles written by any single individual was only four (four contributed by each of the five different reporters).

#### **14. Narrative analysis**

The remaining task is to look in more detail at the ways in which stories are constructed in the press. Using the grid of hazards, dividing them into the primary categories of chemical, biological and radiological, and natural, accidental and deliberate occurrences, plus informative articles with preventive slant, twenty-one (21) stories were selected for narrative analysis.

Stories were selected that were related to the scenarios constructed for use with the focus groups. With the exception of five articles selected because they exhibited important stylistic features, all the other stories were recounted in at least two articles, mostly in different newspapers.

There were no stories about naturally-occurring radioactive hazards, floods, or fires that had been ascertained as deliberately lit. The final type of article noted was informational where the main orientation of the report was to give information about a decision, an illness or preventive actions in relation to a hazard.

In order to cover different hazards and situations, three stories were included in the analysis for biological hazards, and fire. The selection of stories is summarised in Table 22, together with the number of articles for each story and the number of papers in which the story occurred.

Most of the articles were either news reports or in-depth accounts with the exception of the nuclear waste site debate.

- There appear to be four (4) distinctive narrative styles:
  - Straight information / reportage
  - Simplistic but even-handed presentation of point(s) of view
  - Presentation of points of view with critical narrative
  - Action-oriented

**Table 22: Stories selected for narrative analysis**

<b>Occurrence</b>	<b>Chemical</b>	<b>Biological</b>	<b>Radiological</b>	<b>Fire</b>	<b>Flood</b>
<b>Natural</b>	Potential cemetery leak	Bairnsdale ulcer	n/a	Wildfire	Flash flood
No. articles	4	3		2	2
No. papers	2	2		2	2
<b>Accidental</b>	Herbicide spill	Avian 'flu	N-dump	Fuel reduction blaze	Burst water main
No. articles	2	4	10	2	2
No. papers	2	2	3*	2	2
<b>Deliberate</b>	New gas store for Coode Is.	Mutant bacteria	Isotope loss	n/a	n/a
No. articles	2	1	2		
No. papers	2	1	2		
<b>Information</b>					
<b>Story 1</b>	Contaminated food recall	Blue-green algae	N-waste not dangerous	Bairnsdale VFF meeting	Council flood plan
No. articles 1	2	1	1	3	1
No. papers 1	2	1	1	1	1
<b>Story 2</b>		Hospital anti-terror kits		Council warning on burn-off	
No. articles		3		2	
No. papers		3		2	
<b>Story 3</b>		Gastro-enteritis outbreak		Fire recovery education kit	
No. articles		1		2	
No. papers		1		1	

\* This item attracted one section of letters in each of the three newspapers, and one editorial

### *Information/reportage*

In this style, an event is reported, with some details of what happened to whom, when and where, and may include a quotation from one or more spokespersons or stakeholders. The public is informed that something has happened, and a message may be given to reassure the public concerning the event.

#### **Example 1: Loss of radioactive materials.**

We are informed on Day 1 that anti-terrorist police are involved in the search for radioactive material stolen from RMIT (no exact location). We are told in one paragraph what this group does, and the police are quoted concerning what they believe happened, finishing with a description of the safe in which the material was stolen. There is no follow-up on the *Herald Sun* concerning the theft, nor does it appear in other metropolitan dailies. The following week, a local paper, the *Whittlesea Leader*, reported that the safe had been found in an RMIT car park at Bundoora, what it contained, with reassurances from a professor that all was safe, a comment from a DHS spokesperson reminding us that people had been warned (which begs the question of why it did not appear in any metropolitan daily paper) but that it was a low risk. Meanwhile it's over to the local Criminal Investigation Unit to deal with the theft.

We find out in Example 1 in a simple way what has happened and what actions have been taken. There are no complications or evaluations of the event until the belated report of the message from DHS when all is now well and good. The lack of follow-up story in the daily paper, or of reporting on the DHS warning, is of concern to those wishing to keep the public effectively informed. No source is cited for the information reported by the journalists. Even simpler are the straight stories associated with contaminated food recall, which list the products, any identifying details, and not even a place where suspect goods should be deposited. What is remarkable about these two stories (one each for two separate products) is that both appeared only in regional daily papers, not in the metropolitan dailies.

