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State Emergency Response Plan
Tsunami Sub-Plan

Edition 2

Working in conjunction
with communities, government,
agencies and business

This plan has been endorsed by the State Crisis and Resilience Council (SCRC) as a subplan to the State Emergency Response Plan.

Authorised and published by the Victorian Government
Melbourne

This document is also available in Word and PDF format at www.emv.com.au

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1 Introduction

1.1 Purpose

This State Emergency Response Plan (SERP) Tsunami Sub-plan, referred to as the Plan hereafter, outlines the Victorian arrangements for managing a tsunami event in Victoria.

1.2 Objective

The objective of this SERP Tsunami Sub-plan is to convey the Victorian tsunami risk and associated potential consequences to the community, infrastructure and services; provide sources of information, and to outline the arrangements for ensuring an integrated and coordinated approach to the State's management of tsunami events in order to reduce the impact and consequences of an event.

1.3 Scope

This plan provides strategic information about the Victorian arrangements for managing response to a tsunami. It includes:

- An overview of what is known about the hazard.
- A description of potential risks and consequences of tsunami to the wellbeing, liveability, viability, sustainability and community connectedness of Victorian communities.
- The arrangements in place before, during and after a tsunami event.
- The multi-agency management arrangements at the national, state, regional and municipal levels and key agency roles and responsibilities.
- Links to sources of information for further detail.

This plan does not include detail about specific operational activities of individual agencies.

The contents of this plan are based on the available scientific data and knowledge available at the time of development. It is assumed that this Plan will be read in conjunction with the SERP and the Emergency Management Manual Victoria (EMMV), in addition to local planning documents (see Section 6 – Capability and complementary plans).

1.4 Authorising environment

The Emergency Management Act (1986 and 2013) is the empowering legislation for the management of emergencies in Victoria. The EMMV contains policy and planning documents for emergency management in Victoria, and provides details about the roles different organisations play in the emergency management arrangements.

The SERP (Part 3, EMMV) identifies Victoria's organisational arrangements for managing the response to emergencies. This plan is a subordinate plan of the State Emergency Response Plan and has been approved by the State Crisis and Resilience Council (SCRC), Capability and Response Sub-Committee.

In addition to the Emergency Management Act, the following Acts and Regulations relate to the management of tsunami:

- *Victoria State Emergency Service Act 2005.*
- *Essential Services Act 1958.*
- *Planning and Environment Act 1989.*
- *Local Government Act 1989.*
- *Meteorology Act 1955 (Commonwealth).*

1.5 Activation of the plan

The arrangements in this plan apply on a continuing basis and do not require activation.

It is acknowledged that in the event of a catastrophic[1] tsunami event (see Section 3.1.3 – Realistic worst case scenario for further details) that emergency management agencies are likely to be overwhelmed[2] and as such it will be critical for key elements of the plan to be applied, including prioritisation of needs based on consequences, effective control and coordination of the event, and provision of public information and warnings to the community to promote protective action.

1.6 Audience

The audience for this plan comprises the Victorian Government and agencies within the emergency management sector, including business and community groups with a significant role in the management of the emergency.

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[1] 'The term catastrophe is widely used and numerous definitions exist, though in many regards the true scale of a catastrophe is largely contextual. Common listed attributes allude to their extraordinary impacts that overwhelm the normal functioning of societies and require different approaches to their management (Quarantelli et al., 2006, in Gissing, Eburn and McAneney, 2018, Planning and capability requirements for catastrophic and cascading events, available: **file:///C:/Users/ses54561/Downloads/403id91._andrew_gissing.pdf**).'

[2] Gissing and Eburn, 2018, Planning and capability requirements for catastrophic and cascading disasters, BNHCRC Annual Project Report 2017/18, available: **file:///C:/Users/ses54561/Downloads/rb21-catastrophic_disasters_annual_report_2017_18_2_1.pdf**

Although the wider community is not the primary audience, community members may find the contents of this plan informative.

1.7 Linkages

This plan reflects current legislation, the arrangements in the SERP, the State Emergency Relief and Recovery Plan, the strategic direction for emergency management in Victoria and the accepted State practice for managing emergencies. The arrangements in the SERP and State Emergency Relief and Recovery Plan have not been repeated unless necessary to ensure context and readability. Both plans can be accessed at: **emv.vic.gov.au/policies/emmv**, under Part 3 and 4.

Arrangements for secondary consequences of tsunami are contained in the following documents:

- Flooding – the State Emergency Response Plan Flood Sub-Plan.
- Rescue – the Victorian Urban Search and Rescue Response Arrangements.
- Health – the State Health Emergency Response Plan (Edition 4).
- Essential services – the State Electricity and Gas Supply Sub-Plan.
- Transport – the State Public Transport Disruption Sub-Plan.
- Maritime emergencies – the State Maritime Emergencies (non-search and rescue) Sub-Plan.

This plan also links to Regional and Municipal plans in Section 6 – Capability and complimentary plans.

1.8 Exercising and evaluation

The plan was first exercised in 2018. This revised plan will be exercised within one year from the date of approval and is aligned to a 3-year planning cycle[3] implemented by the Victoria State Emergency Service (VICSES). The exercise will be evaluated and, where improvements to the emergency management arrangements in this plan are required, the plan will be amended and a revised version issued.

Exercises will be conducted in accordance with the Australian Institute for Disaster Resilience (AIDR) Managing Exercises Handbook, available at: **knowledge.aidr.org.au/resources/handbook-3-managing-exercises**

[3] VICSES Emergency Management Plans have been aligned to the 3-year planning cycle for Municipal Emergency Management Plans in Section 21A (1) of the Emergency Management Act 1986, No.30 of 1986, Part 4 – Responsibilities of Municipal Councils, available: **http://www.legislation.vic.gov.au/Domino/Web_Notes/LDMS/LTObject_Store/LTObjSt2.nsf/b1612aeaf0625227ca257619000d0882/c9a12e4a8326f2f3ca257761001fc47c/$FILE/86-30a042.pdf**

1.9 Review

This plan was current at the time of publication and remains in effect until modified, superseded or withdrawn. This plan will be reviewed and updated every three years. Consideration will be given to an earlier revision if the plan has been applied in a major emergency or exercise, or following a substantial change to the relevant legislation or arrangements.

2 The emergency context

2.1 The tsunami hazard and risk environment

The greatest tsunami threat to Victoria and the broader Australian coastline is likely to result from a marine threat tsunami. Likely effects of a marine threat tsunami include 'dangerous rip tides, waves and strong currents. Land threat tsunami events are rare but extremely hazardous and can cause inundation in low-lying coastal regions. There have been more than 50 recorded tsunami events on the Australian coastline since European settlement[4],' however, it is widely acknowledged that there are limited records of tsunami events and associated consequences.

With close to 2,000km of Victorian coastline[5] and approximately 80% of Victoria's population living within 50km of the coast[6], Victoria can be deemed to have a susceptibility to marine based hazards, such as tsunami. This vulnerability is heightened during peak holiday seasons, most notably during the spring and summer months, where coastal populations can double or triple in size due to transient populations and short-term stays by tourists and holiday makers.

Despite this, Victoria is considered to have a lower tsunami risk than many other parts of Australia and the world. This is because the waters of Bass Strait, seaway separating Tasmania from the mainland, are in large part protected from effects due to:

- Distance – the long distance between the waters along Victoria coastline and the edge of the continental shelf, where many tsunami events resulting from earthquake originate.
- Offshore barriers and land formation – that obstruct a tsunami entering Bass Strait and in turn minimising wave heights reaching Victoria's most populous locations. Examples include:
    - Furneaux Islands and the shape of the Victorian coastline (in particular, Wilson's Promontory) obstructing a tsunami entering Bass Strait from the east, reducing the wave heights reaching communities around Melbourne.
    - King Island and Wilsons Promontory which effectively block tsunami events originating from the west, and in turn reduce wave heights at Yarram and Lakes Entrance[7].

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[4] **https://knowledge.aidr.org.au/tsunami-the-ultimate-guide/#/**
[5] **https://www.ga.gov.au/scientific-topics/national-location-information/dimensions/border-lengths**
[6] **https://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/1301.0Feature%20Article32004**
[7] Attorney Generals Department, 2009, Near Shore Tsunami Hazard Assessment

This is not to say Victoria is without a tsunami risk (see Figure 1). A tsunami can impact communities outside Bass Strait which are not protected by offshore features, including but not limited to Warrnambool, Portland and Port Fairy in the south-west of Victoria, and Lakes Entrance and Mallacoota in the south-east.

While there is no state-wide tsunami risk assessment for the Victorian coast, on-shore tsunami modelling and associated maps were developed in 2010 for four key communities in Victoria (see Appendix A for Lakes Entrance example or EM-COP Library under Hazard Information for full suite of maps, available: **cop.em.vic.gov.au**) deemed to have the greatest tsunami risk in the State. It is important to note that the four communities are not the only communities in Victoria with tsunami risk.

VICSES will act as the primary point of contact in Victoria for emergency risk management related research modelling and planning. Where Geoscience Australia, municipal council, other state government agencies or private organisations are conducting risk assessments for tsunami, VICSES will actively participate. This includes working closely with the Australian Tsunami Advisory Group (ATAG) on the Tsunami Information Development for Locations of National Strategic Significance project, currently underway. This project is intended to deliver on-shore tsunami mapping for locations of national significance in the next 2-3 years.

The most definitive inventory of tsunami events and associated impacts in Australia is captured by Goff and Chague-Goff in the 2014 publication, The Australian Tsunami Database: A review.

2.2 What is a tsunami?

A tsunami is a series of ocean waves generated by a sudden displacement of large volumes of water. The impacts of a tsunami can vary widely. A small tsunami may result in unusual tides or currents that can be dangerous to swimmers or cause damage to berthed vessels. A large tsunami can cause widespread flooding and destruction. It may also cause strong rips and currents in oceans around the world for up to a few days after the initiating earthquake.

