2012 Gippsland Flood Event - Review of Flood Warnings and Information Systems

TRIM ID: CD/12/522803
Date: 21 November 2012
Version: Final
MINISTERIAL FOREWORD

In early June this year, heavy rain and widespread flooding affected tens of thousands of Victorians across the central and eastern Gippsland region.

The damage to towns and communities was widespread – particularly in the Latrobe City, Wellington and East Gippsland municipalities. Homes, properties and businesses were damaged, roads and bridges were closed, and more than 1500 farmers were impacted by the rains. A number of people were rescued after being trapped or stranded by the rising waters.

Following the floods, some communities had a perception that telephone-based community warnings and information had failed them. As the Minister for Police and Emergency Services, I requested Victoria’s Emergency Services Commissioner to review the effectiveness, timeliness and relevance of the community information and warnings.

This report has met my expectations and has identified the consequences and causes for the public’s perception.

I welcome the review’s findings. I am confident these will, in time, lead to better and more effective arrangements for community information and warnings and contribute to a safer and more resilient Victoria.

PETER RYAN
Minister for Police and Emergency Services
Contents

Glossary .......................................................................................................................................... v

Executive Summary .......................................................................................................................... 1

1. June 2012 Gippsland flood ....................................................................................................... 3
   1.1 Key physical aspects of the 2012 Gippsland flood event .................................................. 3
   1.2 Key aspects of information and warnings in the incident response ............................... 6
       1.2.1 Key information and warnings from Bureau of Meteorology ............................. 6
       1.2.2 Key information and warnings through incident management ........................... 7

2. Review Approach ...................................................................................................................... 12
   2.1 Recent History of floods in Victoria ................................................................................. 12
   2.2 Objectives and scope ........................................................................................................ 12

3. Preparedness ............................................................................................................................. 13
   3.1 Community preparedness ................................................................................................. 13
       3.1.1 Risk awareness ......................................................................................................... 13
       3.1.2 Peoples confidence in their ability to respond ......................................................... 13
       3.1.3 Household or community pre-planning .................................................................. 14
       3.1.4 Nature of community information expectations ..................................................... 14
       3.1.5 Information and warnings-specific functions ......................................................... 15

4. Effectiveness of community information and warnings for the June 2012 event .............. 18
   4.1 Overview of community perception ................................................................................. 18
       4.1.1 Information as threats emerge and develop ............................................................ 18
       4.1.2 Prepare to evacuate and evacuate warnings ............................................................ 19
   4.2 Case studies of two localities ............................................................................................. 21
       4.2.1 Traralgon .................................................................................................................. 21
       4.2.2 Paynesville and Raymond Island ............................................................................ 24

5. Key Issues and Opportunities for Improvement .................................................................... 27
   5.1 Summary of key issues ....................................................................................................... 27
       5.1.1 Overview ................................................................................................................... 27
       5.1.2 Clarity and completeness of local strategies, plans and inputs ............................... 27
       5.1.3 Availability of trained and skilled personnel ............................................................ 28
       5.1.4 Incident management following planned roles and processes ............................... 28
       5.1.5 Work tools and processes ....................................................................................... 29
       5.1.6 Operational IT and facility support ......................................................................... 29
   5.2 Opportunities for improvement .......................................................................................... 30
       5.2.1 Management of community expectations ............................................................... 30
       5.2.2 Efficient and effective supporting tools and processes .......................................... 31

6. Conclusion .................................................................................................................................. 32

7. References .................................................................................................................................. 33
Appendices
Appendix 1 Method and data sources and limitations .................................................................35
Appendix 2 Summary of evidence and the Lines of Enquiry ....................................................39
Appendix 3 Stakeholder consultation list ..................................................................................44
Appendix 4 Agency roles ...........................................................................................................45

Tables
Table 1: Key BoM Flood Warnings for Gippsland catchments that went into major flood ..........7
Table 2: Key response activity relevant to community information and warnings ..................8
Table 3: Distribution of Emergency Alert messages .................................................................10
Table 4: Chronology of key information and warning response activities in Traralgon ..........24
Table 5: Chronology of key information and warning response activities in Paynesville and Raymond Island .................................................................26

Figures
Figure 1: Flood affected rivers and localities during 4th -9th June 2012 in Gippsland .................4
Figure 2: Greater detail on flood affected rivers and localities around Traralgon and the Gippsland Lakes .......................................................................................5
Figure 3: Localities that received Emergency Alerts ...............................................................11
Figure 4: Gippsland community satisfaction with information as flood threats emerged and developed ...........................................................................................................19
Figure 5: Gippsland community satisfaction with information provided in, and timing of Emergency Alerts ...........................................................................................................21
Figure 6: Chronology of key information and warning response activities in Traralgon, Mon 4 June (pm) and Tue 5 Jun (am) .................................................................23
Figure 7: Total Flood Warning System ....................................................................................37
### Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIIMS</td>
<td>Australasian Inter-service Incident Management System</td>
</tr>
<tr>
<td>BoM</td>
<td>Bureau of Meteorology</td>
</tr>
<tr>
<td>CFA</td>
<td>Country Fire Authority</td>
</tr>
<tr>
<td>CMA</td>
<td>Catchment Management Authority</td>
</tr>
<tr>
<td>DSE</td>
<td>Department of Sustainability and Environment</td>
</tr>
<tr>
<td>EA</td>
<td>Emergency Alert – telephone based warning system</td>
</tr>
<tr>
<td>EMMV</td>
<td>Emergency Management Manual Victoria</td>
</tr>
<tr>
<td>ESC</td>
<td>Emergency Services Commissioner</td>
</tr>
<tr>
<td>ESP</td>
<td>Emergency Service Providers</td>
</tr>
<tr>
<td>FLAGL</td>
<td>Flood Level Assistant for the Gippsland Lakes</td>
</tr>
<tr>
<td>ICC</td>
<td>Incident Control Centre</td>
</tr>
<tr>
<td>IMT</td>
<td>Incident Management Team</td>
</tr>
<tr>
<td>MFB</td>
<td>Metropolitan Fire Brigade</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>OESC</td>
<td>Office of the Emergency Services Commissioner</td>
</tr>
<tr>
<td>OSOM</td>
<td>One Source One Message</td>
</tr>
<tr>
<td>RFA</td>
<td>Request for Assistance</td>
</tr>
<tr>
<td>RSS</td>
<td>Really Simple Syndication</td>
</tr>
<tr>
<td>SCC</td>
<td>State Control Centre</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>TFWS</td>
<td>Total Flood Warning System</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>VicPol</td>
<td>Victoria Police</td>
</tr>
<tr>
<td>VICSES</td>
<td>Victoria State Emergency Service</td>
</tr>
<tr>
<td>VFR</td>
<td>Victorian Flood Report</td>
</tr>
</tbody>
</table>
Executive Summary

In early June 2012, parts of Gippsland experienced severe weather with heavy rainfall causing flooding across a number of municipalities, including Latrobe, Wellington and East Gippsland.

It was widely reported that certain communities in the most affected areas believed the procedures for warning and informing them had ‘failed’. This review has identified why those views are held and the root causes of the failures.

As part of his role to help strengthen Victoria’s emergency management arrangements, the Emergency Services Commissioner conducted an independent review of flood warning and information systems for the June 2012 Gippsland flood event. The review focused on identifying opportunities to improve community information and warnings.

The terms of reference were to:
• determine the effectiveness of information and warnings disseminated to communities which were under immediate threat of floodwaters (in the June 2012 Gippsland flood event)
• assessment of the timeliness and relevance of community information and warnings issued during this event.

Key Findings

The review highlights several important findings that are consistent with those of the Review of the 2010-11 Flood Warnings and Response (commonly referred to as the Victorian Flood Review). The findings are:

• The majority of the community members surveyed expressed satisfaction with the way in which they were first informed about the flood threat and the information available to them during the floods

• For some individuals and certain communities, the effectiveness of information and warnings varied. Some key reasons cited for this included:
  o inappropriate timing
  o perceived inaccuracy
  o perceived lack of clarity.

• Telephone-based warnings, through both Emergency Alert (EA) and the Latrobe City Council warning systems, proved a challenge for agencies to use consistently, accurately and in a timely manner. These warnings fell short of the community’s expectations. Some of the major causes of negative perspectives were:
  o the extended time to construct and disseminate EA messages compared to the time that intelligence became available from the Bureau of Meteorology
  o the appropriateness of EA ‘Prepare to Evacuate’ messaging to local conditions
  o and in the case of Traralgon South, the failure of the Latrobe City Council phone warning system.

• Specific factors affecting the communities’ response to warnings and evacuation messages included:
  o flash flooding – speed of onset and volume of water
households receiving specific warnings with little or no time before flood impacts.

- Limitations in the flood information and warning system:
  - lack of clarity in relation to managing flood intelligence due in part to incomplete local strategies, plans and inputs
  - non-availability of sufficiently trained and skilled personnel in the ICC (Bairnsdale)
  - a need for greater use of local, on-the-ground intelligence in the affected areas
  - ineffective and inefficient work tools and processes in the ICC (Bairnsdale) for constructing and communicating intelligence and the subsequent public information messaging
  - operational IT and facility support in the ICC (Bairnsdale) that were not integrated and interoperable.

Opportunities for Improvement

Key opportunities for improvement lie in three inter-related areas:

- Management of community expectations:
  - better understanding of what different groups within a community expect
  - continued community education
  - further development of tools that would allow the community to more easily access accurate and time-critical information.

- Agency incident management preparedness:
  - provide clarity and certainty in specific roles and responsibilities for each agency
  - refining IT tools to process the intelligence
  - a more comprehensive approach to planning, including the number of personnel, their training and better use of on-the-ground intelligence in the affected areas that enables immediate and strategic decision-making to be concurrent processes.

- Efficient and effective supporting tools and processes:
  - developing tools and workflows to quickly and reliably transform technical data into intelligence that can be used to construct messages for community information that are timely, relevant, tailored and effective
  - streamlining the authorisation processes for urgent warnings
  - high-quality local/municipal planning.
1. June 2012 Gippsland flood

1.1 Key physical aspects of the 2012 Gippsland flood event

During early 2012, locations across Victoria had experienced heavy rainfall and flooding. In particular, rainfall and flooding in May 2012 in the areas of Bass Coast, East and South Gippsland, Baw Baw and Latrobe resulted in saturated catchments with varying degrees of ability to absorb any more water.

On Sunday 3 June 2012, a low pressure weather system developed and then deepened rapidly during the next day directing a strong south-easterly flow over eastern Victoria. This resulted in significant rainfall across Gippsland. Large areas of central and eastern Gippsland received 100-150mm in the 24 hours up to 9.00am Monday on 4 June. Numerous stations recorded up to twice the average June monthly rainfall.

In the next 24 hours to early Tuesday 5 June 2012, there was further substantial rainfall, resulting in major flooding in ten catchments across Gippsland, including flash flooding in Traralgon Creek at Traralgon South. The peak 24-hour rainfall up to 9.00am on Tuesday 5 June included:

- 203mm Avon/Mitchell at Reeves Knob
- 193mm Snowy at Basins Creek
- 191mm Thomson at Murderers Hill
- 178mm Traralgon Creek at Mt Tassie
- 173mm Tambo at Mt Elizabeth
- 165mm Macalister at Licola.

From Tuesday afternoon, rain over Gippsland eased to scattered showers. However, streams and rivers continued to rise as water moved through the catchments. Water began to move into the Gippsland Lakes by Wednesday 6 June. Simultaneously, strong winds developed along the coast and at elevated locations in the East with a 144km/hr gust recorded at Mt Buller and 120km/hr at Gabo Island. These concurrent events drew heavily on the available resources of the Victoria State Emergency Service (VICSES).