### *Simplistic presentation of viewpoints*

Here there is evidence that the reporter(s) has/have consulted a number of sources. However, there is scant attempt at evaluation of these sources and no future perspective on the event.

#### **Example 2: Herbicide spill**

In mid-June 2004, *The Age* reported that a train had crashed into a truck sparking fears of a chemical spill. We are told that no-one was hurt (Rural Ambulance Victoria), and the chemical that was feared spilled (CFA), while the police expected to charge the truck driver. This is basically an information report. Two weeks later, the *Herald Sun's* regional reporter interviewed local farmers and landowners who claimed their crops had been killed by the substance which, contrary to initial reports, was not a fertilizer but an herbicide.

The story focuses on one couple who are contemplating suing the company 'responsible for the herbicide' (told in great details), with one large photo of the man beside some white powder on the railway line, and another of CFA firefighters at the crash). 'Experts' are quoted about the effects of the substance on people and the environment. The last word however goes to a company representative saying they've 'worked diligently with the EPA to protect the environment'.

The story is a series of unlinked statements that tell us what happened and its immediate consequences, but one wonders what the point of it is. Is all well? Or is there more to come? In between, the same paper had published a letter to the editor from someone over 100 km from the spill exhibiting concern about the contents and effects of the substance spilled. The final paragraph is scathing of 'commercial spin gone mad' in the reassurances that the company issued, yet the same paper a week later gives the company the last word.

Again, we see the difference between a series of brief facts, and some critical examination of those facts and the weighing up of consequences. There is no follow-up article on actions taken in the *Herald Sun* so readers are left with a health warning and few means to assess the risks involved.

The above example both shows the inconsistencies in content in the one paper concerning an issue, and a style of reporting that appears to give lots of facts/points of view, but does little to provide a narrative that enables the reader to make sense of the event and its consequences. The first and second articles bring out the difference between reportage, and the presentation of 'facts' with viewpoints.

#### *Points of view with critical assessment*

The reports in *The Age* and the *Herald Sun* about an outbreak of Bairnsdale ulcer (*Mycobacterium ulcerans*) provide a further contrast in reporting styles. Here we see a good example of a critical assessment presented alongside factual information and points of view in two *The Age* articles in contrast to the *Herald Sun*.

#### **Example 3: Bairnsdale ulcer**

Both *The Age* and the *Herald Sun* reported a 'disease' outbreak on 15 July 2004.

The photo and slant of the short *Herald Sun* article is on the fact that 'footy great' David Parkin had suffered from Bairnsdale ulcer. We are then told in successive paragraphs that doctors are investigating eight cases, where the disease broke out, and a message from the Chief Health Officer to consult a doctor about skin sores or ulcers that are not healing. All useful information. However, *The Age* on the same day gives much more details of the nature of the disease (said here to have affected six people), some background on previous occurrences, and the Chief Health Officer gives more details of both the development of the lesions and preventive action. Parkin is mentioned, with some details of his experience which enables us to have a greater sense of the seriousness or otherwise, and his outcomes. The reader has a better opportunity to assess both risk and seriousness, and how to avoid it, from this article. It was followed nine days later with an account of investigations being conducted into the source of the bacterium at Point Lonsdale, and further details of when it might be transmitted to humans, progress of the disease, and an assessment of its seriousness.

#### *Action-oriented*

This style is largely polemical, either arguing for actions to be taken (often found in editorial comments), or sympathetically portraying activists. It is also associated with articles that attempt to influence opinion in one direction.

#### **Example 4: 'In the grip of nuclear neurosis'**

Several days after the Howard government announced that the proposed nuclear waste dump would not be located in South Australia after all, despite nearly 12 years of investigation into possible sites, ending with a recommendation in favour of Woomera, *The Australian* printed an article by a named nuclear physicist and

engineer castigating the way in which the debate had been conducted. The main point is that Australia 'needs a well-regulated and centralised nuclear waste repository', the Howard government was taking the right steps in funding a new research reactor at Lucas Heights, and by contrast, the South Australian government was creating a phobia about nuclear energy in the way it went about rejecting the waste disposal plan. The reader is presented with credible information about the nature of the waste produced from the types of nuclear activities carried out in Australia, and the article ends with a warning that if we try to become a nuclear free zone, something that is unattainable anyway, we'd have to stop a number of important activities, including medical diagnoses. The final paragraph is a stinging critique of 'pseudo-science, radiation neurosis and political opportunism'.