A tsunami may be caused by one or a combination of (see Section 2.4 for more):

- Vertical movement of the sea floor as a result of a large earthquake.
- Sub-marine or coastal volcanic eruptions.
- Meteor impacts.
- Coastal landslides and slumps, either land-based or sub-marine.

The size of tsunami can range from centimetres resulting in strong and unusual currents to tens of metres causing the flooding of coastal land. Earthquakes have generated the majority of tsunami that have occurred in the Pacific Ocean and recorded on the Australian coast. However, not all earthquakes generate a tsunami. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean, and the earthquake must cause significant vertical movement of the sea floor over a large area. Shallow focus earthquakes along tectonic plate subduction zones are responsible for the most destructive tsunami[8].

[8] **https://knowledge.aidr.org.au/tsunami-the-ultimate-guide/#/**

2.3 Characteristics of tsunami

Tsunami's are primarily characterised by their long wave length, which can range from 10 to 500 kilometres long. Tsunami's travel outward in all directions from their point of origin and can strike coastal areas at great distances from the source. The generation of waves however, is not necessarily symmetrical. The larger waves are focused in directions at right angles to the orientation of the earthquake rupture. A tsunami's speed is dependent on water depth and wave period. In deep water and in the open ocean, waves can reach speeds of 800 kilometres per hour. Heights of tsunami waves in deep water are small and the waves can go unnoticed. As a tsunami wave enters shallow water, its speed decreases rapidly. This causes the length of the wave to decrease and the height of the wave to increase. Wave period is dependent upon the mode of propagation (relative velocity and magnitude of the disturbance, the water depth in which the wave is generated and the volume of water displaced by the event generating the waves). Tsunami's can arrive with a leading crest or a leading trough. Tsunami may strike the coast as a cresting wave, a fast rising tide or a bore. At some locations, the advancing turbulent front will be the most destructive part of the wave. In other situations, the greatest damage will be caused by the outflow of water back to the sea, between successive tsunami waves.

A Tsunami's magnitude at the coast is dependent on the configuration of the coastline, the shape of the ocean floor, reflection of waves, tides and wind waves. Narrow bays, inlets and estuaries may cause funnelling effects that enhance tsunami magnitude. The combination of these factors means that the flooding produced by a tsunami can vary greatly from place to place over a short distance.

A tsunami is not one wave, but a series of waves. The time between the successive waves is usually between 5 and 90 minutes. Destructive waves may continue for a number of hours, and several days may pass before the sea returns to its normal state. The first wave in the series may not be the largest.

Tsunami's can wrap around islands, and damage can be worst on coasts on the lee-side that face away from the source of the tsunami. A tsunami impacting on harbours and bays can create damaging wave activity and currents. In these enclosed environments, maximum wave magnitudes may possibly occur somewhat later than the arrival of the initial wave. Even a small tsunami can generate currents strong enough to cause damage to boats and associated facilities.

2.4 Tsunami sources

A detailed description of each of the possible sources that may generate a tsunami is given below.

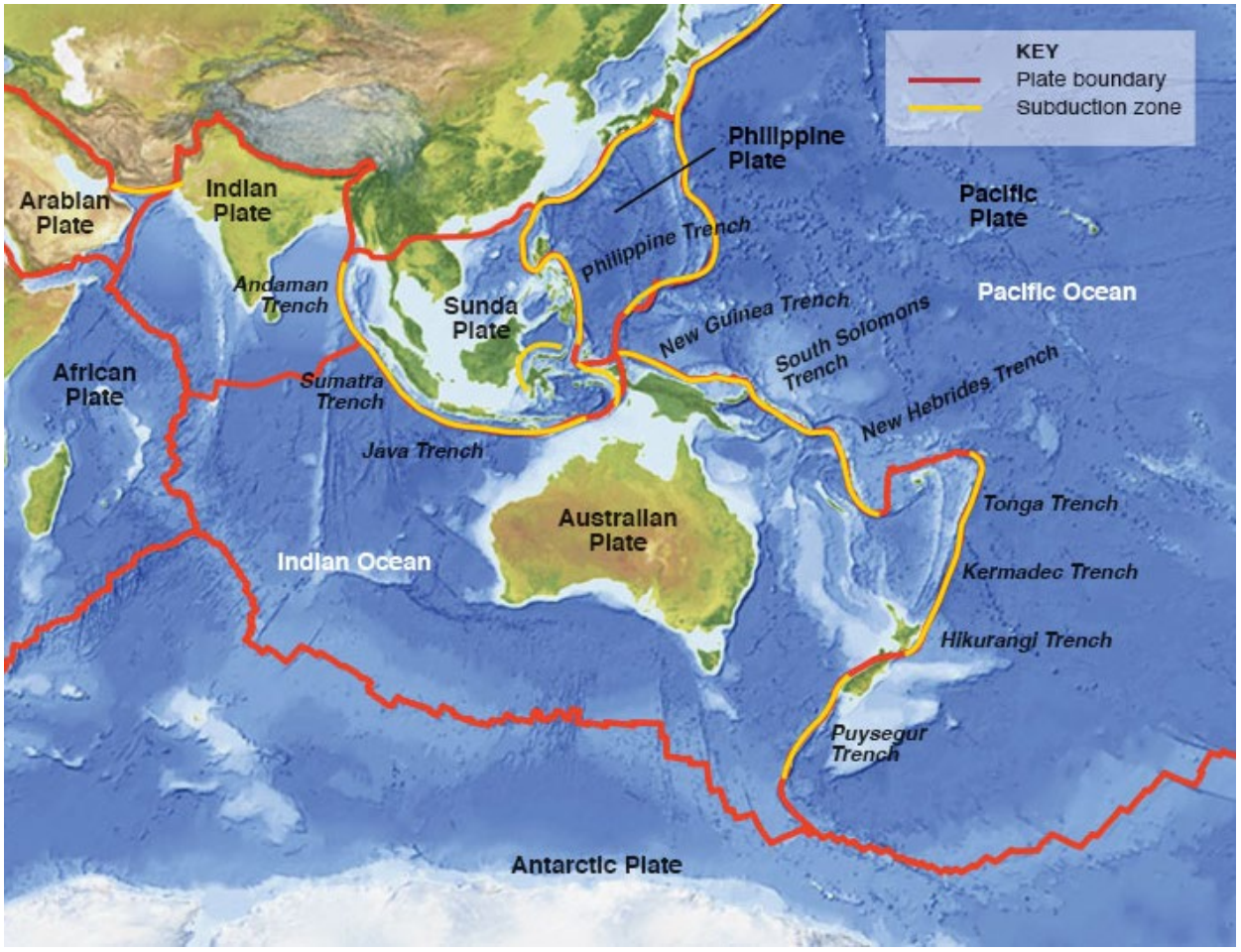
2.4.1 Earthquake sources

Local sources: There is potential for earthquakes occurring within the continental shelf off Victoria to produce tsunami, especially if they have dip-slip mechanisms. No historical tsunami events that have been recorded in Victoria have been attributed to local earthquakes.

Regional sources: Regional earthquake sources are major contributors to the tsunami threat facing Victoria. The largest contributors to the tsunami hazard are the Vanuatu Trench, Tonga-Kermadec Trench and the New Zealand - Puysegur Trench (see Figure 1).

Distant sources: Distant earthquakes have the potential to generate tsunami which can affect Victoria. Within European history, the largest tsunami events have come from South America (1960, 1877 and 1868). The South Sandwich Islands region is the main contributor to the distant source hazard for western Victoria while fault lines along the west coasts of North and South America are contributors to the distant source hazard for eastern Victoria.

Figure 1: Possible regional earthquake sources – subduction zones



Source: Tsunami: The Ultimate Guide depicts 'the subduction zones, shown in yellow, [that] have the potential to generate a tsunami that could impact on mainland Australia and its offshore territories.[9]'

[9] **https://knowledge.aidr.org.au/tsunami-the-ultimate-guide/#/**

2.4.2 Volcanic sources

Local sources: No local volcanic sources exist capable of generating tsunami.

Regional sources: The nearest volcanic sources likely to produce tsunami are located in the Pacific Islands and New Zealand. In the area from New Zealand to Papua New Guinea there are more than 130 volcanic centres known to have erupted in the last 10,000 years. While some of these are too small or are located too far inland to produce tsunami, a surprisingly large proportion has some potential to generate tsunami.

Distant sources: Large scale collapses of volcano edifices have occurred on a number of occasions. The best understood of these are repeated failures of Hawaiian volcanoes, with a suspected frequency of about once in 100,000 years or less frequently. Slope failures have been large and capable of generating Pacific-wide tsunami.

2.4.3 Landslide sources

Only very limited information is available about the potential for submarine landslides on the Victorian coast and adjacent areas. Though in the event of a submarine landslide, the impacts of a tsunami may reach the Victorian coastline prior to triggering deep-water buoys and the associated warning system (see 2.6 for further information).

2.4.4 Asteroid/meteor sources

There are no known examples, during recent human history, of a tsunami being generated by asteroids, although the earth does preserve geological evidence of asteroid impacts.

2.5 When does a tsunami become an emergency?

A tsunami event may be defined as an emergency when there is either threat of, or community consequences resulting from a tsunami event, and may result from a no-notice event (i.e. sub-marine landslide) or a known event (i.e. earthquake). For earthquake generated tsunami events, pre-defined thresholds based on likely consequences to the community have been determined through the partnerships of the Australian Total Warning System which trigger the issuing of a Tsunami Warning (Marine or Land Threat) by the Joint Australian Tsunami Warning Centre (JATWC).

The conclusion of a tsunami event is when either the threat of a tsunami event has passed or the hazard has ceased to impact the community. A de-escalation or cancellation message will be issued by the JATWC at the conclusion of a tsunami event.

Further details about the associated threat based tsunami warning products and the associated arrangements under the Australian Tsunami Warning System can be accessed in Section 4.3 – Tsunami warnings of this plan.