Whilst all municipalities were impacted, the greatest flooding was centred on Latrobe City, Wellington and East Gippsland. Hundreds of trees fell as a result of the strong winds causing damage to properties and blocked roads and major highways. Infrastructure, such as bridges, roads and recreational areas (including caravan parks) was also damaged. Some locations east of Bairnsdale temporarily lost power and landline phones. There was significant rural inundation, including crop losses and more than 1,500 farmers were impacted.

From Sunday 3 June to Sunday 10 June, VICSES received 722 Requests for Assistance (RFAs) from Gippsland. There were 33 rescue events involving persons trapped or stranded by floodwaters.

This report recognises the efforts and valuable contribution of all volunteers who willingly gave their time to support their communities. It is also recognised that the emergency services and other agencies were operating in a dynamic environment and decisions taken by them at the time have then been scrutinised by others who now have the benefit of hindsight.
Figure 1: Flood affected rivers and localities during 4th -9th June 2012 in Gippsland

Source: Eastern Victoria Flood Affected Rivers and Towns – 4-9 June 2012 Map supplied by MFB, VICSES, CFA & DSE.
Figure 2: Greater detail on flood affected rivers and localities around Traralgon and the Gippsland Lakes

Source: Eastern Victoria Flood Affected Rivers 5 June 2012 Map supplied by MFB, VICSES, CFA and DSE.
1.2 Key aspects of information and warnings in the incident response

In the lead up to, and during the June 2012 Gippsland floods, community information and warnings were disseminated through a range of media and arrangements.

Emergency services and other agencies undertook a range of actions to inform and warn communities and help ensure their safety during the flood.

1.2.1 Key information and warnings from Bureau of Meteorology

On Thursday 31 May 2012, Bureau of Meteorology (BoM) advised VICSES of a severe weather event to affect, predominantly, the eastern and central parts of the state commencing overnight from Sunday 3 June 2012 for approximately a two-day period (VICSES, 2012a, p.2). On Friday 1 June, BoM issued a Severe Weather Outlook to agencies at the State Control Centre (SCC). This advised the initial estimated rainfall over the next few days up to the following Tuesday. At that stage, the estimated rainfall was not expected to result in significant stream rises, but BoM advised that they would monitor these over the weekend.

On Saturday 2 June at 4.16pm BoM issued a ‘Flood Watch’ for East Gippsland (Mitchell, Tambo, Snowy, Cann and Genoa Rivers). At 4.55pm BoM issued a Flood Watch for West and South Gippsland (Latrobe, Thomson, Macalister and Avon Catchments and South Gippsland Basin) as a result of the change in position of the low pressure system. At this time a ‘Minor Flood Warning’ was also current for the Latrobe River.

On Sunday 3 June 2012 at around 10.00am, BoM updated the Flood Watches for East Gippsland and advised of the high potential for significant rainfall from late Sunday into Monday with potential for flooding during Monday. At 10.30am they did the same for West and South Gippsland.

Flood Watches provided early notification of a potential flood threat from the developing weather situation, indicating the possibility of minor to moderate flooding in the East Gippsland catchments. From late Sunday, 24-hour rainfall totals ranging from 50 to 75mm in East Gippsland and 30 to 70mm in West Gippsland were forecast, with the highest over the Gippsland ranges.

On Monday 4 June at 10.30am, BoM issued a Weather Briefing for 4-5 June 2012 to the State Control Centre. This advised that heavier rain was expected from around midday that day and overnight, with 80 to 120mm possible. Isolated peak rainfall totals up to 150mm over the Gippsland ranges were also predicted, with strong winds on the coast and ranges. Flash flooding was also possible from Monday 4 June 2012. The precise region of heaviest rainfall was dependent on the exact positioning of the low.

Catchment specific Flood Warnings were issued from Monday afternoon. BoM continued to publish new and updated Flood Warnings for specific rivers and localities, where warning systems were in place. A total of twelve Flood Watches and 159 Flood Warnings (55 Minor, 45 Moderate and 59 Major) were issued during this event. Table 1 illustrates the BoM Flood Warnings for each catchment that went into Major flooding, when new flood warning levels were reached.

---

1 Major Flood Warnings were issued by the BoM for Morwell River (Morwell), Traralgon Creek (Traralgon), Tanjil River (Moe), Mitchell River (Bairndale), Snowy River (Orbost), Buchan River (Buchan), Macalister River (Tinamba/Newry), Avon River (Stratford) and Gippsland Lakes. Moderate Flood Warnings were issued for the Latrobe River (Morwell) and Cann River (Cann River). Minor Flood Warnings were issued for Genoa River (Mallacoota), Bombala River (NSW), Tambo River (Swifts Creek) and Bunyip River (Warragul).
Table 1: Key BoM Flood Warnings for Gippsland catchments that went into major flood

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traralgon Creek at Traralgon</td>
<td>Mon 4 June 3.59pm</td>
<td>-</td>
<td>Mon 4 June 9.59pm</td>
</tr>
<tr>
<td>Thompson River</td>
<td>-</td>
<td>Mon 4 June 6.46pm</td>
<td>Tue 5 June 3.05am</td>
</tr>
<tr>
<td>Macalister River</td>
<td>Mon 4 June 6.44pm</td>
<td>Mon 4 June 8.49pm</td>
<td>Tue 5 June 3.26am</td>
</tr>
<tr>
<td>Tanjil River</td>
<td>Mon 4 June 5.06pm</td>
<td>-</td>
<td>Tue 5 June 2.22am</td>
</tr>
<tr>
<td>Buchan River</td>
<td>Tues 5 June 12.06am</td>
<td>-</td>
<td>Tue 5 June 4.07am</td>
</tr>
<tr>
<td>Avon River</td>
<td>-</td>
<td>Mon 4 June 10.40pm</td>
<td>Tue 5 June 4.34am</td>
</tr>
<tr>
<td>Mitchell River</td>
<td>-</td>
<td>Tue 5 June 5.29am</td>
<td>Tue 5 June 7.46am</td>
</tr>
<tr>
<td>Snowy River</td>
<td>Tues 5 June 12.06am</td>
<td>Tue 5 June 4.07am</td>
<td>Tue 5 June 9.00am</td>
</tr>
<tr>
<td>Gippsland Lakes</td>
<td>Tue 5 June 2.04pm, Tue 5 June 6.12pm, Wed 6 June 8.29am, final warning issued on 11 June 9.11am (flood warning category levels not indicated)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: BoM (2012) Chronology of BoM messages

1.2.2 Key information and warnings through incident management

The Incident Control Centre (ICC) at the Bairnsdale VICSES facility was activated by early afternoon on Monday 4 June to monitor the emerging situation for Gippsland. A Level 2 Incident Management Team (IMT) was also on stand-by. The SCC was also activated at “Preparedness/Activation Level 2” to operate 24/7 with a basic level of staffing including the VICSES State Agency Commander and State Agency Duty Officer. ICC arrangements were escalated to Level 3 at 7.00am of Tuesday 5 June, with SCC progressing to “Preparedness/Activation Level 4 (orange)” at the same time.

Table 2 provides a summary of some key activities in incident management relevant to community information and warnings over time. The ICC located at the Bairnsdale VICSES facility was the source for construction and dissemination of community information and warnings. The ICC in Bairnsdale was also managing the response to the windstorm in the far east of Gippsland at the same time as the floods.

---

2 While a second ICC at Moe was activated on early Tuesday morning, the primary role of this ICC was recovery arrangements rather than the construction and dissemination of community information and warnings.
Table 2: Key response activity relevant to community information and warnings

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Response activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 4 June</td>
<td>1.42pm</td>
<td>Level 2 ICC at the Bairnsdale VICSES facility activated, Level 2 IMT on stand-by</td>
</tr>
<tr>
<td>Mon 4 June</td>
<td>4.00pm</td>
<td>Level 2 SCC activated for 24/7 operation</td>
</tr>
<tr>
<td>Mon 4 June</td>
<td>9.59pm</td>
<td>BoM Major Flood Warning for Traralgon Creek at Traralgon</td>
</tr>
<tr>
<td>Mon 4 June</td>
<td>10.15pm</td>
<td>One Source One Message (OSOM) message was issued - did not include specific local information warning people of possible flooding on properties adjacent to Traralgon Creek in Traralgon</td>
</tr>
<tr>
<td>Mon 4 June</td>
<td>11.00pm</td>
<td>Latrobe City Council flood warning system activated by the Municipal Emergency Resource Officer, system did not function</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>~1.50am</td>
<td>‘Evacuate’ EAs sent to Tennyson St (1.49am) and Davidson St polygons (1.51am)</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>Early hours</td>
<td>Door-knocking in the affected areas in Traralgon</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>3.25am</td>
<td>Level 2 ICC at Moe activated</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>7.00am</td>
<td>SCC escalated to Preparedness/Activation Level 4 (Orange), and ICC at the Bairnsdale VICSES facility escalated to incident management Level 3</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>10.00am</td>
<td>Moe ICC escalated to Level 3. Morwell Division active. Bruthen, Wonthaggi, Warragul and Leongatha Divisions on standby. Regional Control Centre activated, operating 8am-8pm.</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>12.45pm</td>
<td>OSOM message - Major Flood Warning for Lakes Entrance with specific information on local impacts. Subsequent OSOM at 1540 hours</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>Afternoon</td>
<td>Door-knocking was conducted to all residents at Hollands Landing</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>2.04pm</td>
<td>Initial BoM Warning Gippsland Lakes issued. Subsequent warning issued at 6.12pm</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>9.52pm</td>
<td>Evacuate EAs to Hollands Landing residents</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>9.54pm</td>
<td>First OSOM message regarding Gippsland Lakes issued as a Major Warning</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>12.00am-4.00am</td>
<td>Country Fire Authority (CFA) instructed by the ICC to conduct door-knocking in Slip Rd, Paynesville</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>10.48am</td>
<td>OSOM Loch Sport flooding and potential two week isolation. Community Meeting organised for Loch Sport but access cut - virtual meeting was organised.</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>1.49pm</td>
<td>OSOM sent for Paynesville and Metung with specific local information about the flooding. Subsequent OSOMs sent at 1716 and 2145</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>4.00pm</td>
<td>Community Meeting held at Lakes Entrance, 120 people attended</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>6.00pm</td>
<td>Community Meeting held in Paynesville, 30 people attended and were told that no EA message would be sent</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>8.00pm</td>
<td>Virtual Community Meeting held for Loch Sport, Metung and Raymond Island</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>9.34pm</td>
<td>‘Prepare to Evacuate’ EA to Paynesville and Raymond Island</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>9.59pm</td>
<td>Prepare to Evacuate EA to peninsula of Lakes Entrance with subsequent door-knocking</td>
</tr>
<tr>
<td>Wed 6 June</td>
<td>10.11pm</td>
<td>Prepare to Evacuate sent to Loch Sport and in response Unit Controller undertook unauthorised door-knock of Reeve St residents</td>
</tr>
</tbody>
</table>
Over the course of the event, between 3 June 2012 and 14 June 2012, the Public Information Unit at the ICC disseminated around 167 One Source One Message (OSOM) messages to the media, agencies, websites and Really Simple Syndication (RSS) feeds.

Various other methods for disseminating information were utilised to support and complement OSOM messages. For example:

- four community meetings for areas under threat of floodwater, namely:
  - Paynesville
  - Bairnsdale
  - Lakes Entrance
  - Mallacoota
  (with attendance variable; for example, 4 people at Bairnsdale and 120 people at Lakes Entrance).