On the surface, this type of article gives a lot of useful information for the reader to think about. However, it contains its own inbuilt evaluation, and no alternative viewpoint is posed. While the previous week had presented a number of negative points about nuclear waste disposal, most were in fact presenting the political debate about not locating the facility in any one 'backyard'. While these articles politicised the debate, the presentation of an apparently dispassionate 'expert' opinion that only presents one side does not even up the score.

These four narrative 'types' are suggestive, pointing in particular to ways of critically examining newspaper content and asking : what would the reader understand about the issue, the risks involved, and the actions to be taken based on this report.

Based on the elements of a narrative suggested by Coffey and Atkinson (1996) there is also a noted variation between newspapers in the extent to which narratives include:

- Any mention of complications
- Evaluations

#### **Example 5: Cemetery leakage?**

On 5 May 2004 the *Manningham Leader* reported that opposition to the extension of a cemetery in Warrandyte was 'absurd', quoting 'cemetery officials'. In a good example of simplistic viewpoint reporting, we are then given the views of major stakeholders concerning the proposal, emphasising residents' concerns with water pollution. An EPA spokesperson has the last say, that the authority is 'not aware of any complaints about cemetery pollution'.

However immediately below this article is a second one reporting that local MPs, are backing calls for an independent investigation, concerned residents' viewpoints are recorded, and the mayor offers to look into the matters raised (last word). This is clearly a polemical stand, giving a small paragraph to reassurances that the Cemetery Trust is trying to 'do the right thing'. There is one photo of the graves set in a bush surround.

Two weeks later, the same paper reports on the large number of submissions received concerning the proposed expansion, and interviews with residents. The emphasis here is not on the possible pollution but the need for a democratic process and possible traffic congestion from the enlargement; this time the Cemetery Trust has the last word, indicating the urgent need for the expansion. The photo shows roses being carefully tendered in the memorial garden section, emphasising the use of the cemetery rather than the environment, as in the first photo.

In between the two articles, *The Age* presented an account of the issues and consultation with various stakeholders which gives both an explanation of the concern about possible seepage into the local creek and ultimately the Yarra River, other aspects of the larger cemetery that are of concern, and more details of the Cemetery Trust's responses to these concerns.

With some of the heat taken out of the debate, despite the headline emphasising the residents' 'fight', it is possible from this type 3 account to weight up the pros and cons through understanding the complications and some evaluations of the situation. Like most newspaper reports, the story seems to have ended there and no account of outcomes is given.

#### Results

This leads to another major point concerning the narratives, namely that most articles are strictly time-limited.

They:

- Deal with what happened in the last 24 hours regarding a particular event
- Little follow-up from the 'one-day wonder', and what there is consists mainly of interest stories, as shown above in Example 1 where one paper announces the theft and another, the recovery, and Example 6, below.
- The exceptions are several articles which deal with an issue which is not imminent or recent and includes factual information about the issue, as seen in Example 7, below.

#### **Example 6: Burst water main**

*The Age* presented a brief news item that tells the amount of water spilled, where it was, that it flooded a house, how long it took to repair and how the residents fared. The *Herald Sun* gave a lot more space to the residents' plight, with three photos to one small one in *The Age*. It also gave details of Melbourne Water's plans regarding the old pipes connected with the offending dam. Neither paper had any follow-up either on the restoration of the residents' house, or of the water mains.

This issue of time perspective is related to the way in which readers can locate an issue and understand its seriousness and implications. As Haavelsrud (1981) suggested, the way in which information is included or excluded has an important bearing on how people judge which factors are, and which are not, seen in relation to each other. This in turn affects how they can act in relation to the information.