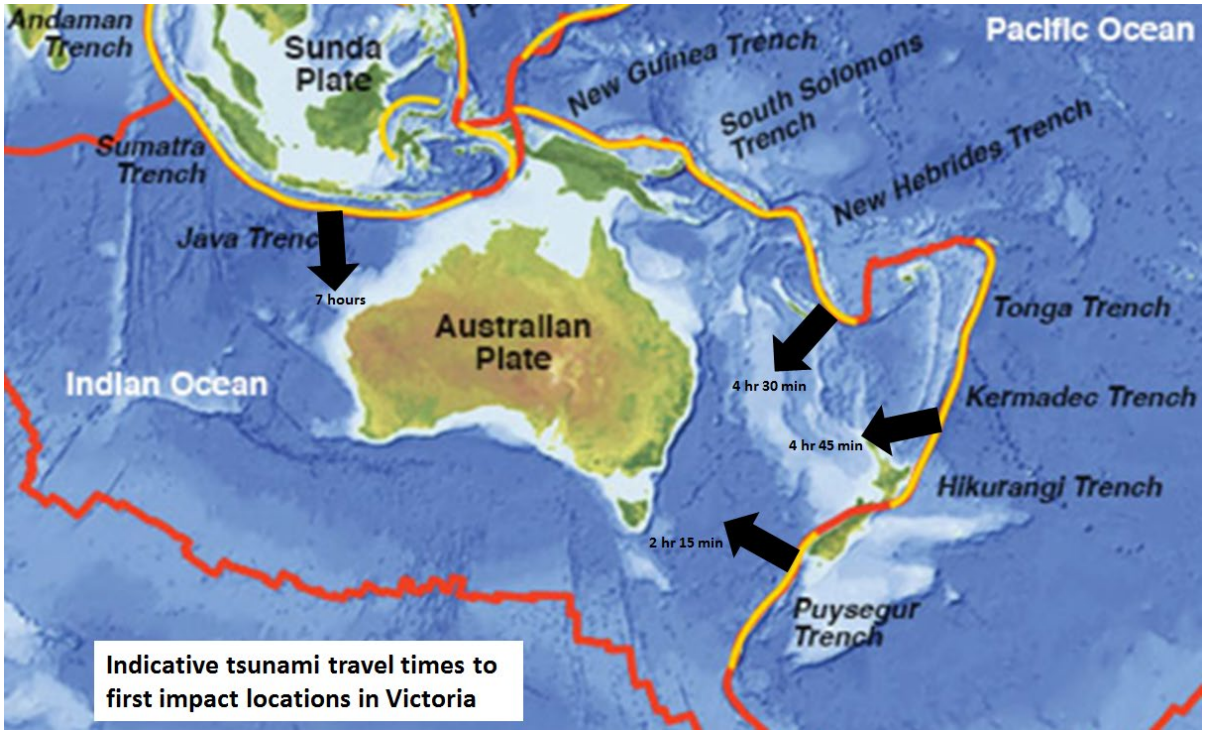
2.6 Warning lead time

Warning time, and therefore warning arrangements, will vary depending on the proximity of tsunami generation (see Figure 2 below, for indicative tsunami travel times from possible earthquake sources), for example:

- A distant tsunami (e.g. Chile, California or Alaska) may arrive over 12 hours after it has been generated.
- An earthquake generated tsunami along the Puysegur Trench in New Zealand may arrive approximately 2 hours after it was generated.
- A local tsunami possibly caused by a submarine landslide may arrive at the initial point of impact along the Victorian coast within minutes. Under these circumstances, limited warning time may be available to adjacent coastal communities outside the initial impact area.

It is critical that timely, tailored and relevant public information and warnings are issued to maximise lead time of a tsunami event, and provide opportunity for community members to take protective action. While it is acknowledged effective communication is important for all hazards, it may be the only protective tool available before and during a tsunami event with little lead time. Further information about public information and warnings for tsunami events are outlined in Section 4 – community resilience.

Figure 2: Indicative tsunami travel times from possible regional earthquake sources



Earthquake subduction zones, shown in yellow, which have the potential to generate a tsunami that could impact on mainland Australia and its offshore territories [from Tsunami: The Ultimate Guide]. Indicative times for a tsunami to travel from the Puysegur, Kermadec, New Hebrides and Java trenches to the first impact locations in Victoria are shown.

3 Tsunami impacts and consequences

3.1 Tsunami impacts

3.1.1 Small tsunami event

Most tsunami events in Victoria will be small, resulting in strong currents and changing water levels over a period of time, which may affect marine based risk elements such as people on beaches, swimmers, boaters, divers, fishers, aquaculture industries and submarine infrastructure (e.g. submarine cables).

The following quote from the Sydney Morning Herald May 1960 provides some indication of the effects of a tsunami on the Victorian coastline following a 9.5 magnitude earthquake in Chile, which resulted in strong currents along the coast.

"Salmon spotting pilot Dick Ritchie yesterday saw Three Mile Beach, Wilson's Promontory "disappear" while he was flying over it. 'I usually land on this beach – but it seemed to be under several feet of water' he said. 'But inside a minute and a half while I flew over it, the water rushed 200 yards out. I first noticed it at 11am. The whole coastal area was disturbed for most of the day. I saw a lagoon nearly a mile by half a mile wide near Port Albert empty one minute, completely full the next, then empty again. Swirling sand and weeds were everywhere. I thought I was seeing things."

"The Lakes Entrance Harbour Master said the freak tides had turned the lakes northern arm into a "vacuum". He said the Lakes Entrance old timers described it as the fastest moving tide in memory. 'Water came rushing in at a terrific rate – then bored out just as fast' he said. 'It gouged three feet of sand away from the pier piles. Marine growth on the bottom was ripped out, and travelled along at three or four miles an hour."

3.1.2 Large tsunami event

Large tsunami events are rare in Victoria. Impacts are most likely to be marine based, however, there is a possibility of land inundation. Below are the potential impacts from a land threat tsunami:

- Inundation (or flooding).
- Wave and debris impact on structures.
- Erosion.

The current generation Australian Tsunami Warning System tsunami scenario database suggests that Victorian Land-Threat Warnings could be issued for earthquakes of about magnitude 8.5 or larger occurring on some of the nearby subduction zones illustrated in Figure 1. Land inundation, might also occur due to intraplate earthquakes close to the Victorian coast or from non-seismic events such as a meteotsunami, landslide, volcano or asteroid impact. These non-subduction tsunami sources have received little study in the Victorian context, but land-inundation from such sources is probably rare.

3.1.3 Realistic worst case tsunami event

Worst case tsunami events that threaten inundation of the Victorian coastline are considered to be very unlikely, but plausible. Despite marine threat tsunami's being more likely in Victoria, focus on extreme cases aids conceptualisation of the potential threat posed by the hazard and associated consequences (refer to section 3.2).

A scenario that illustrates the threat of land inundation for the east coast of Victoria is a magnitude 8.8 earthquake, originating from the Puysegur Trench. While the likelihood of occurrence is extremely low (estimated 2% possibility based on the Probabilistic Tsunami Hazard Assessment 2018 (PTHA18), and 0.024% chance of occurrence in the next 50 years[10]) it is possible, and smaller land inundation events are more likely.

An example of a M8.8 Puysegur Trench Tsunami Warning is included in Appendix B, which depicts the likely threat area in the warning graphic and explains the potential threat and recommended action within the text.

It is acknowledged that the possible impact of a tsunami event is influenced by a large number of variables that influence hazard behaviour and will be unique for each tsunami event, and as such this example should be viewed as a guide only.

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[10] M8.8 Puysegur Trench tsunami scenario included in the Sub-Plan exceeds the largest recorded earthquake (M7.8 in July 2009) based on records from 1900-present [1] though there is indication a M8.0 event may have occurred in 1826 [2]. This is significant because historic records inform PTHA18 estimates.

[1] [Storchak D.A., D. Di Giacomo, I. BondÃ¡r, J. Harris, E.R. Engdahl, W.H.K. Lee, A. VillaseÃ±or, P. Bormann, and G. Ferrari (2012), ISC-GEM Global Instrumental Earthquake Catalogue (1900-2009), GEM Technical Report 2012- 01 V1.0.0, 128 pp., GEM Foundation, Pavia, Italy, doi: 10.13117/GEM.GEGD.TR2012.01],

[2] [Albini, P., R.M.W. Musson, A.A. Gomez Capera, M. Locati, A. Rovida, M. Stucchi, and D. ViganÃ² (2013), Global Historical Earthquake Archive and Catalogue (1000-1903), GEM Technical Report 2013-01 V1.0.0, 202pp., GEM Foundation, Pavia, Italy, doi: 10.13117/GEM.GEGD.TR2013.01].

3.2 Tsunami consequences

The consequences of a tsunami will vary depending on its magnitude. Consequences are categorised under the themes of wellbeing, liveability, sustainability, viability and community connectedness.

While Victoria has a low tsunami risk, potential consequences have been identified which may require consideration when responding to large tsunami events.

Consideration should also be given to other key characteristics of the Victorian environment which will influence the impact and associated consequences (i.e. prior flooding in the landscape, Highest Astronomical Tide (HAT) and marine or land based activities being undertaken by the community). In addition to consideration of cascading events created by a tsunami (i.e. a loss of power may result in a loss of telecommunications, transport (road and rail) management and/or monitoring systems and disruption to supply chains. Damage to coastal transport (road and rail) infrastructure may result in isolation of properties and/or communities. Damage to ships, ports or surrounding facilities may result in risk to life and/or marine pollution harming (marine ecosystems and animals).

Wellbeing *(The safety, security, physical and mental health of individuals, families and the community, including those who become vulnerable due to the emergency).*

- Health services – overwhelming of local healthcare systems due to casualties, injuries or illness.
- Mental health – acute and long term pressures placed on local systems to support community members with increased anxiety and long term mental health impacts.
- Displacement or isolation – relocation or disconnection of community members from temporary or permanent housing, including caravan parks, camp grounds and low-lying coastal areas or on floodplains in tidal river areas.
- Public order and community safety – overwhelming of local road infrastructure in the event of an evacuation or inundation of low-lying roads, and loss of services such as food, water, sanitation and telecommunications resulting in health risks lack of accessibility to available services.
- Environmental health - potential for contamination and disruption to built or natural environments that can increase the risks to public health.