- ABC radio virtual community meeting where physical access was difficult in:
  - Loch Sport
  - Metung
  - Raymond Island communities

- door-knocking in:
  - Traralgon
  - Hollands Landing
  - Eagle Point
  - Lakes Entrance
  - Metung
  - Bairnsdale
  - Paynesville.

- VICSES interviews with the media
- VICSES’s website and Flood Storm information phone line.

Volunteer personnel supported substantial elements of these information dissemination activities; particularly door-knocking.

Over the course of the event, six EAs were issued to warn affected residents in:

- Traralgon
- Hollands Landing
- Paynesville
- Raymond Island
- Lakes Entrance
- Loch Sport (Table 3, Figure 3).

‘Prepare to Evacuate’ EA voice messages were delivered to 2,099 households and text messages to 9,087 mobile phones.
Evacuate EA voice messages were delivered to 96 households and text messages to 407 mobile phones.

Table 3: Distribution of Emergency Alert messages

<table>
<thead>
<tr>
<th>Location</th>
<th>Date/Time</th>
<th>Nature of alert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traralgon Ck – Tennyson St</td>
<td>Tue 5 June 1.49am</td>
<td>Evacuate</td>
</tr>
<tr>
<td>Traralgon Ck – Davidson St</td>
<td>Tue 5 June 1.51am</td>
<td>Evacuate</td>
</tr>
<tr>
<td>Hollands Landing</td>
<td>Tue 5 Jun 9.52pm</td>
<td>Evacuate</td>
</tr>
<tr>
<td>Lakes Entrance</td>
<td>Wed 6 Jun 9.29pm</td>
<td>Prepare to evacuate</td>
</tr>
<tr>
<td>Paynesville/ Raymond Island</td>
<td>Wed 6 Jun 9.34pm</td>
<td>Prepare to evacuate</td>
</tr>
<tr>
<td>Loch Sport</td>
<td>Wed 6 Jun 10.11pm</td>
<td>Prepare to evacuate</td>
</tr>
</tbody>
</table>
Figure 3: Localities that received Emergency Alerts
2. Review Approach

2.1 Recent History of floods in Victoria

Victoria has experienced a number of major floods in the past 25 years, (1990, 1993, 1998, 2010-11, 2012). Floods had typically occurred in Victoria, every 10 to 20 years. However, in the past 18 months, there have been three significant flood events.

The Victorian Flood Review (VFR), released in December 2011, was undertaken in response to the 2010-2011 floods. This Review is comprehensive, with multiple recommendations to improve flood policy, standard operating procedures (SOPs) and community activities. The recommendations pertinent to emergency service providers (ESPs) can be grouped under the following broad themes:

- adequacy of flood predictions and modelling
- timeliness and effectiveness of warnings and public information
- emergency services command and control arrangements
- adequacy of clean-up and recovery arrangements
- community resilience.

All recommendations have been acknowledged and the Victorian Government and ESPs are working to correct many of the issues from 2010-11 floods. They are implementing actions to improve warnings and putting new processes in place.

2.2 Objectives and scope

As part of his role to provide assurance on the effectiveness of Victoria’s emergency management arrangements, the Emergency Services Commissioner (ESC) conducted this independent review of the June 2012 Gippsland flood event. The ESC engaged Sapere Research Group to conduct the review. Strahan Research was also engaged to conduct the community survey.

The review was focused on identifying opportunities for improvement in the provision of community information and warnings based on the learning from this event.

The terms of reference for this review were:

- determine the effectiveness of information and warnings disseminated to communities which were under immediate threat of floodwaters (in the June 2012 Gippsland flood event)
- assessment of the timeliness and relevance of community information and warnings issued during this event.
3. Preparedness

This section focuses on the level of awareness, planning and preparation for floods prior to the June 2012 floods, for both the Gippsland community and the agencies tasked with community information and warnings.

3.1 Community preparedness

Community members receive, interpret and act on information and warnings in light of their own understanding, experience and circumstances. This includes their understanding of risks, their capacity or willingness to respond, and what they expect to do and what information they expect to receive before or during a flood.

3.1.1 Risk awareness

Evidence from the community survey suggests that the Gippsland community is generally aware of flood risks and dangers associated with their localities. Risk awareness is a key factor in motivating protective behaviour, before or during emergencies (Weinstein, Rithman and Nicolich, 1989; Floyd, Prentice-Dunn and Rogers, 2000).

The majority of respondents (89 per cent) were aware of the flood risk in their area prior to the June floods. One in ten (10 per cent) respondents were not previously aware of the flood risk in their area.

In the Traralgon area\(^3\), 84 per cent of the respondents were aware of the flood risk and 16 per cent were not aware. In the Gippsland Lakes area overall\(^4\), 88 per cent of the respondents were aware of the flood risk in their area and 9 per cent were not aware. However, within the Gippsland Lakes area, there were some localities that reported a high level of risk awareness (for example, 92 per cent of respondents across Paynesville and Raymond Island were aware of the flood risk).

3.1.2 Peoples confidence in their ability to respond

The majority of community survey respondents were confident of their ability to respond if their neighbourhood was threatened by a flood, with different aspects shown below:

- Most (97 per cent) respondents were confident that they could keep themselves safe (98 per cent in the Gippsland lakes area and 96 per cent in the Traralgon area)
- The majority (87 per cent) of respondents were also confident that they could keep their family members safe if a flood threatened their neighbourhood (83 per cent in the Gippsland Lakes area and 80 per cent in the Traralgon area)
- The majority (84 per cent) of respondents were also confident that they could protect their house and property (85 per cent in the Gippsland Lakes area and 76 per cent in the Traralgon area)
- The majority (83 per cent) of respondents were confident that they could help their neighbours if a flood threatened their neighbourhood (83 per cent in the Gippsland Lakes area and 76 per cent in the Traralgon area).

---

\(^3\) Covering the localities of Traralgon, Traralgon South and Morwell.

\(^4\) Covering the localities of Hollands Landing, Kalimna, Lakes Entrance, Loch Sport, Newlands Arm, Paynesville and Raymond Island.
Although there was a high level of confidence in people’s ability to protect themselves, their family and neighbours, the report notes that 33 rescues were undertaken by emergency services.

3.1.3 Household or community pre-planning
The scale of explicit preparation for flood risk varies across the community.

- 52 per cent had thought about what their family or household would do in the event of a flood. This was higher in more rural locations (for example 66 per cent for those living on a farm).
- 45 per cent had discussed with family/household members what they would do in the case of a flood. In the areas that received EAs:
  - 37 per cent of respondents in the Gippsland Lakes
  - 36 per cent in Traralgon had discussed with family/household members what they would do.
- 49 per cent of all respondents kept emergency information at hand prior to the flood. The proportion (59 per cent) was higher for households with a member who has a disability or condition that requires assistance or care.
- 40 per cent of all respondents had prepared an emergency kit (torch, first aid kit and battery radio) prior to the flood. Attributes of vulnerability in a household also led to greater emergency kit preparation (51 per cent).
- 8 per cent of the respondents had prepared a written plan for their household:
  - 12 per cent of respondents in Traralgon prepared a written plan for their household.
  - As part of the Latrobe City Flood emergency response system, Traralgon residents received a template for their plan
  - of those respondents who own or run a business, only 3 per cent had prepared a written emergency plan for their business.
- 18 per cent had been involved in or contributed to flood planning in their community.
- 14 per cent had taken other actions prior to the flood.

3.1.4 Nature of community information expectations
The survey asked community members what information they want from the emergency services when a flood is expected:

- early warning was the most common, identified by 16 per cent of respondents
- the height of the water and expected levels was identified by 13 per cent of the respondents
- expected road closures was identified by 13 per cent
- predicted peak level and timing of the peak was identified by 10 per cent
- the areas that are likely to be threatened and the expected extent of the impact was identified by 8 per cent
- 12 per cent said that they did not need any information.

Survey participants were asked what information they want from the emergency services when a flood is happening:

- Information on road closures was the most common, identified by 26 per cent of the respondents
11 per cent of the respondents want information on the river and water levels
10 per cent want information that is up to date
7 per cent want information that is accurate
8 per cent stated that they do not want any information.

In summary, Gippsland community members most want emergency services to provide early warning that a flood is expected, the timing of flood impacts and information on road closures.

Survey results tend to point towards younger people having different expectations of flood emergency information at the time of flood impacts. For example, 26 per cent of younger people (aged 18-44) - suggested, unprompted, that EA could be used for information, compared to 12 per cent overall.

In response to the same question, 39 per cent of those aged 65 years or over considered that no improvement is required in how emergency services keep the community informed or give warnings, compared to 22 per cent overall.

3.1.5 Information and warnings-specific functions
Responsibility for developing and disseminating information and warnings to communities at risk of flooding rests with the BoM, VICSES and local government. Each has various dependencies on other parts of the system (see detail below). Three main functions are considered:

- flood monitoring and prediction
- interpreting impacts of flood prediction
- construction and delivery of information and warnings.

Flood monitoring and prediction
BoM has responsibility for the monitoring of situations likely to lead to flooding and for the prediction of floods. (BoM 2001)

BoM uses a range of data (rainfall, river levels, weather etc.), to monitor and make flood predictions. They use hydrological models and tools; for example, Unified River Basin Simulator - URBS, peak correlations.

Information is communicated to the public and agencies as ‘Flood Watches’ and ‘Flood Warnings’. With early flood predictions, BoM can issue a Flood Watch to ESPs and the public in specific regions. They issue Flood Warnings for specific rivers when flooding is imminent or is already occurring. Where flood category levels have been established and data is available, Flood Warnings provide predictions of flood severity (Minor, Moderate and Major) and the estimations of rise, fall or peak at forecast locations. BoM publishes all Flood Watches and Flood Warnings on the BoM website. These were provided to VICSES, local governments, and the media.

BoM’s capacity to monitor or model floods and provide predictive warnings varies across Gippsland. This is because they rely on other parties for some information, and the nature of flood predictions or warnings depends on the quality and timeliness of that information. For instance, there remain a number of locations where BoM is unable to provide more than qualitative flood information, due to the low coverage or accessibility of gauges (for example in East Gippsland).

Work aimed at predictive capacity is in development. For example, a major project led by the Catchment Management Authorities (CMAs) developed a linear modelling tool, the “Flood Level Assistant for the Gippsland Lakes (FLAGL)”. This area is a particular challenge for warnings due to the complex interaction between river flows, tidal and sea level and wind effects. Although
FLAGL has not been integrated into BoM systems for flood prediction\(^5\), analysis and development carried out in the creation of the FLAGL has informed another BoM modelling tool that operates within its existing systems. This BoM tool was available for the first time to predict lake levels in the June 2012 event.

**Interpreting impacts of flood prediction**

Flood intelligence is important to interpret and predict the on-the-ground impacts on property, roads and critical infrastructure at various flood levels; for example Minor, Moderate and Major flooding.

VICSES-led intelligence functions rely on available sources of information, including flood studies/mapping (from CMAs) and records from previous flood events. In addition to CMAs, hydrologists, local government and local observers, who inform public information and response actions (VICSES, 2012d, p.12).

Department of Sustainability and Environment (DSE) reports that since 2007, additional flood mapping has been completed for Waterhole and Narracan Creeks, Macalister River downstream of Lake Glenmaggie, Thomson River from Cowwarr Weir to the Macalister River confluence.

Flood mapping is underway for the Latrobe River from Moe to Lake Wellington and for the Moe River from Yarragon to the its confluence with the Latrobe River.