#### **Example 7: Armed for bioterror**

Probably the most interesting article in the entire period under consideration was a lengthy piece in *The Australian* in their *Inquirer* section on 12 June 2004. The subject was concerns raised by advances in genetic engineering about the possibility that terrorists could now relatively easily create a superbug and unleash it on a population. It quotes scientific and security experts in a considered account of how one group did accidentally create such a bug and the consequences should the technology get in the wrong hands. It also reports that security agencies are 'very interested' in the development and are following it closely. There is a useful breakout that outlines worst-case scenarios for making both a killer 'pox and a killer 'flu. While the tone of the article is not

reassuring, it does mention that a contemporary biotechnology conference showcased measures being taken to improve defences against bioterrorism.

The above article is informative, and thoughtful, and shows complications, evaluations and some results (anti-terrorist agency interest). It stood out over most of the rest of the reporting on environmental health issues in the three month period, suggesting that on the whole, reporting on the issues is reactive. A related example is reports in the *East Gippsland News* of a public meeting to discuss the effects of the January 2003 fires. It illustrates thorough reporting of a locally relevant issue.

#### **Example 8: Bushfire meeting**

There are three reports: the first announced that the meeting will be held, giving details of time and location; the second, a week later gave the program in some detail, and the third reported on what the main speakers said. In addition to this overview of the meeting, the summing up is presented in clear point form, together with suggested follow-up action strategy.

The reader has a clear sense of what to expect, what happened, and what they can do about it. Different points of view are related, agreements and disagreements between speakers noted, and a political slant is also placed on it by an expert speaker from outside the community, suggesting in a non-confrontational way that action is called for.

On the other hand, some potentially important issues do not gain widespread coverage and therefore do not obtain wide discussion on any level, for example the two isolated brief reports in the rural press of food contamination, and reports in only two local weekly papers of the lifting of fire restrictions accompanied by reminders of regulations governing burning off at any time.

#### *Generalisations about different newspapers*

As suggested in Examples 2 and 5 above, different newspapers appear to consistently give the last word / say in the matter to a spokesperson related to the cause of the problem in default of a conclusion. The *Herald Sun* seems consistently to give the last say to either an aggrieved person or a member of the general public who has suffered as a result of an event. This technique leaves the reader with a sense of unaddressed grievance. *The Age* and *The Australian* are more likely to reach a conclusion or to let a contentious party speak last. In this case, the reader has a sense that this is a contentious issue, with either the newspaper suggesting a conclusion, or leaving it to the reader. It is a case of one style of reporting emphasising stories, and the other, issues. The rural dailies and local weeklies tend to fall somewhere in between the two approaches, depending on the extent to which local people are affected; if local people are highly affected by an issue there is an emphasis on the story. They are also, however, much more likely to carry articles with preventive information, for example on what to do to avoid gastro-enteritis, the development and dangers of blue-green algal blooms or prevention of fuel reduction burn-offs getting out of control.

Overall,

- There is generally a great deal of difference between the *Herald Sun* and other metropolitan daily newspapers in the way in which the narrative content is developed

- The majority of *Herald Sun* articles canvas a range of perspectives/viewpoints and present these in summary form, rather than as a sequential debate
- *The Age* and *The Australian*, whilst often canvassing the same viewpoints, present more detailed information, especially giving background to the issues and /or reasons for the problems, enabling the reader to place the narrative into a more comprehensive context
- The local and rural papers tend to be more personalised with both local stakeholders' views presented in detail, and photographs, but they also tend to give more preventive and usable information on events/issues than the metropolitan dailies.