Liveability *(The continuity, restoration and reconstruction of essential services, critical infrastructure and community infrastructure to enable the functioning of a community).*

- Built infrastructure damage – loss of essential services or key community infrastructure (e.g. roads, bridges and essential services (water, gas, and electricity)) homes and businesses.
- Road and transport access – restricted access to or closure of major roads, rail lines and/or ports due to infrastructure damage results in delays or cancellations of services. Causes significant disruption to community and business at local, state and/or national levels, particularly if arterial, public transport and/or sea transport routes are disrupted.

- Energy (electricity and gas) – partial or complete loss of power to meet community and business needs resulting from damage to gas pipelines causing disruption to reticulated gas supply or fires resulting from ruptured gas lines. Power loss may also cause transport network impacts (e.g. failure of signalling, lack of power for key transport modes, inability to pump fuel, loss of administration or information services etc.) and impact power dependant customers, including those on life support systems.
- Water supply and waste water – contamination of drinking water supplies resulting from broken pipes and sewerage lines blockages resulting in loss or service and/or potential backflow to properties.
- Communications – disrupted or loss of telecommunication services including network and website outages, resulting from damage to infrastructure or overwhelming of services[11]. May also impact on provision of health, emergency and transport services.
- Education – school bus routes may be impacted or schools closed.
- Food and grocery logistics – potential of isolation and reduced access and/or loss/spoilage of products due to refrigeration and transport issues.
- Health and emergency services – road closures resulting in reduced access for ambulances and other emergency services, in addition to an inability for health staff to access work premises.

Sustainability *(The reconnection, re-establishment and integration of local social and economic systems and networks).*

- Economic – disruption and closures to local trade centres including ports, local businesses including aqua-culture (i.e. mussel farms) and fisheries resulting in lost revenue (i.e. closure of the Port of Melbourne is estimated to cost the Victorian economy approximately $2,795 per minute for a marine pollution event, and closures to ports may impact oil/fuel supply within a matter of days), potential job loss and impacts to agricultural exports (i.e. livestock, forestry and grain).
- Agriculture – damage to stock, crops, food and natural resources. Loss of access to market.
- Environment – temporary and potentially long term degradation of natural ecosystems and amenities.
- Animal health – reduction in sizes of local seal colonies and potential threat to migratory birds due to loss or damage of habitat.
- Tourism – reduction in tourism and associated business resulting from damage of critical infrastructure and local amenities (natural and built), or media coverage misrepresenting risk and potential impact of hazard for affected and unaffected coastal areas. Impacts of this can be long term resulting from reputational damage and physical impact (i.e. loss of natural amenities, including beach front).
- Recreation and sport – beach closures and limited access to marine based activities (i.e. boating, swimming, surfing) or closures to coastal parks and walking trails impacting limiting access of tourists and hikers.

[11] *Note – if there is a loss of power, phones and tablets cannot be charged and cordless or NBN home phones will not work.*

- Cultural and heritage – loss of or damage to Indigenous or culturally significant sites (i.e. 12 Apostles and Great Ocean Road).

Viability *(Social and economic systems and networks provide opportunities for growth, renewal and innovation).*

- Business continuity – insufficient resources and redundancies to ensure adequate continuity planning and support to enable ongoing activities of local businesses and key ports.
- Local and regional investment – loss of investment for local initiatives and redirection of funds to aid recovery which poses risk to local initiatives.

Community connectedness *(Community systems and networks are understood, informed and work together to participate in planning and leading recovery through to long-term community resilience).*

- Community connection – inability to support local and transient community needs resulting in fragmentation of community and risk to recovery activities.

4 Community resilience

4.1 Shared and individual responsibility for action

Tsunami events can happen anytime and, as with all hazards, cannot be fully mitigated from potential impacts on the community. As such, it is imperative that there is a shared and individual responsibility for action which if further explained in the National Strategy for Disaster Resilience, developed by the Council of Australian Governments (COAG) and is available at: **knowledge.aidr.org.au/media/2153/nationalstrategyfordisasterresilience.pdf**. This strategy provides high-level guidance on disaster management to agencies with a role in emergency management.

Foremost in the strategy is the principle of all of society taking responsibility for preparing for disasters. Examples in the context of tsunami include:

- Individuals being aware of their tsunami risk, and following advice from emergency services when responding to warnings.
- Municipal councils, emergency management committees, and communities undertaking 'Community Emergency Risk Assessment (CERA)' activities, including tsunami discussion, and ensuring consideration within emergency management planning, intelligence and land use planning.
- Industry and businesses planning for the risk of disruption, and ensuring arrangements are in place to maintain critical services, and assist communities.
- Government agencies undertaking:
    - Risk assessments to gain an appreciation of tsunami risk.
    - Engagement with the community regarding tsunami risk.
    - Work with communities to plan the management of tsunami risk.
    - Provision of emergency information and tsunami warnings.
    - Effective and well-coordinated response during a tsunami event.
    - Activities to help communities recover and learn following a tsunami event and build their resilience to future events.

In Victoria, Emergency Management Victoria (EMV) has led the development of the Community Resilience Framework for Emergency Management. It defines community resilience as “the capacity to survive, adapt and thrive no matter what kind of chronic stresses and acute shocks they experience”. Information can be found at: **emv.vic.gov.au/how-we-help/community**

Likewise, the VICSES Community Resilience Strategy (2019-2022) defines a key and measurable objective to increase the level of interest, and support behaviour change within our communities, so they are more aware, informed and prepared for emergencies – supporting them to understand their risk, and the relevance of taking action before, during and after emergencies. Information can be found at: **ses.vic.gov.au/who-we-are/resilience**

4.2 Household, business and farm plans

The Victorian emergency management sector encourages every household, business and farm to have the written emergency plan.

Information on the development of these plans can be found at: **ses.vic.gov.au or redcross.org.au**

4.3 Tsunami warnings

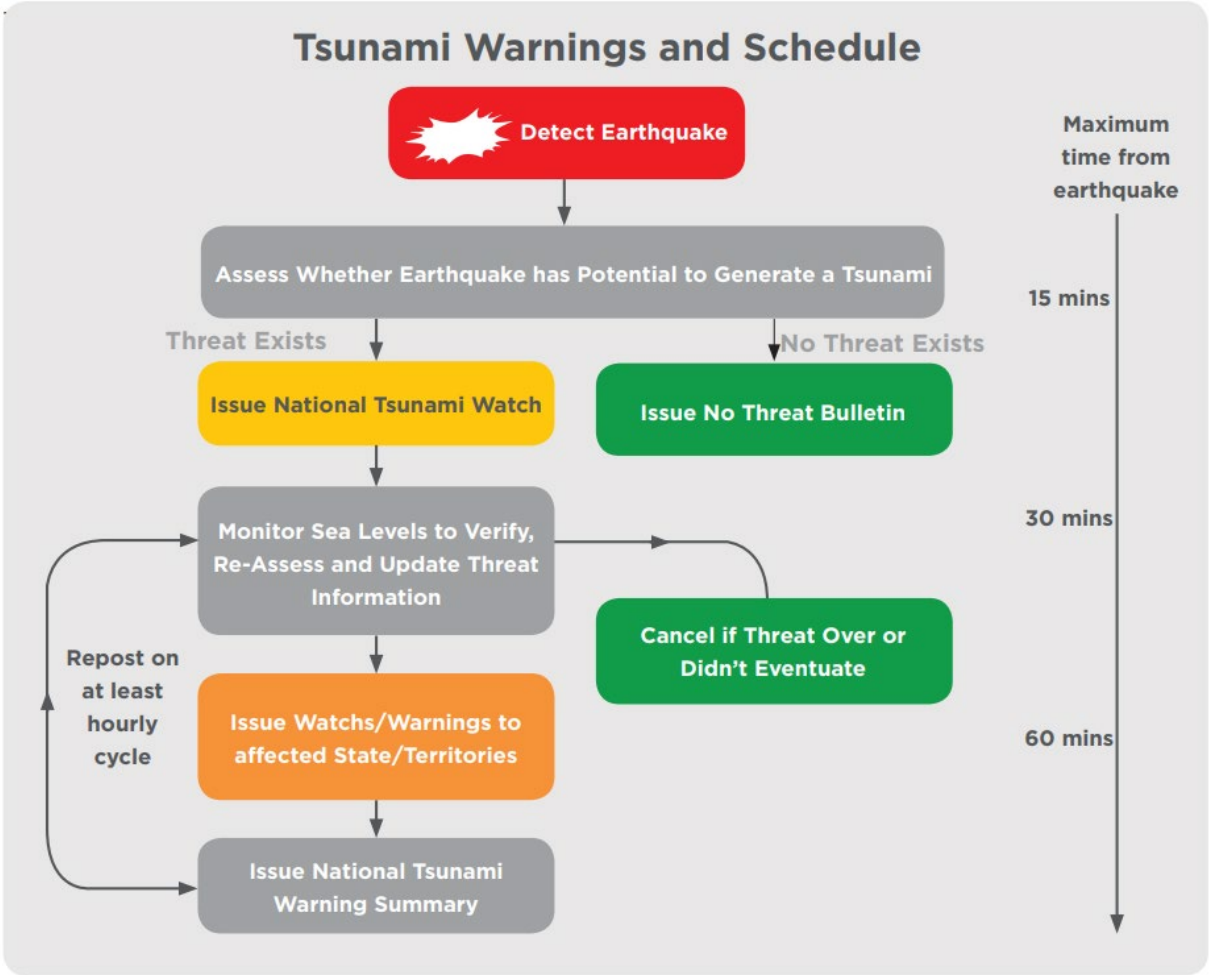
There are two originating sources of public information and tsunami warnings in Victoria. Warnings issued are designed to be coordinated and complimentary, reflecting the likely impact associated with the tsunami threat, and the roles of lead agencies in the Australian Tsunami Warning System.