VICSES has recently been developing Flood Intelligence Cards\(^6\) for Gippsland, where flood mapping and records are available. These Flood Intelligence Cards were available for the June 2012 floods for some localities within Gippsland, particularly the Gippsland Lakes. They are being developed in other areas where data and information is available.

**Construction and delivery of flood warnings and information**

VICSES has responsibility for disseminating notifications and advice to the affected communities and key support organisations. This includes providing the community with information regarding flood predictions, current flood situation, likely flood consequences, and actions required to protect life and property, how to access further information about flooding and how to obtain emergency assistance (VICSES, 2012d, p.5).

VICSES has developed a detailed notification process, documented in the VICSES SOPs. There are a variety of ways in which warnings can be communicated depending on the location and the nature of the situation. These include:

- OSOM was implemented by VICSES in mid-2011 as the platform for issuing emergency information. It is used to create messages from templates, which are published simultaneously to the VICSES website, RSS feeds, emergency broadcasters, VICSES Flood Storm Information Line, emergency service organisations and key stakeholders, they are also sent by email. (VICSES, 2011a, p.3). Additional delivery mechanisms include door-knocking and community meetings.

\(^5\) BoM indicated that FLAGL was not implemented in the BoM’s flood system because of concerns over operational stability, difficulty in automatic ingest of input data available in the BoM systems, lack of compatibility of the Windows operating system based FLAGL with the Linux based BoM IT systems in the long term, and training challenges for BoM in the use of a flood forecasting tool specific to a single catchment while operating a national flood forecasting service with nationally-consistent standards and procedures.

\(^6\) Flood intelligence cards are a tool to describe the relationship between flood magnitude and flood consequence at a specific, local level. For example, they may outline what critical infrastructure and property locations will be affected in what ways at minor, moderate and major flood levels for a given locality.
The EA system is able to provide warnings through SMS messages to mobile phone and voice messages to landline phones in geographic areas defined by VICSES. These are based on the phone registration/service address.

In certain locations, local governments have established telephony-based alerting/warning systems, that pre-date EA. In 2006, Latrobe City Council established an opt-in phone-based notification for Traralgon residents. This can be triggered by the council when BoM issues a Moderate or Major Flood Warning for the Traralgon Creek. This is managed through an external provider.7

7 The experience of the Latrobe system in the June 2012 event is described in section 5.2.1.
4. Effectiveness of community information and warnings for the June 2012 event

This section details community perspectives on the effectiveness of information and warnings, and outlines experience in two locations where community feedback on effectiveness was less positive.

4.1 Overview of community perception

In general, there was satisfaction with the information provided as flood threats emerged. However, there was less satisfaction with the warnings given when the threat of flooding became more critical in certain locations.

4.1.1 Information as threats emerge and develop

Finding out about the flood threat

Observing the rain or rising water and monitoring the broadcast media, such as radio and television, were the principal means by which the community first found out about the threat of flooding.

For example, 48 per cent of respondents cited observing heavy rainfall and the rising water levels in rivers and creeks, and 39 per cent cited radio. The Internet/websites were cited by 11 per cent overall, but 20 per cent for those aged 18-44.

The majority of the community members surveyed expressed satisfaction with the way in which they were first informed about the flood threat and the information available to them during the event. In total, 80 per cent of the respondents were satisfied or very satisfied with the mode in which they found out about the flood threat. However, 14 per cent were dissatisfied or very dissatisfied.

Information during the flood event

However, 18 per cent of respondents felt that the information met only some (10 per cent), a few of (4 per cent), or none of their needs (4 per cent). Key reasons cited included that the information provided was not localised and did not provide insights on how it would impact them. Secondly, they perceived the information to be out of date/untimely (17 per cent) or not accurate.

These themes were also reflected in suggested improvements, with respondents wanting information that is more up to date, accurate, specific to their towns and localities, and less dramatic/more balanced.

---

8 Although not comprehensive, where local maps were available they were provided as part of public messaging. Often location specific information is not available because flood intelligence does not exist for the area.
Figure 4: Gippsland community satisfaction with information as flood threats emerged and developed

Data source: Strahan Research (2012)

Acting on emergency service advice
Respondents were asked if they acted on the advice on what to do and what not to do, that was provided before and during the floods by emergency services. In total, 29 per cent of respondents said that they acted on all the advice provided. A further 16 per cent acted on some of the advice. However, 22 per cent did not act on the advice and almost 32 per cent stated that they did not get any advice.

The top four reasons why respondents did not act on the emergency services’ advice or only acted on some of the advice were because:

• they relied on their own experience and judgement
• they felt safe
• the flood was not as bad as they expected
• the advice given was wrong or inadequate.

4.1.2 Prepare to evacuate and evacuate warnings
The overall levels of satisfaction do not fully reflect the perceptions of effectiveness in those specific communities that were under immediate threat of floodwaters. Most of the survey respondents were not under immediate threat. The majority (81 per cent) did not receive an evacuation warning, and only 5 per cent of those who did not receive an evacuation warning believed they should have.

While those receiving ‘Prepare-to-Evacuate’ or ‘Evacuate’ warnings cover a relatively small proportion of the Gippsland population (approximately 10,000 persons), they were clustered in particular localities, such as Traralgon and the Gippsland Lakes communities of Paynesville, Raymond Island, Loch Sport, Hollands Lands and Lakes Entrance.

Of those respondents who received a warning to Prepare to Evacuate or ‘Evacuate’, in total 70 per cent received the warning through an EA as an SMS on their mobile phone and/or as a recorded voice message on their landline. A further 19 per cent received an evacuation warning from
VICSES and 8 per cent were warned through other emergency services, including the CFA, local police or a flood warden.

Community members who reported receiving a warning to Prepare to Evacuate or Evacuate\(^9\) expressed greater dissatisfaction than others:

- 53 per cent were dissatisfied (38 per cent) or very dissatisfied (15 per cent) with the information they were provided and its timing.
- 62 per cent were dissatisfied or very dissatisfied with content and timing of the EAs. Supporting comments indicated that this was due to their belief that it was an ‘overreaction’ and ‘unnecessary’. However this was said with the benefit of hindsight.
- The main reasons for dissatisfaction with the evacuation warning were:
  - inappropriate timing
  - lack of clarity.
  - it contained information that was perceived as inaccurate or wrong
  - it was a false alarm
  - an overreaction to the actual situation that caused anxiety and panic; especially amongst elderly residents
  - the warning message was sent late at night at a time when it was too late to respond.

3 per cent of respondents evacuated during the flood. Of those who did, the majority did so as soon as they received the first warning or when they realised flooding would affect their property. 5 per cent evacuated either when flood waters reached a level that inundated their garden or property, or shortly after their house began to flood, or a few hours or days after their house was flooded.

The main reason given by respondents for evacuation was concern about the safety of their family (42 per cent of responses). The majority of evacuees (58 per cent) went to stay with friends or family in a safe area.

The main reason why respondents did not evacuate was because they believed:

- that their property was not threatened (71 per cent of responses).
- there was no threat to them or their family (25 per cent) (Strahan Research, 2012).

\(^9\) This includes from, for example, an EA, from SES or other Emergency Services such as the CFA or the police, on the radio or television, or from a family member, friend or neighbour.
4.2 Case studies of two localities

The next two sections provide summary case studies on two areas where warnings were provided: Traralgon, and the areas of Paynesville and Raymond Island. These studies provide further detail on experience in two localities where community feedback (with the benefit of hindsight) suggested that the effectiveness of warnings was relatively low. Both areas received warnings that included EA messages.

Figure 5: Gippsland community satisfaction with information provided in, and timing of Emergency Alerts

![Figure 5: Gippsland community satisfaction with information provided in, and timing of Emergency Alerts]

Data source: Strahan Research (2012)

4.2.1 Traralgon

Views on effectiveness

The Traralgon Creek experienced flash flooding\(^{10}\) in the late evening of Monday 4 June and early morning of Tuesday 5 June. The creek rose quickly from 1.8 metres to more than 5 metres in around three hours.

Of those respondents who received an evacuation warning during the flood, the majority (57 per cent) were dissatisfied (28.5 per cent) or very dissatisfied (28.5 per cent) with the information and its timing.

Verbatim community comments explaining these views include:

- “poor timing, was too late to be useful”
- “the warning came too late for me to act and prepare.”

\(^{10}\) Consistent with standard definitions of flash flooding, for example:

- ‘Flooding that occurs within about six hours of rain, usually the result of intense local rain and characterised by rapid rises in water-levels’ (BoM, 2012b)
- ‘A flood that rises quite rapidly with little or no advance warning, usually as a result of an intense rainfall over a small area’ (Emergency Management Australia, 1998)
- ‘Flooding in which less than six hours warning time is available. This is often the case with riverine flooding in short and/or steep creeks and rivers and is always the case with overland flows’ (Flood Victoria, 2012).
• “wrong information at the wrong time with lack of information relevant to us”
• “expecting a warning that was gonna [sic] get evacuated and it was a bit late because couldn’t drive out”
• …as well as “early warning and told us to evacuate” (Strahan Research, 2012).

There were also examples of positive responses:
• “system working as its supposed to”
• “didn’t really need it as they didn’t need to evacuate but was satisfied that they got the warning”

Reasons for these views
According to the Latrobe City Council representative, previous experience in Traralgon had led to an expectation that there would be six to ten hours from a Moderate or Major flooding warning to a peak. In this event, there were less than five hours from BoM’s first ‘Flood Warning’ in this case, Major to peak levels being reached.

BoM stated that the Traralgon Creek’s rapid onset of flooding meant that quantitative forecasts of river height could only be provided for the next 2-3 hours with any degree of accuracy. Beyond this any forecasts would have a reduced level of confidence.

The planned processes for community notification did not operate as expected and, therefore, did not meet the community’s expectations. Figure 6 cross-references key activities to the height of the Traralgon Creek gauge, and a more detailed chronology is Table 4.

Planning for community information and warnings had recognised the existence of the Latrobe City Council telephone flood warning system to complement OSOM messages. This system (see section 3.2.2) is intended to give direct notification to residents upon a BoM Moderate or Major Flood Warning, and is well-known locally.

At 11:00pm the system was activated by Latrobe City Council. This was soon after the first Flood Warning beyond Minor from BoM\footnote{In this case, the first Major flood warning as there was no Moderate flood warning.}. Telephone messages should have gone to 600 numbers. However, the messages were not sent due to a system fault that had not been detected previously by the service provider.

The consequence was that community members did not receive the expected warning. This was realised by Latrobe City Council within an hour of the system being activated.

Public information planning at the ICC assumed, reasonably, that Latrobe City Council notification system would be functional. Once the failure was identified, EA messages were sent as an alternative to Tennyson Street and Davidson Street (67 landlines and 185 mobile phones). Local door-knocking also took place.

The EA message, however, was not distributed to the two locations until 1.47am and 1.51am respectively on Tuesday 5 June 2012 with a message to evacuate by 2.00am. The EAs were distributed approximately an hour after the Major flood level was reached, and approximately an hour before peak levels were reached, and three hours after the failed activation of the Latrobe City Council warning system.

In retrospect, the EAs were sent to fewer properties than were affected by the flood event. The EA polygons were developed when the need to distribute the alternate EA messages was first identified, and did not therefore, take account of the changes on the ground.
For example a further Major Flood Warning from BoM at 12.58am on Tuesday 5 June provided a specific forecast peak level and timing of “around 5.2 metres…expected around 3am Tuesday morning”. This was at odds with the previous general advice “rises beyond major flood level (4.5m) possible” that BoM provided three hours earlier at 9.59pm on Monday 4 June.

Interpretation of the emerging intelligence also complicated matters.