#### **Example 9: A new storage issue for Coode Island**

Two articles on this issue were published, one week apart. In the first, the *Herald Sun* reported that Docklands residents could soon be watching ships carrying toxic gas up the Yarra River. A company was reported to want to store a named flammable gas at Coode Island, so that for the first time ships carrying hazardous gas would be going that far up the Yarra. We learn a little about that company, and a second one that has tendered to Dow Chemicals (first reference) to store the gas elsewhere. Some space is given to local council views on this, with a final reassurance from the first company that fears are misfounded, and from Dow Chemicals, with no explanation of their role, saying the process would take some time to decide. Reading on the same issues a week later in *The Age* is like suddenly understanding what it's all about. We find out that Dow Chemicals has to find a new supplier and storage facilities because the gas used to be made locally and now has to be imported, and that the two tendering companies both have other contracts for storage at Coode Island. One of the companies says it has withdrawn from consideration because of the potential risks from the transport of the liquid gas, the other company disagreeing. We learn that EPA approval, not yet sought, would be necessary for such storage and that Worksafe Victoria is involved in discussions. A process has been clarified, as has the nature of the issue, and disagreements are in the open. Docklands residents are presented as privileged in the first article, in a rather snide fashion ('now you'll know what it's like for the rest of is' seems to be implied); a Greens councillor is mentioned in the second but no residents.

#### *Conclusions*

Issues are not evenly reported between newspapers in terms of size of article, position, and accompanying illustration.

The day of the week also makes a difference: possibilities for non-urgent messages appear to be Thursday, follow by Wednesday and Friday.

Most 'news' is oriented to the short-term event or issue, with little follow-up (flood and fire aftermath were the exceptions).

While a number of stakeholders is listed in many of the articles, there is often little clarification of their role in the event or attempt to moderate conflicts of interest or even to explain their interest in the issue.

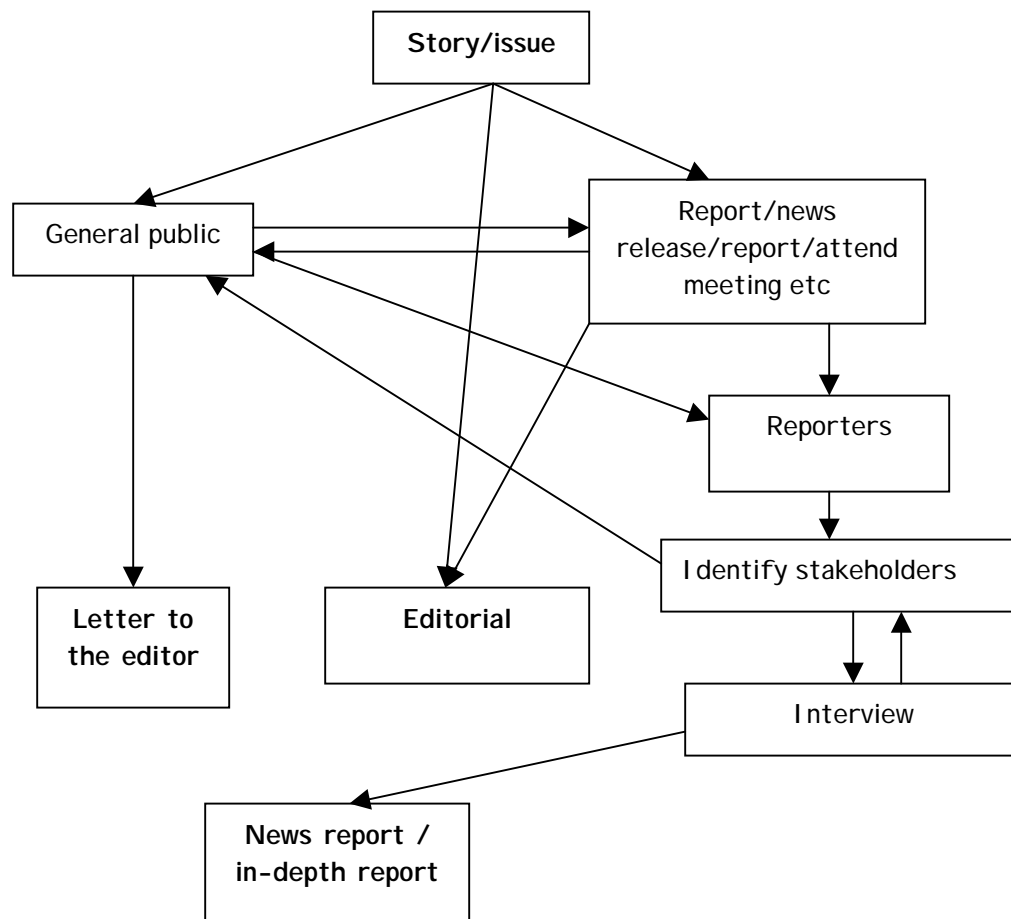
There is an increased tendency to print articles with a journalists by-line, rather than invited articles by experts, at least in the area of reporting covered here (environmental health). This is in contrast to findings from just over a decade ago (Burns & Robinson 1993).