The warning service and products are in Figure 3.

4.3.1 Australian Tsunami Warning System

The official tsunami warning centre for Australia is the Joint Australian Tsunami Warning Centre (JATWC). The centre is responsible for issuing tsunami Bulletins, Watches and Warnings for Australia including Victoria. The JATWC is jointly operated 24 hours a day by the Bureau of Meteorology and Geoscience Australia. Based in Melbourne and Canberra, it has been established so that Australia has an independent capability to detect, monitor, verify and warn the community of the existence of tsunami in the region and possible threats to Australian coastal locations and offshore islands.

Figure 3: National tsunami warning process



The series of warning notifications that are issued by JATWC are as follows (Figure 3):

National Tsunami No Threat Bulletin

A Tsunami No Threat Bulletin is issued by the Bureau of Meteorology after the JATWC has detected a large undersea earthquake and based upon an evaluation of the magnitude and location of this earthquake it has been determined that there is no threat of a dangerous tsunami to the Australian mainland, islands or territories.

Tsunami Watch

If there is a threat of tsunami, the Bureau of Meteorology will issue a National or State Tsunami Watch. A Tsunami Watch is a notification of a possible tsunami threat after an undersea earthquake has been detected and analysed. Two types of Tsunami Watches exist in the Victorian context. Both the same technical meaning but differ in the areas they apply to:

- National Tsunami Watch – issued in the context of Australian region.
- Victorian Tsunami Watch – issued in the context of Victoria only.

The National Tsunami Watch will be issued immediately following the detection of an undersea earthquake which has the potential to generate a tsunami that may threaten Australia. If the tsunami remains unconfirmed by sea level observations and is still more than 90 minutes away from any potential first point of impact, then State Tsunami Watches will be issued at hourly intervals following the initial National Watch.

Tsunami Warning

A Tsunami Warning may be issued by the Bureau of Meteorology once there is high degree of confidence that a tsunami threat exists based upon detection that a tsunami has been generated; or if the tsunami is less than 90 minutes away from a potential first point of impact. The Tsunami Warning will outline the areas under threat using coastal waters forecast districts and the actions that should be taken by the community. Warnings are stratified to give some indication of tsunami magnitude. The following specific categories of threat exist:

- Marine and Immediate Foreshore Threat: The tsunami is expected to mainly affect the marine environment for specified coastal areas. Warning of potential dangerous waves and strong ocean currents. Although major land flooding is not expected, there may be local amplification of the tsunami in some areas leading to flooding in limited low-lying coastal areas. Significant sea level variations may continue for many hours and even days, along the affected coastal areas. Strong rips and currents may result in extreme danger to people in the water. Potential for damage to marine facilities and craft in marinas and harbours. Potential for sea water intrusions to the top of the beach, minor overtopping of sea walls and even over very low lying foreshore areas such as paths, roads, beachfront car parks, etc.
- Land Inundation Threat: Warnings for low lying coastal areas of major land flooding, dangerous waves and strong ocean currents. Significant over-topping of foreshore dunes and sea walls, with areas of flooding beyond the immediate foreshore. Extreme danger extending beyond the water to low lying coastal areas. Probable extensive damage to ports, marina and small boats. Potential damage to buildings and infrastructure near the shore. Extremely dangerous affects in the water continuing for many hours and even days. Tsunami Warnings can be cancelled if the situation is reassessed as having no threat, or at a point following an event at which the situation is assessed as posing no further threat.

Community safety advice

VICSES use the nationally agreed key safety messages developed by the Australian Tsunami Advisory Group (ATAG), of which VICSES are an active member. The key safety messages are designed to support the community respond immediately before, during and after a tsunami event. They are available on the VICSES website at: **ses.vic.gov.au/get-ready/tsunamisafe** or Section 4.4 of this Plan.

National Tsunami Warning Summary

Once separate Tsunami Warnings are issued for individual states and territories, a National Tsunami Warning Summary will be issued summarising the warnings and cancellations that are in effect for the current tsunami event. The JATWC website (see **http://www.bom.gov.au/tsunami/**) provides a complementary coastal threat graphic showing the regions currently under threat.

Tsunami Watch Cancellation or Tsunami Warning Cancellations

A Tsunami Warning Cancellation will be issued by the JATWC through the Bureau of Meteorology in consultation with VICSES after confirmation that destructive impacts will not eventuate from a tsunami or after confirmation that a tsunami event has ended, and the coastal area is safe for emergency services to enter the impact area to commence immediate post-impact response operations.

Advice regarding potential regional and distant tsunami in the Pacific Ocean is also issued by the Pacific Tsunami Warning Centre (PTWC); however, the JATWC Tsunami Bulletins, Watches, Warnings are regarded as the primary source of tsunami information for Victoria. The Bureau of Meteorology does not encourage the use of the Pacific Tsunami Warning Centre warnings as they apply different thresholds and standards that may cause confusion or conflict with JATWC Tsunami Watches or Warnings.

In the absence of detailed tsunami inundation modelling, the depth and extent of flooding from a tsunami are not generally predictable. A range of variables including the angle of approach of the wave(s), local bathymetry and localised coastal geographic features will influence its impact.

4.3.2 Notification of tsunami other than from Bureau of Meteorology

To maximise the opportunity for some warning following the initial impact of a locally generated tsunami such as a submarine or coastal landslide, for which there is no pre-impact notification via the Bureau of Meteorology, the following is to be undertaken:

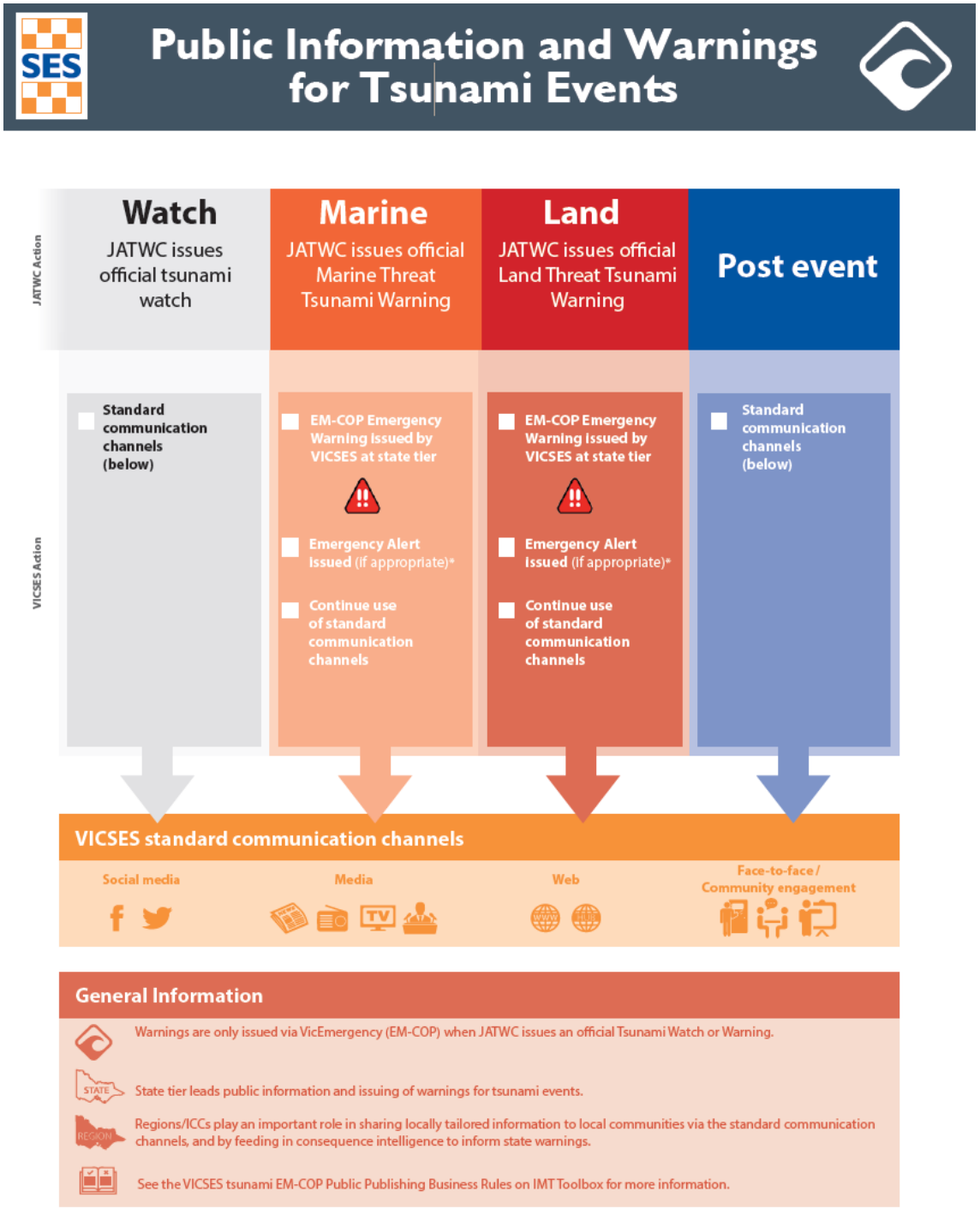
- Local VICSES units will report any tsunami impact through their relevant VICSES Regional Duty Officer and then onto the State Duty Officer.
- Life Saving Victoria will notify the relevant VICSES Regional Duty Officer when unusual ocean behaviour which may be indicative of an imminent tsunami occurs or when a tsunami has occurred.
- Victoria Police will notify the VICSES State Duty Officer of any information they receive indicating the impact of a tsunami (e.g. information received via calls received by 000), including information from adjacent states.
- VICSES State Duty Officer will alert the Bureau of Meteorology to the impact of the tsunami. The Bureau of Meteorology will issue a Tsunami Warning to all Victorian coastal broadcast media and emergency services.