Figure 6: Chronology of key information and warning response activities in Traralgon, Mon 4 June (pm) and Tue 5 Jun (am)

Source: Victorian Water Data Warehouse, OSOM Report for the Gippsland Flood, BoM website for flood class levels
Table 4: Chronology of key information and warning response activities in Traralgon

<table>
<thead>
<tr>
<th>Day</th>
<th>Time (hr)</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 4 June</td>
<td>3.59pm</td>
<td>BoM Initial Minor Flood Warning</td>
</tr>
<tr>
<td></td>
<td>4.59pm</td>
<td>OSOM Minor Flood Warning</td>
</tr>
<tr>
<td></td>
<td>9.59pm</td>
<td>BoM Major Flood Warning for Traralgon Creek at Traralgon (this was the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>next scheduled update, and there was no Moderate warning)</td>
</tr>
<tr>
<td></td>
<td>10.15pm</td>
<td>OSOM Major Flood Warning – be prepared to evacuate. Message did not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>include specific local information warning people of possible flooding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on properties adjacent to Traralgon Creek in Traralgon</td>
</tr>
<tr>
<td></td>
<td>11.00pm</td>
<td>Latrobe council flood warning activated (system did not function)</td>
</tr>
<tr>
<td>Tue 5 June</td>
<td>Approx. midnight</td>
<td>Door-knocking began in flood affected area of Traralgon</td>
</tr>
<tr>
<td></td>
<td>12.58am</td>
<td>BoM further Major Flood Warning with prediction of a peak around 5.2m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at around 3.00am.</td>
</tr>
<tr>
<td></td>
<td>1.30am</td>
<td>OSOM exceeded Major (4.5m), peak expected around 0300</td>
</tr>
<tr>
<td></td>
<td>1.47am</td>
<td>EA sent to Tennyson Street polygon – ‘Evacuate’</td>
</tr>
<tr>
<td></td>
<td>1.51am</td>
<td>EA sent to Davidson Street polygon – Evacuate</td>
</tr>
</tbody>
</table>

Source: BoM Warning Chronology Gippsland Flood Event 2012 and the OSOM Report for the Gippsland Flood event

4.2.2 Paynesville and Raymond Island

Views on effectiveness

The flood event facing Paynesville and Raymond Island on the Gippsland Lakes was slow-moving but complex to predict (section 3.1.5 describes some complexities in Gippsland Lake prediction). For the Gippsland Lakes, flooding usually occurs only after the seven different inflow systems have experienced flood. Historically, this has sometimes taken up to 14 days.

The majority (63 per cent) of the respondents living in Paynesville and Raymond Island received a warning to ‘Prepare to Evacuate’. Of these, 68 per cent were dissatisfied or very dissatisfied with the information the message provided and its timing.

The majority (60 per cent) of the respondents said the impact of the flood was less than expected. Only one in four acted on all of the advice provided by the emergency services, 17 per cent acted on some of the advice and 37 per cent did not act on the advice at all.

A sample of community comments, both negative and positive, included:

- “information not timely or accurate”
- “not specific enough to what I needed to know”
- “the information wasn’t accurate and they didn’t take into account tidal accounts”
- “advised to evacuate but no need to. They got it wrong...too much panic...not applicable to us”
- “self sufficient make own decisions”
- “only those that was relevant, road closures, no need to evacuate because not that bad”
• “not accurate, many people panicked, the advice was ridiculous, no need for it”
• “it warned me to evacuate but I was more panicked as it was a call at 11pm and woke me up”
• “they gave us the message to evacuate but then didn’t say anything else about it”

Positive comments:
• “we got a message, usually nobody knows that we are here”
• “it was my only warning that there was a flood threat/ my first warning so I had time to prepare”
• “it was good to be given the information, but there is no danger here”
• “had it been a serious flood, the information would have been good…."

Reasons for these views
The June 2012 flood was BoM’s first use of its jointly developed forecasting tool (see section 3.1.5) to predict lake levels at five forecast locations around the Gippsland Lakes.

A chronology of key information and warning activities for Paynesville and Raymond Island is detailed in Table 5.

On Tuesday 5 June, there was an extended time period between the first BoM warnings for Gippsland Lakes (specifically Paynesville and Raymond Island) and related OSOM messages being sent to the community. For example it took 7.5 hours between the initial BoM warning at 2.04pm and the first OSOM at 9.29pm.

Both the BoM initial Flood Warning at 2.04pm and the subsequent one at 6.12pm stated that “early indications are that levels similar to those observed in 2007 may be possible from late Wednesday”, although the later 6.12pm warning provided the first quantitative forecast. For example, “[lake] levels expected to reach 0.7m overnight into Thursday” for Paynesville.

EAs were sent to the majority of the community, although many were unlikely to be impacted. 2373 messages were sent - 858 household landlines and 1,515 mobiles across both localities - compared to a combined population of approximately 3,450.

People who received these commented that the message content and area to which EAs were sent did not take sufficient account of local arrangements or local knowledge. For example, how some elderly residents would react to receiving the EA late in the evening, and that local units had already observed that the predicted peak of 1.4m was unlikely to be reached.

Ultimately, the flood impact in Paynesville and Raymond Island was less than predicted by BoM using its hydrological forecasting model. For Paynesville, lake levels peaked at around 1.0m overnight on Thursday 7 June into Friday 8 June rather than the highest expected peak of around 1.2-1.4m forecast. These higher-than-experienced estimates from BoM contributed to the disappointment expressed by community members in the accuracy of the information and warning given.

BoM has since stated that the June 2012 flood was the first event where the full record of lake levels and river inflows had been recorded, and this data will now inform refinement of this modelling for the future.

---

12 As context for these lake levels, indicative flood class (or category) levels of Major 1.3m, Moderate 1.1m, and Minor 0.8m are indicated in a (draft) attachment to the East Gippsland Shire Flood Emergency Plan, July 2012, Attachment 8. These indicative levels have not been agreed across the planning system: although agreed by VICES, West and East Gippsland CMA, and Wellington and East Gippsland Shires in November 2011, they have not been agreed by BoM.
Table 5: Chronology of key information and warning response activities in Paynesville and Raymond Island

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tue 5 Jun</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.04pm</td>
<td>Initial BoM warning Gippsland Lakes</td>
</tr>
<tr>
<td></td>
<td>6.12pm</td>
<td>BoM message – change of situation on Gippsland Lakes. Possible flooding in Raymond Island and other locations tonight into Wednesday (high tide 10.00pm).</td>
</tr>
<tr>
<td></td>
<td>8.40pm</td>
<td>Local Raymond Island SMS message regarding ferry stoppage</td>
</tr>
<tr>
<td></td>
<td>9.29pm</td>
<td>OSOM Major Flood Warning for Gippsland Lakes. Early indication of 2007 levels from late Wednesday. Paynesville ~0.5m, expected 0.7m overnight</td>
</tr>
<tr>
<td><strong>Wed 6 Jun</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approx. midnight-4.00am</td>
<td>Doorknock on Slip Rd and Bay Rd (Paynesville) carried out by the CFA</td>
</tr>
<tr>
<td></td>
<td>9.50am</td>
<td>OSOM – Paynesville level currently ~0.8m and rising. Further rises expected today with peak 1.2-1.4m (below 2007)</td>
</tr>
<tr>
<td></td>
<td>5.29pm</td>
<td>BoM flood warning – Paynesville 0.9m and slowly rising, rises expected overnight Wednesday into Thu with a peak 1.1-1.3m (below 2007) expected Thursday morning</td>
</tr>
<tr>
<td></td>
<td>6.00pm</td>
<td>Community Meeting in Paynesville – said an EA would not be sent</td>
</tr>
<tr>
<td></td>
<td>8.00pm</td>
<td>Virtual Community Meeting for Loch Sport, Metung and Raymond Island</td>
</tr>
<tr>
<td></td>
<td>8.45pm</td>
<td>OSOM – flood level of 1.0-1.3m by approx. mid-day Thursday, prepare to evacuate</td>
</tr>
<tr>
<td></td>
<td>9.34pm</td>
<td>EA prepare to evacuate - further info will be provided if you need to evacuate (no timing given)</td>
</tr>
</tbody>
</table>
5. **Key Issues and Opportunities for Improvement**

This section provides some general insights into aspects of preparedness and response that constrained the effectiveness of community information and warnings, and suggests some opportunities for mitigating or reducing these issues in the future.

The analysis has been informed by examination of documentation and data in relation to emergency planning and event activity, a survey of Gippsland community members, public submissions and interviews with a range of agency stakeholders.

### 5.1 Summary of key issues

#### 5.1.1 Overview

As in any complex multi-agency system, a range of factors affected how well information and warnings were produced and communicated to different communities at different times in the June 2012 Gippsland floods. Individual community members will have a different perception of effectiveness, based on their personal circumstances and experience.

The system operated for non-urgent community information as the threat of flooding developed across Gippsland. Albeit there were gaps in intelligence that meant some messages were not consistent with the actual circumstances on the ground.

Limitations in the flood information and warning system:

- lack of clarity in relation to managing flood intelligence due in part to incomplete local strategies, plans and inputs
- non-availability of sufficiently trained and skilled personnel in the ICC (Bairnsdale)
- a need for greater use of local, on-the-ground intelligence in the affected areas
- ineffective and inefficient work tools and processes in the ICC (Bairnsdale) for constructing and communicating intelligence and the subsequent public information messaging
- operational IT and facility support in the ICC (Bairnsdale) that were not integrated and interoperable.

These are described individually with relevant examples in the following sections.

#### 5.1.2 Clarity and completeness of local strategies, plans and inputs

A lack of clarity in strategies and plans, plus gaps in the supporting information led to a divergence away from meeting community expectations; particularly where more than one agency was involved.

This situation was exacerbated as local municipal flood response plans for local government were in the early stages of development at the time of the June 2012 floods. The East Gippsland plan was substantially complete and it was approved in July 2012. Its content provided a useful guide on the use of intelligence that was utilised during the June 2012 floods.

Gaps in flood studies and mapping along with insufficient gauges across the area also contributed to an incomplete intelligence capability to inform messaging to the community.
Flood category levels have not yet been confirmed for the Gippsland Lakes as part of its flood warning system upgrade. This affects the quality of information subsequently provided for both operational decision-making and community information and warnings.

Improvements will be gained once State-wide service level agreements for Flood Warning that outline agreed levels of service, from and between the agencies involved. This is being addressed by the Victorian Flood Warning Consultative Committee.

5.1.3 Availability of trained and skilled personnel

In the early stages of the event (Mon 4 June – Wed 6 June) resourcing key functions in the ICC were heavily reliant on available local staffing. These were later reinforced by personnel from other regions in Victoria, who performed the roles of Incident Controller and Public Information Unit Leader.

For a rapidly escalating event in Gippsland, local resourcing provided very limited capacity and minimal contingency for a protracted event. The resourcing model as applied was not able to meet the expectations of a high performing team.

One example was the limited capacity in the Public Information Unit to undertake strategic planning in the early stages of the flood event, because of the immediate need to prepare community warnings. This had a compounding effect – “we struggled to get ahead of the game” – and was one factor contributing to why warnings were either late or inaccurate. For example, the benchmarked one hour between the receipt of updated BoM warnings and the promulgation of updated OSOM messages for some locations was not achieved.

Changes to incident management structures to reinforce the importance of Intelligence and Public Information were, at the time of the event, not yet fully embedded in training and operational practice. Improvement will be realised as greater numbers of personnel are trained in specific Australasian Inter-service Incident Management System (AIIMS) roles, for example public information, intelligence. In addition they will have the benefit of actual or exercised experience in flood situations. Additional efficiencies will be gained through the involvement of local personnel from non-VICSES agencies to undertake key ICC roles.