The citation of experts varies between different issues, with the most cited for fire, and micro-organisms.

It is clearly difficult for the public to assess the source of information in their newspapers, even when a number of stakeholders is mentioned. And while the number of articles by named journalists was high, very few of these were by environmental or health reporters.

There are also big differences in terms of content and style of reporting and narrative style. Most papers tend to be story-oriented rather than issue-oriented, and to address the public in general rather than specific groups of stakeholders.

**Figure 9: Model explaining how different types of news reports are constructed**



### *Implications*

Understanding which papers are most likely to report particular issues is helpful in placing news releases and public information, though this should be taken in conjunction with information from focus groups on which sources the public expects to use for emergency information.

Clear, concise news briefings from governments do appear to be used by reporters so care preparing these is probably time well spent.

There are few specialised news reporters. This suggests that research is needed in order to identify the appropriate person with whom to place news releases and information.

Journalists are more likely to seek opinions than information, so if you don't provide correct information nobody else will, and it needs to be brief in order to ensure that your version, not the journalist's summary, will be printed.

Few stories linger for more than a day or so, and since there is a tendency not to provide follow up, it is important for public risk apprehension and also for closure on issues to provide follow-up information, preferably within a week of an event or problem.

### **References**

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**Appendix 2.1: Table identifying content of the environmental health articles**

<b>Environmental category (number of articles)</b>	<b>Sub-category</b>	<b>Number of articles</b>	<b>Newspapers</b>
<b>Biological hazards (20)</b>	Insects	3	Border Mail
	Exotic pets	1	Herald Sun
	Vermin	4	Herald Sun, Age
	Pigeons	12	Herald Sun, Age, Shepparton News
<b>Micro-organisms and communicable diseases (28)</b>	Legionella	11	Shepparton News, Border Mail, Herald Sun, Age
	Meningococcal disease	2	Australian, Border Mail
	<i>Mycobacterium ulcerans</i>	3	Age, Herald Sun
	Dengue fever	1	Australian
	Hepatitis C	1	Border Mail
	Gastroenteritis	1	Border Mail
	Hydatids	1	Border Mail
	Listeriosis	1	Border Mail
	SARS	2	Border Mail
	Avian influenza	3	Age, Herald Sun
	Emergency Management	2	Herald Sun, Shepparton News
	<b>Food contamination (18)</b>	Frog in airline food	3
Christmas at the Old England		1	Heidelberg Leader
Kelloggs food recall		1	Shepparton News
Cornflour		1	Shepparton News
Genetically modified food		12	Border Mail, Australian, Herald Sun
<b>Border security &amp; bioterrorism (23)</b>	General preparation	4	Herald Sun, Australian
	Ports, airports, stations	4	Herald Sun, Australian, Border Mail
	Medical	4	Herald Sun, Age, Whitehorse Leader
	Radioactivity	2	Herald Sun, Whitehorse Leader
	Gasses	1	Age
	Plane bomb	8	Age, Australian