4.3.3 Victorian tsunami warnings

Where a tsunami event is likely to impact the coastline of Victoria, VICSES will lead the coordination of public information and warnings that translate the tsunami threat identified in the JATWC warnings to likely impact of a tsunami event.

VICSES have developed a one-page infographic that graphically depicts how VICSES warnings align to JATWC warnings before, during and after the event, along with the associated communication channels (see Figure 4).

Figure 4: Public Information and Warnings for Tsunami Events Infographic (2018)



4.3.4 VicEmergency and warning channels

VICSES use the state endorsed multi-hazard warning platform, EM-COP Public Publishing, to disseminate public information and warnings to the community via VicEmergency and its associated channels.

VicEmergency warning recipients include emergency broadcasters (i.e. commercial and ABC radio) who are required to re-disseminate warning information and sound the Standard Emergency Warning Signal (SEWS) if required, in accordance with the Emergency Broadcasting Practice Note and the agreed Memorandum of Understandings.

A range of approaches are used by VICSES to disseminate public information and warnings that are selected based on the needs of the community and the nature of the event. Examples include:

- Door knocking for evacuation of a small area, if time permits.
- Emergency Alert (EA) for urgent dissemination of warnings to telephones (including mobile phones) within a specific geographic location (see section 5.2.4).

VICSES ensure public information and warnings align to current best practice, as outlined in the National Public Information and Warnings Handbook,(see **knowledge.aidr.org.au/resources/public-information-and-warnings-handbook**) and the Victorian Warnings Protocol, available on the Public Information section of the IMT Toolbox on EM-COP.

The VICSES Tsunami EM-COP Public Publishing Business Rules can also be found on the Public Information section of the IMT Toolbox. A version is also contained in Appendix C of this Plan.

Adjoining states will be consulted over public information messages if impacts have occurred in a border area.

4.3.5 VicEmergency Hotline (1800 226 226)

Community members can call the VicEmergency Hotline (1800 226 226) to access emergency information during and after major incidents in Victoria, including tsunami events. It also offers information to help Victorians plan for and recover from emergencies.

The VicEmergency Hotline is staffed by operators from Monday to Friday 8:00am – 6:00pm, with opening times extended during significant emergency events. The hotline also features an automatic text to speech function, which ensures Victorians can access important emergency information outside of operator hours, at any time of the day or night, by entering their postcode.

The hotline is managed by the DELWP Customer Contact Centre. The VICSES State Agency Commander may, in consultation with the State Response Controller, request enhanced readiness and staffing in anticipation of, or in response to, an emergency event. This may include extending the operating hours of the centre beyond standard arrangements, including weekends.

4.3.6 Community meetings

Community meetings are a useful and effective method of disseminating up-to-date information and engaging with communities. They can be used to provide face-to-face information before, during or after an incident, to assist community members to make decisions and educate about the roles of relevant agencies. A 'virtual meeting' can also be held through online platforms where a face-to-face meeting is not possible for any reason or to reach a wider audience (i.e. Facebook Live[12]).

The decision to run a community meeting is made within the Incident Management Team (IMT) through the Incident Controller and Public Information Officer, prior to consultation with the Emergency Management Team (EMT).

4.4 Community safety messages

VICSES use key safety messages designed to promote protective action by the community, developed in line with the national tsunami key safety messages created by ATAG members. The key safety messages provide action based advice for what to do immediately before, during and after a tsunami event. The latest version of the VICSES Hazard Key Messages can be found on the Public Information section of the IMT Toolbox, and have been split based on the likely threat of a tsunami (marine and land threat).

[12] Online communication platforms such as Facebook Live are dependent on functioning telecommunications, powered devices or availability of electricity, and internet connectivity. These elements should be considered when determining the appropriateness of the channel.

5 Collaboration, notification and coordination

5.1 Collaboration, notification and escalation

Tsunami emergency operations will be managed as per the Emergency Management Manual Victoria (EMMV), Part 3 – State Emergency Response Plan.

The EMMV, Part 4 – State Relief and Recovery Plan outlines the arrangements for the coordinated management of relief and recovery.

VICSES response to a tsunami event is triggered by the notification of a likely tsunami event, as detailed below.

5.1.1 Notification and escalation for tsunami events originating from earthquakes

The Bureau of Meteorology State Forecasting Centre maintains distribution lists for Tsunami Bulletins, Watches and Warnings. The distribution lists contain VICSES, Victoria Police, Marine Safety and Rescue, Department of Transport (DoT), Port Authorities, and the media. Bulletin, Watch and Warning messages are also automatically uploaded to the Bureau of Meteorology website and available on local radio and TV announcements or via a phone info line (1300 878 6264).

Tsunami notifications from JATWC to VICSES will be provided directly from the Bureau of Meteorology State Forecasting Centre to the VICSES State Duty Officer. VICSES, as control agency for response to tsunami in Victoria, has the responsibility to disseminate notifications and advice to the emergency services and key support organisations at state, regional and municipal levels.

Upon receipt of a Tsunami Warning or Watch from the JATWC, the VICSES State Duty Officer will notify all Emergency Service Organisations (ESOs), including the Emergency Services Telecommunications Authority (ESTA) and Life Saving Victoria, of events that are identified as having a potential marine or land based threat to Victoria via the State EMT and relevant agency State Duty Officers. Regional Duty Officers will notify all Regional ESOs via their EMT and relevant agency Regional Duty Officers.

The VICSES Chief Officer is responsible for notifying the Emergency Management Commissioner (in accordance with Joint Standard Operating Procedure 3.16 Significant Event Notification). The Emergency Management Commissioner can assist through the State Control Centre (SCC) to notify State Coordination Team and the State Emergency Management Team.

VICSES has developed a detailed notification process for tsunami events which is documented in the VICSES Standard Operating Procedures.

5.1.2 Notification and escalation for undetected tsunami events

When a tsunami event originates from an undetected source such as a sub-marine landslide originating closer to the Victorian coastline than the offshore detection buoys near the coast of New Zealand or an undetected meteor / asteroid, the likely trigger for notification will be field observations.

While there is currently no agreed notification and escalation process in place for such events, key agencies are collaborating to address this gap which will rely on field observations being reported to VICSES as lead agency and conduit to JATWC as outlined in section 4.3.2.

5.2 Strategic coordination of a tsunami event

5.2.1 The role of the Emergency Management Commissioner

Under the Emergency Management Act 2013, the Emergency Management Commissioner has legislated management responsibilities across major emergencies, with the exception of terrorism-related emergencies. These include response coordination, ensuring effective control arrangements are established, consequence management and recovery coordination.

The State Emergency Response Plan (Part 3: EMMV) contains a detailed listing of the Emergency Management Commissioner's responsibilities.

5.2.2 The role of the control agency for tsunami

VICSES is the control agency for tsunami as defined in Part 7 of the EMMV. In this role VICSES is responsible for providing protection of life, property and the environment.

5.2.3 Supporting agency roles and responsibilities

A tsunami event requires a coordinated response from multiple supporting agencies. Roles and responsibilities of supporting agencies are listed in Appendix D. This should be read in conjunction with Section 7 of the EMMV.

5.2.4 Cross jurisdictional arrangements

The cross jurisdictional arrangements to support operational response to tsunami events are underpinned by national and interstate agreements, including:

- Arrangement for Interstate Assistance (AIA) which provides the national governing arrangements for interstate deployments and support.

- Inter-state Memorandums of Understanding (MOU) between VICSES and South Australia (SA) SES and New South Wales (NSW) SES respectively, which detail arrangements for cross jurisdictional response within 40km of the state boundaries.

Local arrangements are also detailed in VICSES regional plans.

Some of the key considerations when establishing cross jurisdictional arrangements that are relevant to tsunami response include:

- Use of the national warning platform, Emergency Alert, to provide urgent information to community members above and beyond state warning platforms (i.e. VicEmergency).
- Establishment of offline communication (i.e. radio networks).

5.3 Victorian government management arrangements

This section describes the management arrangements for a whole of Victorian government approach to managing a major tsunami emergency.

The Emergency Management Commissioner manages the state response to major emergencies through the following five key teams:

- State Coordination Team (SCOT).
- State Control Team (SCT).
- State Emergency Management Team (SEMT).
- Emergency Management Joint Public Information Committee (EMJPIC).
- State Relief and Recovery Team (SRRT).

During a large-scale emergency, the Victorian Government's Security and Emergency Management Committee of Cabinet (SEMC) provides whole of government ministerial oversight. The State Crisis and Resilience Council (SCRC) provide the Security and Emergency Management Committee with assurance that the broad social, economic, built and natural environmental consequences of the emergency are being addressed at a whole of government level. The SCRC also has responsibility for the oversight of the development of a whole of government communications strategy for the approval of SEMC.

Neither the SEMC nor the SCRC have an operational response role.

5.4 Emergency Management Team

EMTs are formed at each activated tier of emergency response management as follows:

- State Emergency Management Team (SEMT).
- Regional Emergency Management Team (REMT).
- Incident Emergency Management Team (IEMT).

EMTs are collaborative forums where agencies with a diverse range of responsibilities during emergencies meet to discuss the risks and likely consequences of a tsunami and assist the Emergency Management

Commissioner and Incident Controllers to establish priorities and plan a 'whole of government' approach to the management of these risks and consequences.

An EMT ensures the response and recovery agencies, other relevant agencies, municipal council and service providers are coordinated in their approach. For instance, a tsunami event may result in the loss of road and transport access, impairing the community's ability to access emergency services and medical aid. To overcome this, a new service delivery model will need to be considered by relevant agencies as part of the EMT, and will require coordinated implementation to effectively meet the community's needs.

The response to a tsunami event may involve a range of disparate emergencies (e.g. health emergencies, power and transport emergencies, urban fire etc.). The Emergency Management Commissioner, Regional Emergency Response Coordinators and Municipal Emergency Response Coordinators chair their respective EMT.