The lack of availability of resources also extends to non-specialist roles. Some interviewees reported extensive delays (up to 2 hours) in answering calls to the main telephone number for the VICSES ICC at Bairnsdale. This included calls from the media and local units. Thus there were insufficient people to facilitate the flow of information for both immediate and strategic decision making.

5.1.4 Incident management following planned roles and processes

The production and dissemination of information and warnings is influenced by the effectiveness of incident management. In this event, there were examples of people and processes not following the planned arrangements.

The majority of agency personnel interviewed stated that incident management during the flood could have been improved.

---

13 There is not yet agreement between BoM and other agencies on what levels are both appropriate and technically feasible. There are a number of perspectives on why this is the current situation and how the situation might be resolved.

14 VICSES have advised that since this event, they are implementing an organisational resource strategy.

15 Incident management issues in this section reflect on the ICC located in Bairnsdale, which was the primary ICC for the development of community information and warnings.
Some IMT personnel had concerns over the effectiveness of the information flow between sections within the Bairnsdale ICC. As examples, a number of interviewees reflected that situational awareness from the Planning Unit was not always flowing through effectively to the Public Information Unit, and that Operations personnel, including those working directly with the community, were not always aware of decisions being made elsewhere that affected them.

A high-performing IMT will have individual roles and responsibilities for each function in place from the start. This includes a consistent understanding of who needs to be consulted in the IMT and Emergency Management Team to ensure timely decisions on what needs to be communicated to the public at the appropriate time. Some suggested that, at certain times, this incident was characterised by limited consultation within the IMT on objectives and strategies. This affected interoperability within the ICC.

The issue is particularly important in the context of large-scale events when Incident Controllers and others in key roles do not have local knowledge and are unable to gain access to it because it has not been fully documented in the plans.

In this event, various participants reflected that incorporation of local knowledge was limited and inconsistent. This also aligns with feedback from Gippsland Lakes communities in particular.

**5.1.5 Work tools and processes**

To compensate for the absence of consistent templates needed for end-to-end processing of information, localised arrangements and/or individual-based tools and techniques had been established. While innovative and meeting the needs of the individual or team that created them, these did not always meet the needs of the next user of the information. One example included information being provided in one format that then had to be changed into another to be of use to the next person in the process.

One officer noted that in some circumstances, the processes involved, end-to-end, to prepare and send an EA message were overly long. This contributed to the timeliness, relevance and effectiveness of EAs sent during this event. To streamline that process and allow the community time to take action, the systems and processes need to be improved. This involves regularly and exhaustively practising the procedures.

**5.1.6 Operational IT and facility support**

The layout of the accommodation and the IT setup within the ICC at the Bairnsdale VICSES facility are not compatible with effective working within the IMT sections. This places many practical constraints on the effective and efficient performance of the ICC.

For example:

- there was no interoperability between VICSES and CFA systems – with the effect that those using CFA laptops could not access information on the VICSES drive. This included flood intelligence and operational information for OSOM
- delays from VICSES’s corporate IT support in response to requests for IT assistance
- workspace constraints meant that the Public Information unit was either operating in three adjacent but separate places, or with others in a crowded space
- at least two people in the Public Information Unit did not have a functional OSOM log in, which constrained the ability to work on multiple messages simultaneously.
5.2 Opportunities for improvement

Opportunities for improvement to address the key issues constraining effective community information and warnings in the June 2012 Gippsland floods lie in three main areas:

- **Management of community expectations:**
  - better understanding of what different groups within a community expect
  - continued community education
  - further development of tools that would allow the community to more easily access accurate and time-critical information.

- **Agency incident management preparedness:**
  - provide clarity and certainty in specific roles and responsibilities for each agency
  - refining IT tools to process the intelligence
  - a more comprehensive approach to planning, including the number of personnel, their training and better use of on-the-ground intelligence in the affected areas that enables immediate and strategic decision-making to be concurrent processes.

- **Efficient and effective supporting tools and processes:**
  - developing tools and workflows to quickly and reliably transform technical data into intelligence that can be used to construct messages for community information that are timely, relevant, tailored and effective
  - streamlining the authorisation processes for urgent warnings
  - high-quality local/municipal planning.

5.2.1 Management of community expectations

As discussed throughout this report, assessments of information and warning effectiveness are driven by the varying expectations of community members for what is accurate, timely and relevant for them.

There was common agreement amongst people interviewed that community expectations of the information and warnings in time of flood are growing. Many are seeking a greater level of precision and tailoring. However, as flood predictions can be inherently uncertain and resources are limited, the ability of emergency services to provide accurate and timely information can be constrained. In particular, there is a trade-off between accuracy and timeliness if a flood can only be predicted with greater accuracy in the later stages of the event (Attorney-General’s Department, 2009, p.15). Nevertheless, tools for flood prediction are improving.

Surveys suggest that younger people are less prepared as they are more likely to seek out information provided at the time of flood rather than information before the event that would build their resilience. If this data is reflective of a trend across the state, then it represents a significant challenge to the prevailing models for educating young people about planning and preparedness.

Agencies have a clear role in shaping and managing expectations, particularly if they are not feasible technically. Agencies should engage actively with communities to build a better shared understanding of each other’s expectations and capabilities, and the consequences of particular choices and preferences for delivering and receiving messages in an emergency.

There are a number of mechanisms for providing community information and warnings. The most appropriate to the local community need to be identified when developing local plans.
One specific but important issue is the strategic role for the use of EA. While only one part of a suite of available information and warning tools, its ability to reach individuals by telephone confers a level of special prominence, importance and authority. The current circumstances for the use of EA under the Standard Operating Procedure\(^\text{16}\) are very broad and need to make a greater distinction between appropriate uses and timing of ‘Prepare to Evacuate’ and ‘Evacuate’ messages.

In addition, some respondents to the community survey suggested that information could be better and more broadly delivered through greater use of EAs for more general information. This is different to the intended purpose of the technology.

### 5.2.2 Efficient and effective supporting tools and processes

The Intelligence Unit, and to a lesser extent, the Public Information Unit are new aspects of AIIMS. It is critical to ensure all personnel in these roles, at all levels, have a contemporary understanding of intended management protocols and processes for them to be effective. This includes; how the Units should be utilised in incident priority-setting and what information should be transmitted between them and when. Exercises based on specific flood examples would help to embed the right processes and ensure proficiency in their use.

There are opportunities for further work to help agencies be more prepared for high-risk situations, individually and as a collective.

EA is unlikely to be an effective tool for urgent situations in flood if incident management is unable to streamline content, approval and dissemination so that messages can be provided quickly. One step would be to pre-plan and develop EA polygons for high-risk flood locations under various scenarios so these can be adjusted rather than created in time-critical situations.

\(^\text{16}\) SOP057, Use of Emergency Alert, version 1.0 effective 26 August 2011. “The use of Emergency Alert should be considered by VICSES to precede an emergency warning message(s) to the Victorian community where the impact of the emergency poses an imminent threat to life or a message needs to be disseminated urgently... Examples of the appropriate use of Emergency Alert would include:...severe flash flooding – very likely or occurring;...where a Major Flood Warning may result in an impact on communities;...time critical evacuation of a community due to a threat...”
6. Conclusion

The absence of sufficient resources in the Incident Control Centre located at the Bairnsdale VICSES facility, combined with some inefficient procedures for processing data contributed to a perception that information and warnings failed certain sections of the Gippsland community.

The only actual “failure” identified was the telephone based warning system operated by a contractor on behalf of Latrobe City Council.

Key areas of sustained focus to improve the timeliness, relevance and effectiveness of information and warnings to the community for all hazards should include:

- high-quality local/municipal planning
- internal and cross-agency training, integrated information systems and workflows
- clarity over specific responsibilities, obligations and activities
- greater use of local, on-the-ground intelligence in the affected areas.

For floods in particular, additional work is needed to prioritise installation of flood gauges in high risk areas.

The findings from this review are consistent with those of the Victorian Flood Review. While emergency service providers have been working to correct many of the issues since the 2010-11 floods, they are implementing actions to improve warnings and information.
7. References


DNRE (1998) Victoria Flood Management Strategy, Department of Natural Resources and Environment, Melbourne.

DSE (2012), Response to Additional Questions from the Environment and Natural Resources Committee, Inquiry into Flood Mitigation Infrastructure in Victoria, Department of Sustainability and Environment, Melbourne.


Appendix 1 Method and data sources and limitations

The methodology applied in conducting the review included establishing Lines of Enquiry in accordance with the Terms of Reference (ToR), developing mechanisms for data collection and consultation, undertaking data analysis, and producing a final report.

Key performance questions for the review were derived from the Lines of Enquiry and ToR. Quantitative or qualitative performance measures or types of evidence for each group of key performance questions were defined. The Lines of Enquiry are shown at Appendix 1.

In developing the ToR for the review, the total flood warning system concept (below) was considered in determining the context of ‘effectiveness’. For this review, ‘effectiveness’ is when people have:

- received timely and accurate information
- understood that information and appreciated what it means for them
- been prompted by the information to initiate relevant damage reducing or safety enhancing actions within timeframes appropriate to the circumstances.

The community provided response through individual submissions and community surveys. Evidence was gathered using a number of mechanisms. This report reflects the integration and analysis of these in line with the Lines of Enquiry.

- **Documentation on emergency service agency planning**
  Analysis of documentation from ESPs and other sources including:
  - previous reviews
  - Standard Operating Procedures

- **Documentation from incident activity relevant to information and warnings**
  Analysis of documentation and data in relation to community information and warnings, including records and summaries of the information and warnings sent from VICSES and the BoM, operational documentation and reporting utilised through the event, media reporting, and data from the Victorian Water Resources Data Warehouse.

- **Stakeholder interviews**
  Interviews with stakeholders from relevant agencies as determined by the Office of the Emergency Services Commissioner (OESC), including:
  - VICSES at state, regional and local levels
  - Victoria Police (VicPol)
  - CFA
  - East Gippsland Shire

---

17 See Appendix 1 for the Lines of Enquiry
• Lattrobe City Council
• East Gippsland and West Gippsland Catchment Management Authorities
• The BoM (see Appendix 3 for a detailed list of stakeholders interviewed).

• Community survey
A telephone survey of 557 households in areas affected by the flood event was conducted by Strahan Research for the OESC. This took place between the 13th and 25th August 2012. The sample was drawn from forty-four localities identified from incident maps and EA polygons\(^{18}\). The areas that received an EA were over sampled to ensure at least 100 respondents. These localities were combined into the four areas below for analysis. The subsequent sample results were within 3.6 per cent of population values of all the areas surveyed. These were:

1) Emergency Alert (EA) areas\(^{19}\)
2) Sale and Macalister Irrigation District
3) Bairnsdale Area
4) Tambo, Buchan and Boggy Creek Area.

The survey questionnaire was based on the Lines of Enquiry. The community survey report *Impact of the June 2012 Floods on affected Gippsland communities* presents its findings and results against these four areas\(^{20}\).

As they were the areas most impacted, a further breakdown of the ‘EA areas’ into the Traralgon and Gippsland Lakes areas (Traralgon area incorporating Traralgon, Traralgon South, Morwell; Gippsland Lakes area incorporating Lakes Entrance, Kalimna, Paynesville, Raymond Island, Newlands Arm and Hollands Landing), enabled the development of case studies and descriptive analysis of these areas.

These two groups are the general physical area within which EA warning messages were disseminated to specific properties. It therefore covers all properties in a locality, not just the smaller set of properties to which EAs were disseminated. This approach balances a smaller level of aggregation with a reasonable sample size.