<b>Chemical hazards (26)</b>	Asbestos	5	Age, Australian, Free Press Leader, Herald Sun, Whitehorse Leader
	Power lines	3	Herald Sun
	Gas blast	2	Age, Herald Sun
	Air quality	5	Age, Australian, Border Mail, Whitehorse Leader
	Chemical spills	8	Age, Herald Sun, Border Mail
	Chemical clean-up	1	Heidelberg Leader
	Fertility risk	1	Border Mail
	Explosives	1	Whitehorse Leader
<b>Pollutants (91)</b>	Soil	3	Herald Sun, Australian, Diamond Valley Leader
	Rivers (general, Yarra and Murray)	5	Herald Sun, Age, Progress Leader, Australian
	Sea / Port Phillip Bay	3	Herald Sun, Age
	Antarctica	2	Herald Sun
	Cemetery sites	4	Age, Manningham Leader
	Tip / quarry	2	Whitehorse Leader, Whittlesea Leader
	Toxic dumps	29	Herald Sun, Age, Australian, Border Mail, Shepparton News
	Nuclear dump	26	Australian, Herald Sun, Age
	Beaches	6	Age, Herald Sun, Australian
	Parks	1	Border Mail
	General street rubbish	7	Herald Sun, Whitehorse Leader, Whittlesea Leader, Shepparton News, Border Mail
	Biofuel project	2	Shepparton News
	Cyanobacteria (BGA)	1	Shepparton News
	<b>Storms (not including floods) (5)</b>	Twisters	3
Lightning		1	Herald Sun
El Niño (as a cause of Hepatitis A)		1	Herald Sun

<b>Fire - Risk and risk reduction (55)</b>	Smoke alarms	5	Border Mail, Shepparton News, Diamond Valley Leader
	Check homes	2	Border Mail, Free Press Leader
	Fines for breaching	3	Diamond Valley Leader, Ranges Trader Mail, Manningham Leader
	City debate/plans	4	Manningham Leader, Whittlesea Leader, Ranges Trader Mail, Diamond Valley Leader
	Burning off debate	7	Age, Manningham Leader, Shepparton News, Border Mail
	Victorian Farmers Federation debate	4	East Gippsland News, Border Mail
	Politics	1	Shepparton News
	Review of past fires	6	Border Mail, East Gippsland News, Shepparton News
	Funding/plans	6	Diamond Valley Leader, Whitehorse Leader, Heidelberg Leader, Border Mail, Shepparton News
	Fire outbreaks	17	Border Mail, Shepparton News, Free Press Leader
<b>Services (25)</b>	International meeting	2	Ferntree Gully & Belgrave Mail, Ranges Mail
	Establishing disaster group	2	Ferntree Gully & Belgrave Mail, Ranges Mail
	Extension of services	8	Free Press Leader, Whittlesea Leader, Diamond Valley Leader, East Gippsland News, Shepparton News
	Delivery of services	2	Border Mail, Shepparton News
	Training and education	4	Manningham Leader, Shepparton News
	Individuals and teams	7	Manningham Leader, Shepparton News, Whitehorse Leader, Ranges Trader Mail
<b>Water (133)</b>	Salinity	6	Shepparton News, Border Mail, Age, Australian
	Restrictions	14	Progress Leader, Free Press Leader, Whitehorse Leader, Whittlesea Leader, Diamond Valley Leader, Herald Sun, Age, Australian
	Costs	3	Age, Herald Sun

	Initiatives	27	Herald Sun, Age, Shepparton News, Heidelberg Leader, Whitehorse Leader, Progress Leader, Free Press Leader, Manningham Leader, Diamond Valley Leader, Border Mail, East Gippsland News, Australian
	Good news – returning wildlife	8	Free Press Leader, Progress Leader, Diamond Valley Leader, Heidelberg Leader, Ranges Trader Mail
	Water quality plans	7	Shepparton News, Herald Sun
	Federal / state strategy	55	Herald Sun, Age, Australian, Shepparton News, East Gippsland News, Border Mail
	Floods	13	Herald Sun, Age, Australian, Border Mail, Shepparton News, Whittlesea Leader, Manningham Leader, Heidelberg Leader
<b>Conservation, greenhouse etc (116)</b>	Kyoto Protocol	6	Age, Australian, Herald Sun
	Greenhouse gasses	6	Age, Australian, Herald Sun, East Gippsland News
	Climate change	10	Age, Australian, Herald Sun, Shepparton News
	Wind farms	6	Age, Australian, Herald Sun
	Solar power	4	Age, Herald Sun
	Nuclear power	2	Age, Herald Sun
	Energy policy debate	54	Age, Australian, Herald Sun
	'Green' houses	5	Australian, Whittlesea Leader, Progress Leader, Melbourne Weekly
	National parks	2	Age
	Environmental funding	2	Ranges Trader Mail, Age
	Logging	1	Age
	'Green' action groups	5	Age, Free Press Leader, Ranges Trader Mail, Progress Leader, Border Mail
	Conservational leaders	3	Age, Herald Sun
	World Environment Day	4	Age, Herald Sun, Progress Leader
	Population policy	4	Age, Herald Sun
Environment NOS	2	East Gippsland News, Age	