Once formed, an EMT operates throughout a continuum for the response to and recovery from the tsunami event.

Not all agencies have the capability to provide a representative for EMT at each tier. For example, a person may represent their agency at both the REMT and IEMT.

Further detail can be found in the SERP.

5.5 Consequence management

During a damaging tsunami or where one is reasonably expected, such as on receipt of a Tsunami Warning for land inundation, the Emergency Management Commissioner appoints a Consequence Manager, responsible for assessing the likely consequences of the tsunami and working with the SEMT and REMT to ensure a whole-of-government approach to the management of these consequences.

Key considerations are outlined in Section 3 – Tsunami impacts and consequences.

5.6 Reporting to government

During a tsunami event, the Emergency Management Commissioner may request agencies to report on the impact and consequences of the event on their area of responsibility, identifying any emerging issues and actions to resolve these.

This information forms the basis of the SEMT Situation Report, which the Emergency Management Commissioner uses to brief the Minister for Emergency Services and the SCRC, and for the SEMT members to brief their departmental executive and respective Minister.

5.7 Transition to recovery

Emergency relief and recovery activities integrate with emergency response activities and commence as soon as the effect and consequences of the emergency are anticipated. Towards the conclusion of the emergency response, and where recovery activities need to continue, the arrangements for managing the emergency will transition from response to recovery coordination.

The teams at the relevant incident, regional and state tiers should discuss and agree the timing of the transition. The recovery coordinators/ managers at the relevant tiers must be ready to assume responsibility and have the appropriate resources assembled prior to the transition. Considerations regarding the timing of the transition should include the extent to which:

- Any emergency risks remain.
- The powers available to response agency personnel (which may be available only during an emergency response) are still required.
- The effect and consequences of the emergency are known.
- The affected community continues to require relief services.
- The recovery resources have assembled and are ready to manage their responsibilities.

A schedule of required transition actions is included in the document 'An Agreement for Transition of Coordination Arrangements from Response to Recovery', which can be obtained from Regional or State Coordinators[13].

Consideration should also be given to transition of information to support effective decision making. For instance relief and recovery agencies have highlighted the importance of receiving timely, complete and accurate impact assessment data being provided by the Incident Controller to the recovery coordinators/ managers.

5.8 Management of spontaneous volunteers

It is likely in the aftermath of a damaging tsunami that self-organised volunteer community groups may emerge to assist in response and recovery efforts. Where identified, municipal councils will assist to coordinate support and community liaison officers may be deployed to assist groups with logistics and risk management.

Guidance for best practice when engaging and supporting self-organising volunteers is outlined in AIDR Handbook 1 – Communities Responding to Disasters: Planning for Spontaneous Volunteers, available at: **https://knowledge.aidr.org.au/resources/handbook-12-communities-responding-to-disasters-planning-for-spontaneous-volunteers/**.

[13] Victorian Emergency Operations Handbook – Edition 1 October 2017

6 Capability and complementary plans

The Victorian Preparedness Goal led by EMV sets out the core capabilities needed before, during and after emergencies occur (see **emv.vic.gov.au/our-work/victorian-preparedness-goal**).

The 21 core capabilities in the Victorian Preparedness Goal are highly interdependent on each other. Many are relevant to reducing the potential consequences of a tsunami event (i.e. building community resilience) as well as managing a tsunami event (i.e. search and rescue) as well as the relief and recovery considerations after it occurs.

For VICSES, these capabilities are developed through its volunteer workforce supported by paid staff within the responsibilities of being the control agency. VICSES requires supporting capabilities from across whole of government including for example access implementation of relief and recovery requirements.

6.1 Regional and municipal tsunami emergency planning

6.1.1 Regional tsunami planning

Regional Tsunami Plans have been developed for all three VICSES regions (including East (Gippsland), South West (Barwon South West) and Central Regions) that have been determined to have a tsunami risk.

These plans include the identification of suitable Incident Control and Regional Control locations in consultation with other key emergency management agencies. The selection and placement of these locations must take into account possible access and damage limitations that could occur during major tsunami.

Regional tsunami emergency plans will cover:

- Regional risk assessment.
- Resource requirements.
- Sources of incident intelligence.
- Public information arrangements.

- Location of Incident Control Centres (ICCs) and subordinate control centres (e.g.: Division Command Points).
- Incident management and regional control arrangements.
- Rescue arrangements.
- Engineering advice and services arrangements.
- Resource arrangements for within the region.
- Traffic management plans.
- Planned staging areas.
- Relief centres.
- Consequence management.
- Cross border arrangements.

6.1.2 Municipal tsunami planning

Where a tsunami hazard is identified through the Community Emergency Risk Assessment (CERA) process as a high risk to a community, VICSES will provide advice and support to Municipal Emergency Management Planning Committees (MEMPCs) to ensure the Municipal Emergency Management Plan (MEMP) contains arrangements concerning the preparedness for, and response to, a tsunami event based on an all-hazards and all-agency response.

6.2 Australian Tsunami Advisory Group

The Australian Tsunami Advisory Group (ATAG) comprises of representatives from relevant Commonwealth agencies and jurisdictions. It provides national leadership in programs and projects relating to tsunami response and recovery capability development aimed at enhancing community resilience and industry capability. It also works as a consultative and coordinating forum to facilitate processes for effective national exchange of practice, research, information and knowledge management in relation to tsunami.

7 Managing a tsunami event

7.1 Concept of operations

At the state tier, VICSES acts as the control agency for the response to a tsunami event. Other agencies will support operations as detailed in this plan. The Emergency Management Commissioner may vary this arrangement in consultation with VICSES and the State Response Controller.

Control and coordination of a tsunami event should be carried out at the lowest effective level. The State Response Controller shall consult with the Regional Controller and the State Control Team to determine the most appropriate structure to manage the event.

There may be multiple consequential emergencies resulting from a tsunami (e.g. fire, building collapse, hazmat, flooding). Incident Controllers shall therefore be appointed from appropriate support agencies to lead incident control under the 'all agencies – all emergencies' focus.

Incident Controllers at all times will ensure the occupational health and safety of emergency service personnel. This includes ensuring that a dynamic risk assessment is undertaken and adequate risk treatments are implemented in the event of secondary tsunami effects.

As the control agency for tsunami, VICSES has the responsibility to issue public information and warnings to the potentially affected community and to other agencies (see section 4.3).

7.1.1 Control of incidents

Establishing an appropriate control structure to manage the response from a tsunami event should be determined by the impact and associated consequences that are likely to be experienced from a tsunami event. The tsunami threat level and associated control structure should be based on information provided by the JATWC.

7.2 Strategic response

Soon after the receipt of a Tsunami Watch or Warning the Emergency Management Commissioner, VICSES and all agencies with responsibilities in the management of a tsunami event will collectively prepare for the integrated management of the likely impact and consequences at the state and regional tiers through the state, regional and Incident Emergency Management Teams. Actions may include:

- Establishing the control structure for managing the event.
- Providing consistent emergency warnings and information to the community.
- Implementation of evacuation and emergency relief plans.
- Confirming agencies at all tiers are activated and appropriate arrangements are in place.
- Identifying the likely consequences of the tsunami and any interdependencies that may affect planning.
- Confirming agencies have adequate resources in place to fulfil their responsibilities and are planning for sustainment and surge capacity. This may include identification of need for inter-state or international assistance.
- Identifying mass gatherings or large public events that maybe at-risk, and arrangements to ensure the safety of individuals attending or those travelling.
- Analysis of traffic management requirements and development of traffic management plans.
- Pre-positioning resources to priority areas.
- Confirming agencies with call taking responsibilities have resources in place and back up arrangements to cope with the expected call load.
- Positioning of Emergency Management Liaison Officers (EMLO) from key support agencies to the SCC and Regional Control Centres (RCCs), where appropriate.
- Arranging for regular meetings of the state, regional and Incident Emergency Management Teams.
- Providing whole-of-government situation reports to relevant Government Ministers.

7.3 Community information

VICSES will lead the community information and media management function to ensure the provision of timely and accurate emergency information to the community.

Where there are impacts to marine areas, beaches, roads and parklands, this will be done in collaboration with respective agencies that have a responsibility to provide information and advice to key stakeholder and the community, including Victoria Police (Water Police), Life Saving Victoria, VicRoads and Parks Victoria respectively.

See section 4.3 of this plan for full details relating to the provision of public information and warnings.

7.4 Rescue

In accordance with the EMMV, marine rescue is the responsibility of Victoria Police to be undertaken as directed by the Incident Controller.

The Incident Controller will task Urban Search and Rescue (USAR) resources, through the appropriate agencies as detailed in the Victorian Urban Search and Rescue Response Arrangements, and in consultation with Victoria Police to ensure effective coordination.

7.5 Health response

The State Health Emergency Response Plan (Edition 4) outlines the arrangements for coordinating the health and medical response to emergencies. The State Health Emergency Response Plan is a sub-plan of the SERP and is referenced in the EMMV Part 8 Appendix 10 and located at:
https://www2.health.vic.gov.au/emergencies/shera

Three key roles operating at the state level and reporting directly to the State Controller include the:

- State Health Commander (undertaken by Ambulance Victoria), responsible for directing the pre-hospital and field response to an emergency.
- State Health Coordinator (undertaken by DHHS), responsible for coordinating activities across the health system.
- Public Health Commander (undertaken by DHHS), responsible for commanding the public health functions of a health emergency response (including investigating, eliminating or reducing a serious risk to public health).

In response to mass fatalities, Victoria Police will manage the disaster victim identification process and will administer the handling and investigation of deceased persons and their subsequent removal on behalf of the State Coroner.

7.6 Restricting access

To ensure public safety, it may be necessary to restrict access to affected areas. Victoria Police and relevant land managers will coordinate the restriction of access to these areas as directed by the Incident Controller.

Traffic management will be conducted in accordance with the Joint Standard Operating Procedure for Traffic Management (JSOP3.10).