• Community inputs
The OESC sought public submissions through newspapers covering affected areas. Six submissions were received from community members.

Further data sources included a chronology of BoM warnings and OSOM messages that were compiled after the event by VICSES. Where possible, data and information was tested

---

\(^{18}\) An EA ‘polygon’ is a two-dimensional shape made up of lines overlayed on a map of a given area, defining the boundaries within which properties will receive an EA message (or rather, the phones registered to those properties).

\(^{19}\) EA areas or areas that received EAs refers to the general localities within each emergency alert (EA) messages were disseminated to specific properties in the June 2012 Gippsland flood. It therefore covers all properties in a locality not just a smaller set of properties to which EAs were disseminated.

\(^{20}\) Further detailed information on the community survey response is provided in Strahan Research’s ‘Impact of the June 2012 Floods on Affected Gippsland Communities’ – A Report for the Office of the Emergency Services Commissioner, 30 August 2012.
against multiple sources: however, this was not always feasible and in some cases it was not possible to reconcile conflicting data derived from alternative sources.

The review recognises that due to the time that had elapsed since the June 2012 flood event, individual recollections may be affected. In addition, the survey respondents self-reported their level of preparedness and the information they received, which can be subjective rather than objective.

**Total Flood Warning System**

The Total Flood Warning System (TFWS) concept was developed in 1995 in the flood warning manual ‘Flood Warning: an Australian Guide’ and remained a central concept in the updated 2009 manual ‘Australian Emergency Manual: Flood Warning’. The TFWS assists flood emergency management agencies and communities to understand the nature of developing floods so they can take action to mitigate the impact of floods.

The key components of TFWS, shown in the figure below, are:

- **Monitoring and prediction:** detecting environmental conditions that lead to flooding, and predicting river levels during the flood
- **Interpretation:** identifying in advance the impacts of the predicted flood levels on communities at risk
- **Message construction:** devising the content of messages to warn people of impending flooding
- **Communication:** disseminating warning information in a timely fashion to people and organisations likely to be affected by the flood
- **Protective behaviour:** generating appropriate and timely actions and behaviours from the agencies involved and from the threatened community and
- **Review:** examining the various aspects of the system with a view to improving its performance.

**Figure 7: Total Flood Warning System**
For the TFWS to work effectively:

- it must recognise and satisfy the warning needs of the flood-prone community by ensuring the community is involved in system design and development
- it must incorporate all relevant organisations and be integrated with floodplain and emergency management arrangements
- it must be capable of operating for both ‘routine’ and severe flood events and
- each agency involved in the system must accept ownership of it and work cooperatively with other agencies to improve its operations.

Source: Attorney-General's Department, 2009
## Appendix 2 Summary of evidence and the Lines of Enquiry

<table>
<thead>
<tr>
<th>Expectation - Prevent</th>
<th>Key Performance Questions</th>
<th>Summary of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The community and stakeholders are aware of and understand the emergency risks and dangers they are exposed to</td>
<td>How aware is each local community of the risks they face? Did the community understand the flood risk in their area? Do elements of the Gippsland community have special needs for information given their exposure to particular risks?</td>
<td>Majority (89 per cent) of the Gippsland community were aware of the flood risk in their area prior to the June floods. Slightly less awareness in some areas of high flood risk. Those in high-risk areas have special needs commensurate with their risk levels, for example Gippsland Lakes. Isolated caravan parks near the river edge and vulnerable people can have special needs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expectations - Prepare</th>
<th>Key Performance Questions</th>
<th>Summary of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility for emergency management is shared across the whole community, including households, community organisations, local councils, ESPs, businesses and government agencies. • All members of the community take appropriate actions to prevent emergencies and mitigate the identified risks • All members of the community have genuine opportunities to contribute to planning and preparing for emergencies in their community • The community, individuals, businesses, volunteers, ESPs and other government</td>
<td>What community-wide planning and preparation for community information and warnings had been established for flood events in Gippsland, including systems, roles and responsibilities? Have communities had opportunities to be involved and contribute to emergency planning in their community How well do people understand what information and warnings will be available? How well do people understand how they will be expected to receive and act on information and warnings? How are these understandings formed?</td>
<td>Roles and responsibilities are clear in concept, but inter-relationships and mutual dependences complicate implementation Flood emergency planning has been undertaken at the State, Regional and Municipal level. Operational or location-specific planning less complete: e.g. no formalised flood sub-plans in place at the time of the June 2012 floods). Service level agreements with BoM are in process. Most community members have had the opportunity to be involved in, or contribute to emergency planning in their community Gippsland community expects: early warning that a flood is expected; the height of the water and expected levels; information on the expected road closures including which roads are open and closed and what bridges are affected; when the flood is expected and the predicted peak level and timing of the peak; information on which areas are threatened and the expected extent of the impact; and evacuation arrangements</td>
</tr>
<tr>
<td>Expectations - Prepare</td>
<td>Key Performance Questions</td>
<td>Summary of Evidence</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>agencies understand their roles in the event of an emergency so they can respond in an effective, coordinated and timely way</td>
<td>To what extent were people in the community prepared for the imminent danger? Did people in the community know what to do in response to a flood event? Did people in the community know what to do for vulnerable people? What are the implications for information and warning preparedness arising from community understanding of their risks and what to do in response to a flood event? To what extent have vulnerable people been incorporated into planning for information and warnings?</td>
<td>Varying levels of preparedness prior to the June 2012 floods:  - 53 per cent had thought about what their family or household would do in an event of a flood;  - 45 per cent had discussed this with family/household members;  - 49 per cent kept emergency information handy;  - 40 per cent had prepared an emergency kit (torch, first aid kit, battery radio);  - 8 per cent of the respondents had prepared a written plan for their household, and 3 per cent for their business  - 18 per cent had been involved in or contributed to flood planning in their community High level of confidence in their ability to respond to a flood threat, yet modest levels of engagement in individual or community planning and preparedness. Emergency services discern growing expectations for precise, customised information Lists of vulnerable people are incorporated into municipal plans, however informal community knowledge of vulnerable people is generally relied upon.</td>
</tr>
<tr>
<td>People in the community know what to do in an emergency, including how to help vulnerable people</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expectations - Respond</th>
<th>Key Performance Questions</th>
<th>Summary of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>An effective incident management system is in place that ensures timely and quality decisions are made to support effective response to the emergency.</td>
<td>How effectively did the incident management system lead to timely and relevant community information and warnings? How adequate, timely and relevant was the</td>
<td>Where extreme urgency or community-specific arrangements not required, incident management system was effective, but concerns of priority-setting, internal communication, and external communication Information and intelligence was adequate, timely and relevant to inform the need for community information and warning, but detail was not</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 40
<table>
<thead>
<tr>
<th>Expectations - Respond</th>
<th>Key Performance Questions</th>
<th>Summary of Evidence</th>
</tr>
</thead>
</table>
| Information/intelligence required to inform operational decision making on community information and warning? | How can the incident management be improved? | always adequate, timely and relevant.  
- Incident management could be improved through: the clarification of roles and responsibilities; expansion of technical information used for intelligence during peace times; further exercises to ensure agency readiness; resolving operational IT and facility support concerns. |
| Information and communication systems across all levels of government are interoperable to ensure an effective response by ESPs to the community’s needs | What information and communication system interoperability was required to provide effective information and warnings to communities? To what extent was interoperability achieved, and are there are systemic barriers? What are opportunities for improvement? | Main barrier to system interoperability limiting the provision of effective information and warnings to communities was IT interoperability at ICC. |
| People receive clear, realistic and authoritative messages about the proposed response and the actions they should take | Was the information disseminated by agencies to the community during the flood event in a relevant way and in an appropriate format? Did people have the right information to make decisions about what to do, including where relevant with regard to evaluation? What could be done better in the future? | Majority (86 per cent) of community was satisfied with the information available as threats emerged. Majority of community members became aware through their observation of rainfall and water levels or they heard about via radio or television.  
- Less satisfaction with warnings/EA in particular. For those that received a warning, over half were dissatisfied or very dissatisfied with the information it provided and its timing.  
- Community members wanted information to be more up to date; more accurate and reliable; specific to their towns and localities; and (from some localities) more balanced/less dramatic.  
- Community members said that information could be better delivered and more broadly disseminated through greater use of EAs for information rather than evacuation warnings; greater use of the radio especially ABC local radio; and greater use of the internet. |
| Emergency services are mobilised and provide the emergency response in an effective and | How did the emergency response mobilise to provide information and warning support to the community? | Mobilisation generally followed incident management processes. Local-level resourcing at early stages, later supplemented by non-local resources in key roles. |
### Expectations - Respond

**timely way, meeting the community’s needs**

### Key Performance Questions

- **What are the opportunities for improvement?**
- **What preferences do people have for the channels through which information is provided?**
- **What type of sources did the community access to get information?**
- **How influential was information and warnings from agencies?**
- **How did community demand for information intersect with emergency service supply of information?**

### Summary of Evidence

- Information and warnings provided by emergency services consisted of:
  - 167 OSOM messages
  - 5 Community Meetings in Paynesville, Bairnsdale, Lakes Entrance and Mallacoota and an ABC Virtual Meeting
  - EA voice/text messages across 6 locations:
    - ‘Prepare to Evacuate’ sent to ~10,000 households
    - ‘Evacuate’ sent to ~500 households
  - Doorknocks in Traralgon, Hollands Landing, Eagle Point, Lakes Entrance, Metung, Bairnsdale and Paynesville
  - Interviews with the media
  - VICSES website and flood system information phone line

- Identified opportunities for improvement included streamlining and clarifying authorisation procedures balancing control and timeliness, implementing an integrated approach to information transfer between units, reinforcing intended communication paths, conducting further exercises to ensure agency readiness, resolving IT and facility support concerns, increasing cross-agency training in specific AIIMS roles within flood response management to expand the potential resource pool and assessing levels of capacity and capability within agencies and assessing whether the facilities are fit for purpose.

- Preferred flood information channels are (in order) ABC local radio; websites; television; community radio station; local police, CFA or SES and neighbours.

- Sources of information sought by community aligned with their preferences, except for the level of reliance on neighbours for information which was less preferred.

- Less than one third acted on all the advice provided by emergency services before and during the flood, with most community members tended to rely on their own experience and judgement.