**Appendix 2.2: List of environmental health topics in the period surveyed**

Subject	Freq (Percent)	Subject	Freq (Percent)
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Air quality	1 (0.4%)	LPG tanker crash	1 (0.4%)
Air quality/traffic emissions	1 (0.4%)	Legionella	11 (4.4%)
Anti-anthrax spray available soon	1 (0.4%)	Listeriosis	1 (0.4%)
Asbestos fears	5 (2.0%)	Litter	4 (1.6%)
Australian preparedness for pandemic	1 (0.4%)	Live frog in Qantas salad	3 (1.2%)
Avian flu	3 (1.2%)	Maintaining blood supply	1 (0.4%)
Bairnsdale ulcer	3 (1.2%)	Meningococcal disease	2 (0.8%)
Beach smoking ban	5 (2.0%)	Mercury spill	2 (0.8%)
Bio-security against plant pests	1 (0.4%)	Micro-animal contaminated food	1 (0.4%)
Biofuel plant	2 (0.8%)	Nature of twisters	1 (0.4%)
Blue-green algae	1 (0.4%)	National CO2 output	1 (0.4%)
Burning off dangers	1 (0.4%)	Nuclear dump	22 (8.8%)
Bushfire aftermath	6 (2.4%)	Ocean pollution	3 (1.2%)
CD outbreaks in animals	1 (0.4%)	Paper recycling	1 (0.4%)
CO2 emissions from wind generators	1 (0.4%)	Pesticide spill	1 (0.4%)
Cemetery leakage	4 (1.6%)	Pigeons	12 (4.8%)
Chemical spill	1 (0.4%)	Plane bomb scare	8 (3.2%)
Coastal reserve action	1 (0.4%)	Plane hit by lightning	1 (0.4%)
Coode gas storage potential terror issue	1 (0.4%)	Plastic bags	1 (0.4%)
Cornflour recall	1 (0.4%)	Pollutant exposure damages fertility	1 (0.4%)
Council action plan to reduce CO2	1 (0.4%)	Port Phillip Bay	2 (0.8%)
Dengue fever transmission	1 (0.4%)	Potential bioterror bug	1 (0.4%)
Disaster kits for hospitals	3 (1.2%)	Quarry fill	3 (1.2%)
Drainage overhaul for flood prevention	1 (0.4%)	Rats	3 (1.2%)
El Nino health effect	1 (0.4%)	Recall of contaminated cereal	1 (0.4%)
Electromagnetic field emissions	2 (0.8%)	Risks of burning off during fire danger	1 (0.4%)
Explosives	1 (0.4%)	River pollution (Yarra and others)	1 (0.4%)
Fines for breach of new fire regulations	1 (0.4%)	River pollution (Yarra)	4 (1.6%)
Fire education	3 (1.2%)	Rodents	1 (0.4%)
Fire outbreak	1 (0.4%)	Roof at kinder a flood hazard	2 (0.8%)
Fire policy debate	1 (0.4%)	SARS	2 (0.8%)
Fire safety	2 (0.8%)	Salts, fertilizers and nitrates	1 (0.4%)
Flash flood from storm	1 (0.4%)	Sewerage leak	1 (0.4%)
Flash floods over southern Australia	1 (0.4%)	Smoke alarms	4 (1.6%)
Flood aftermath	2 (0.8%)	Soil pollution	2 (0.8%)
Flood at Mornington Peninsula	2 (0.8%)	Stolen radioactive material	2 (0.8%)
Flood danger from faulty loch	1 (0.4%)	Street rubbish dumping	1 (0.4%)
Flood from contaminated	2 (0.8%)	Temporary sewage	1 (0.4%)

		<b>Total articles</b>	<b>250</b>
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