- Some evidence of imbalance between demand and supply for...
<table>
<thead>
<tr>
<th>Expectations - Respond</th>
<th>Key Performance Questions</th>
<th>Summary of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The community and stakeholders:</td>
<td>To what extent were timely and accurate information and warnings provided to communities?</td>
<td>community information and warnings including, particularly with respect to content,</td>
</tr>
<tr>
<td>• understand the imminent dangers because they have access to timely, relevant and</td>
<td>Did people understand what impact the emergency would have in their community and what the planned response was going to be?</td>
<td>timeliness and accuracy of information. Emergency services prioritised supplying</td>
</tr>
<tr>
<td>tailored emergency management information and warnings</td>
<td>Did people have confidence in the information and warnings provided?</td>
<td>information and warnings to areas under the greatest threat of floodwaters, however it is in these areas that had the greatest level of community dissatisfaction with information and warnings.</td>
</tr>
<tr>
<td>• make informed decisions about their safety</td>
<td>Did people have the information to make the right decisions about what to do?</td>
<td>• Majority of Gippsland community satisfied with the information available, however in areas of critical importance there was a significant level of dissatisfaction with the timeliness and relevance of information.</td>
</tr>
<tr>
<td>• have confidence in the planned response.</td>
<td>What could be done better in the future?</td>
<td>• Only half said the impact of the flood was as they expected given the information and warnings received and less than one third acted on all the advice provided by the emergency services.</td>
</tr>
<tr>
<td>Information and warnings:</td>
<td></td>
<td>• Majority said that, during the floods, they were able to get information and the majority said that the information met all or most of their needs. Some level of dissatisfaction with the specificity, accuracy and timelines of the information.</td>
</tr>
<tr>
<td>• are in formats appropriate to community needs</td>
<td></td>
<td>• Community members said that emergency services could improve the way they keep people informed or give warnings in the case of a flood by making changes to the nature of the information, content and delivery.</td>
</tr>
<tr>
<td>• reflect an ‘all hazards, all agencies’ approach, and are provided through suitable all-hazards channels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulnerable people are supported, including during any necessary evacuations</td>
<td>How well did community information and warnings incorporate the needs of vulnerable people?</td>
<td>• Advice given on evacuation processes in information and warnings.</td>
</tr>
<tr>
<td>People and communities exercise choice and share responsibility for their safety by taking actions that align with the planned response to the emergency</td>
<td>To what extent did people act on the community information and warnings?</td>
<td>• Limited specific incorporation of the needs of vulnerable people in community information and warnings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only a minority acted on all the advice provided by the emergency services and just over one in five did not act on any of the advice provided.</td>
</tr>
</tbody>
</table>
## Appendix 3 Stakeholder consultation list

<table>
<thead>
<tr>
<th>Position</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Officer Operations</td>
<td>VICSES</td>
</tr>
<tr>
<td>Deputy Chief Officer Operations</td>
<td>VICSES</td>
</tr>
<tr>
<td>Director Emergency Management Planning and Communications</td>
<td>VICSES</td>
</tr>
<tr>
<td>Regional Manager</td>
<td>VICSES</td>
</tr>
<tr>
<td>Regional Manager</td>
<td>VICSES</td>
</tr>
<tr>
<td>Manager of Media and Community Information</td>
<td>VICSES</td>
</tr>
<tr>
<td>Community Resilience Coordinator</td>
<td>VICSES</td>
</tr>
<tr>
<td>Community Resilience Coordinator</td>
<td>VICSES</td>
</tr>
<tr>
<td>Community Resilience Coordinator</td>
<td>VICSES</td>
</tr>
<tr>
<td>Regional Manager Operations</td>
<td>VICSES</td>
</tr>
<tr>
<td>Inspector</td>
<td>VicPol</td>
</tr>
<tr>
<td>Superintendent</td>
<td>VicPol</td>
</tr>
<tr>
<td>Municipal Emergency Coordinator</td>
<td>Latrobe City</td>
</tr>
<tr>
<td>Emergency Coordinator</td>
<td>East Gippsland Shire</td>
</tr>
<tr>
<td>Municipal Emergency Recovery Manager</td>
<td>East Gippsland Shire</td>
</tr>
<tr>
<td>General Manager Liveability, Coordinator Built Environment Planning, Emergency Management Coordinator and Manager Finance</td>
<td>Wellington Shire</td>
</tr>
<tr>
<td>Regional Director (Victoria)</td>
<td>BoM</td>
</tr>
<tr>
<td>Senior Hydrologist at Bureau of Meteorology</td>
<td>BoM</td>
</tr>
<tr>
<td>Hydrologist</td>
<td>BoM</td>
</tr>
<tr>
<td>Strategy and Planning Manager</td>
<td>East Gippsland CMA</td>
</tr>
<tr>
<td>Planning Manager</td>
<td>West Gippsland CMA</td>
</tr>
<tr>
<td>District Manager and Public Information Officer</td>
<td>CFA</td>
</tr>
<tr>
<td>Sector Commander</td>
<td>CFA</td>
</tr>
</tbody>
</table>
Appendix 4 Agency roles

Listed below are the key agencies involved in planning and/or response and their key supporting functions, as relevant to community information and warnings for flood, taken from Part 7 of the EMMV and Appendix 3 of the State Flood Emergency Plan. It is not a full list of all agencies and functions in relation to flood generally. These activities will not occur in isolation and may occur simultaneously. The list of relevant agency roles covers:

• Victoria State Emergency Service (VICSES)
• Bureau of Meteorology
• Catchment Management Authorities
• Municipal councils
• Victoria Police
• Country Fire Authority
• Emergency broadcasters
• Department of Sustainability and Environment
• Department of Human Services
• Office of the Emergency Services Commissioner

Victoria State Emergency Service

Prevention / Mitigation / Risk Reduction

• Provision of advice, information, education, training and assistance to municipal councils, other agencies and the community in relation to emergency management principles and practices.
• Assistance to municipal councils in the development of emergency management plans including assistance to incorporate an all hazards risk management approach to emergency management planning.
• Audit municipal emergency management plans.
• Provide the emergency response development function to each emergency response region.

Response Activities

• Control agency flood events
• Rescue of persons from, or endangered by emergency or dangerous situations.
• Support agency for search and rescue on land, including caves, and on water.
• Support agency for evacuation.
• Provision of information to the community and government.
Bureau of Meteorology

Prevention / Mitigation / Risk Reduction Activities

• Contribute to community awareness activities related to meteorological and hydrological phenomena and warning systems.
• Contribute to community hazard mapping by taking the lead role in the analysis of relevant meteorological and hydrological information.

Response Activities

• Issue warnings on gales, storms and other weather conditions likely to endanger life or property, or that give rise to floods or bushfires.
• Provide weather forecasts and meteorological and hydrological information.
• Provide expert advice for emergencies that are influenced by meteorological and hydrological conditions.
• Provide weather-related information to media, including direct broadcast via radio and the internet.

Catchment Management Authorities

Prevention / Mitigation / Risk Reduction Activities

• Manage and prioritise regional flooding issues in cooperation with local government and the community.
• Advise Government on regional priorities for floodplain management activities through the implementation of regional floodplain management strategies.
• In partnership with local government, prepare and implement local floodplain management plans in accordance with the regional floodplain management strategy and community expectations.
• Collect, maintain and enhance flood information.
• Advise and assist local government in the incorporation of flood related planning controls in planning schemes.
• Advise local government and other authorities on planning permit referrals, building issues and infrastructure management within floodplains.
• Provide flood advice to local government and the community in general.
• Support community education and involvement on flooding issues.
• Manage and maintain specific strategic and regional (non-urban) works and measures in accordance with responsibilities under the regional floodplain management strategy or catchment management strategy.
• Monitor and report on performance of regional floodplain management strategies.
• Implement flood damage restoration programs for flood affected waterways.

Response Activities

• Prepare flood response action plans for internal use.
• In partnership with local government, the Bureau of Meteorology and DSE, facilitate the development, maintenance and upgrading of regional flood warning systems.
• Support response agencies at the regional level through the provision of flood advice, including flood extent and severity during major flood events.
• Monitor significant flood events and collect flood data in conjunction with local government.
• Implement emergency stabilisation and other activities to arrest river breakaways and remove debris accumulation threatening structural stability of public assets.
• Assess all river waterway damage that poses a threat to public assets and stability of river systems.

Municipal Councils
Most of the activities in the list below are carried out by councils in close conjunction with, or with direct support by, Government departments and agencies.

Prevention / Mitigation / Risk Reduction Activities
• Perform municipal functions under Planning legislation.
• Identification and assessment of hazards/risks.
• Provision of community awareness, information and warning system(s).
• Identification and assessment of risks using a community emergency risk management framework.
• Implementation/co-ordination of specific risk treatments for identified risks and exposed elements in the community. Including maintaining a register of at-risk groups.

Response Activities
• Provision of available municipal resources needed by the community and response agencies.
• Establishment of Municipal Emergency Coordination Centre - facilities and staffing.
• Provision of facilities for emergency services’ staging areas.
• Facilitate the delivery of warnings to the community.
• Provision of information to public and media.
• Coordination of the provision and operation of emergency relief (includes catering, emergency relief centres, emergency shelters and material needs).
• Clearance of blocked drains and local roads, including tree removal.
• Support to VicRoads for partial/full road closures and determination of alternative routes.

Victoria Police

Prevention / Mitigation / Risk Reduction Activities
• Development of community emergency awareness through the provision of information and education in the media, and other means.
Response Activities

• Responsible for the effective coordination of resources or services in response to emergencies.

• Responsible for:
  – Evacuation - in consultation with the control agency and other expert advice.
  – Registration of evacuees - in conjunction with the Australian Red Cross.
  – Provision of media coordination (where no other facility exists).

• Support to other agencies in:
  – Provision of personnel.
  – Provision of land, air and water transport.
  – Access to communications.

Country Fire Authority

Prevention / Mitigation / Risk Reduction Activities
CFA works to minimize the impact of emergencies on Victorian communities through prevention, preparedness, education and fire protection activities such as:

• Supporting development of an aware and prepared community
• Development and enforcement of relevant legislation and regulations
• Community development processes to enable communities to deal with emergencies
• Provision of support though information, resources or coordination to other organisations or personnel preparing for or engaging in prevention tasks
• Risk modelling to identify key safety processes and priorities
• Planning and/or providing anything ancillary to the matters listed above.

Response Activities

• Rescue of persons endangered by emergency situations.
• Provide advice to threatened and affected communities on actions that they should take during an emergency event
• Support to, and management of, other agencies in the response to emergencies

Emergency Broadcasters

Prevention / Mitigation / Risk Reduction Activities

• Broadcast of information that promotes community safety.

Response / Relief / Recovery Activities

• Operation and maintenance of appropriate communication system for authorised emergency service representatives to initiate emergency broadcasts
• Broadcast of emergency messages (warnings and information) in the form provided by an authorised emergency service representative, interrupting scheduled programming and repeating as required
• Broadcast of the Standard Emergency Warning Signal (SEWS) as required, in accordance with the SEWS Guidelines (refer to Appendix 14, Part 8 of this Manual)
• Broadcast of weather forecast information from the Bureau of Meteorology relevant to developing emergencies
• Providing continuous broadcast services in parts of Victoria affected by a significant emergency (abandoning scheduled programming)
• Participation in emergency debrief forums, particularly regarding public information and media issues.

Note: Emergency broadcast arrangements with Victoria’s Emergency Services Organisations are formalised through memoranda of understanding (MOU). The MOU facilitates closer working relationships by providing details about the system used to communicate emergency messages.

Department of Sustainability and Environment

Prevention / Mitigation / Risk Reduction Activities in Floodplain Management
• Overview and revision of State flood strategy.
• Develop statewide policy and promote best practice in accordance with national standards.
• Provide inter-Governmental, statewide and regional liaison.
• Review regional floodplain management strategies for approval by the Minister for Water.
• Provide technical input into assessment of applications for funding of high priority flood studies, floodplain management plans and flood mitigation works.
• Develop management arrangements for strategic and private levees systems across the State.
• Coordinate and maintain the Victoria Flood Database.
• Support community education and knowledge.

Response Activities
• Provide real time access for flood warning purposes to stream flow data collection networks managed by the Department for the purpose of natural resource management.
• Contribute to the collection of real event flood data for major floods of State significance.
• Support response agencies at the State level through the provision of flood mapping information and flood advice.
• Advise the Minister for Water on major flood events and damages.
Department of Human Services

The Department of Human Services is responsible for State and regional co-ordination of emergency relief and recovery.

Prevention / Mitigation / Risk Reduction Activities

- To enhance prevention, preparedness, response and recovery services for a major mass casualty incident or major natural disaster in Victoria.
- Conduct community training and awareness activities (including promoting awareness of safe practices and emergency procedures and implementing safety and warning systems) for relevant clients of the Department of Human Services.

Response Activities

- Support service delivery by the Department of Health to affected individuals, groups and/or communities.