Analysis of traffic management requirements and development of traffic management plans will be undertaken in consultation with relevant road managers.

7.7 Evacuation

Evacuation and staged relocation are risk management strategies, which may be used as a means of mitigating the effects of an emergency or disaster on a community. It involves the movement of people to a safer location. However, to be effective it must be correctly planned and executed.

In Victoria, the Incident Controller makes a recommendation to evacuate and it is the choice of individuals as to how they respond to this recommendation. However, in particular circumstances legislation provides some emergency service personnel and land managers with authority to remove people from areas or prohibit their entry, e.g. *Coroners Act 2008* (sections 37(2), 37(3) & 38(1)).

Evacuation operations should be consistent with Evacuation Guidelines available on EM-COP (**files-em.em.vic.gov.au/IMT-Toolbox/Inc/EvacuationGuidelines-v2.0.pdf**) and Joint Standard Operating Procedure on Evacuation (JSOP3.12).Guidelines for best practice for planning evacuations are provided in AIDR Handbook 4, available at:

www.knowledge.aidr.org.au/resources/handbook-4-evacuation-planning/

7.8 Management of waterways

If a tsunami is imminent (marine or land inundation threat), people on boats or ships will be encouraged to:

- Return any boats in shallow water (harbours, estuaries, beaches) to shore - then secure the boat and move away from the waterfront, or
- Move vessels already at sea to water at least 25 metres deep and remain there until further advised.

7.9 Protection and pre-deployment of resources

Land and marine resources required to deal with the impact of a tsunami will be protected by moving them to locations outside the likely impact area.

For land-based resources this will mean moving them to high ground if flooding is anticipated. For marine resources this will mean moving them to deep water outside bays, harbours and estuaries. Or if time is limited, appropriately securing or moving them to high ground outside the potential impact area if trail-able.

If land inundation is likely, other resources may need to be deployed to staging areas outside the likely impact area.

To avoid the potential for conflict created by the removal of resources essential for warning and evacuation, the Incident Controller will specify the timing of protection and pre-deployment activities.

7.10 Engineering advice

Engineering advice will be required to undertake the following:

- Assess built infrastructure stability (e.g. buildings, bridges).
- Support USAR activities.
- Support damage control to limit risks to public safety.

In the first instance, Incident Controllers should seek engineering advice through the relevant municipal council and state infrastructure agencies including VicRoads (supported by DoT) and representatives for essential services.

7.11 Impact assessment

Undertaking an impact assessment provides all decision makers with relevant information regarding the nature and extent of the hazard, and any potential consequences during and after the emergency to ensure efficient, timely and appropriate support for communities.

Immediate reconnaissance of affected areas will be managed by the Incident Controller responsible for that area. Rapid reconnaissance is required to establish the impact to the community, inform appropriate response, and identify immediate and longer term needs.

The Victorian Preparedness Framework identifies three critical for the future state of Victoria's impact assessment processes. In the initial stages of an event, the critical task is to 'gather information regarding extent of damage, immediate threats, loss of life and persons displaced'.

Impact assessment should include data on people (casualties, injuries, displacement), property (residences, businesses), essential transport (road, rail) and community infrastructure (water, sewerage, telecommunications), and environmental data.

The State Response Controller will ensure that arrangements are in place for Initial Impact Assessment data to be incorporated into the operational response. Information collected may be derived from several sources, for instance multiple agency Incident Management Systems may be used for smaller type events whilst large events may require the use of dedicated Initial Impact Assessment Coordinator teams (located within ICC's and the SCC to collate collected data).

Intelligence gathered will be used to inform situational awareness, incident action planning and recovery planning.

The Incident Controller will:

- Ensure that Initial Impact Assessment data is collected, collated and passed on to the appropriate agencies (including Bureau of Meteorology and agencies with recovery responsibilities) in timely manner.
- Ensure systems are put in place to manage the collection and collation of Initial Impact Assessment data and that they are determined by the level of operation and severity of the incident.

7.12 Tsunami treatment

In the immediate aftermath of a tsunami event there may be some scope for action to be taken to limit danger to the public through identifying and mitigating immediate damage to built infrastructure and removing debris from the affected area(s).Tsunami treatment/mitigation operations will be directed from the relevant ICC and/or RCCs.

Restoration or reconstruction tasks are regarded as recovery operations under these arrangements and will be the responsibility of the landholder and/or relevant authority, with the support of the Municipal Recovery Manager.

7.13 Clean-up

Municipal councils maintain broad responsibility for waste management within their local area, and have the expertise required to coordinate the additional clean-up requirements that follow natural disasters such as tsunami events, as detailed in the Relief and Recovery Guidelines – Natural Disaster Clean-Up Arrangements, available on EM-COP at: **cop.em.vic.gov.au**.

In instances where the clean-up requirements for private property owners exceed their capacity the joint *State and Commonwealth Government-funded Natural Disaster Recovery Funding Arrangements* may be available to assist with costs.

If waste presents public health and/ or safety issues, municipal councils, with support from the State Government if required, should make arrangements to address concerns. Clear advice should be provided to property owners relating to clean up and disposal of different types of materials.

In events where the scale of damaged or destroyed properties may require the coordination of private property clean-up, more targeted responses may be required. The requirement for government support in such circumstances will be determined by the capacity and capability of the impacted municipal councils, and may be influenced by the type of waste and extent of damage to council infrastructure and essential public services. Asbestos and other hazardous materials etc. requires licences to remove and dispose. Department of Treasury and Finance (DTF) may appoint a State Assessor to support recovery of essential municipal council assets.

State Government coordination of clean-up is most likely to occur when clean-up requirements extend beyond a single municipal council area, and where the scale of clean-up works and type of waste require expertise and resources that are beyond the capacity of affected councils.

The Emergency Management Commissioner, with the support of the State Relief and Recovery Manager, will work with impacted municipal councils, including Municipal Recovery Managers to make sure people on the ground have input, and where appropriate, DHHS (regional coordination) to identify whether the support of State government is required.

7.14 Relief and recovery

The aim of relief and recovery is to support communities to successfully deal with the impacts of an emergency on the social, built and economic and natural environments.

Emergency Management Victoria (EMV) supported by the Australian Red Cross is responsible for relief and recovery at the state level, and the DHHS supported by the Australian Red Cross is responsible for coordinating relief and recovery at the regional level. Municipal councils are responsible for coordinating relief and recovery locally.

Relief and recovery commences at the local level through municipal councils. As required, it can escalate from local to regional or state level:

- When requested, because capability is exceeded.
- Where an emergency has affected multiple municipal council in one region, or multiple regions within the state.
- Where an emergency has a significant community-wide impact, in which case, the Victorian Government may establish an event-specific relief or recovery coordination structure to oversee a whole-of sector response.

Incident Controllers are responsible for ensuring that relief arrangements have been considered and implemented where required.

If the Regional Emergency Response Coordinator becomes satisfied that the event exceeds the capacity of the council to perform this function, a request to DHHS to coordinate emergency relief at the regional level will be made. To ensure a smooth transition of responsibility, a council should notify DHHS as soon as it becomes apparent an event will exceed its capacity. This does not replace the requirement for the Regional Emergency Response Coordinator to monitor the emergency relief situation.

Detailed arrangements for the management of emergency relief and recovery are outlined in the State Emergency Relief and Recovery Plan (Part 4 of the EMMV).

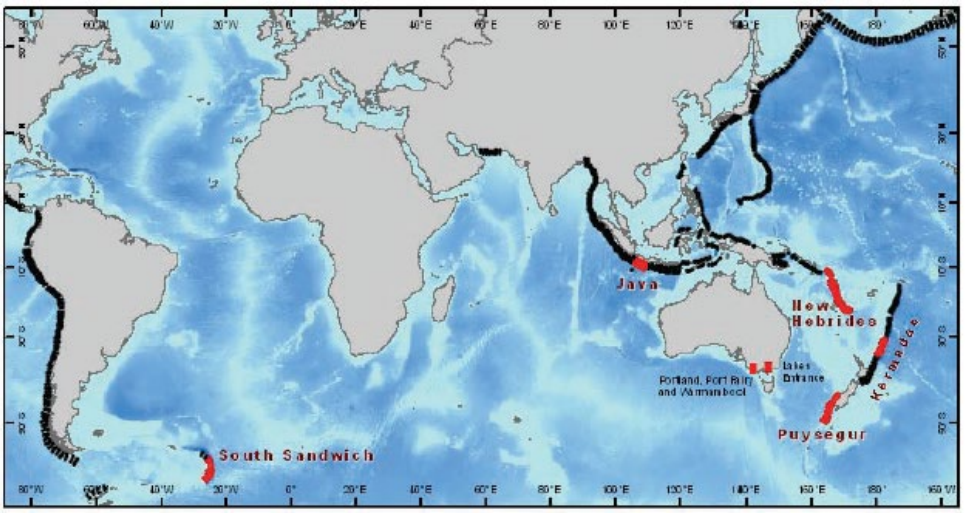
8 Appendix A – Examples of onshore inundation maps for Lakes Entrance, 2010

The onshore inundation maps were developed by Geoscience Australia in 2010 to support Victorian planning and response to possible tsunami events, based on three likely scenarios. These maps have been included to provide a guideline of potential impacts resulting from a tsunami impacting Port Fairy, Portland, Warrnambool or Lakes Entrance. The full suite of tsunami inundation maps is accessible on EM-COP Library under Hazard Information, available: **cop.em.vic.gov.au**.

As outlined in Section 2.1, **it is critical to note that the 2010 maps should not be used as a definitive planning product.** While they provide an indication of the potential on-shore impacts of a tsunami event based on three potential tsunami event scenarios, the supporting data has since been superseded by the publication of the Probabilistic Tsunami Hazard Assessment 2018 (PTHA18). Additionally, the 2010 onshore maps do not include any changes to infrastructure and topography of the land that is likely to have occurred in the last decade.

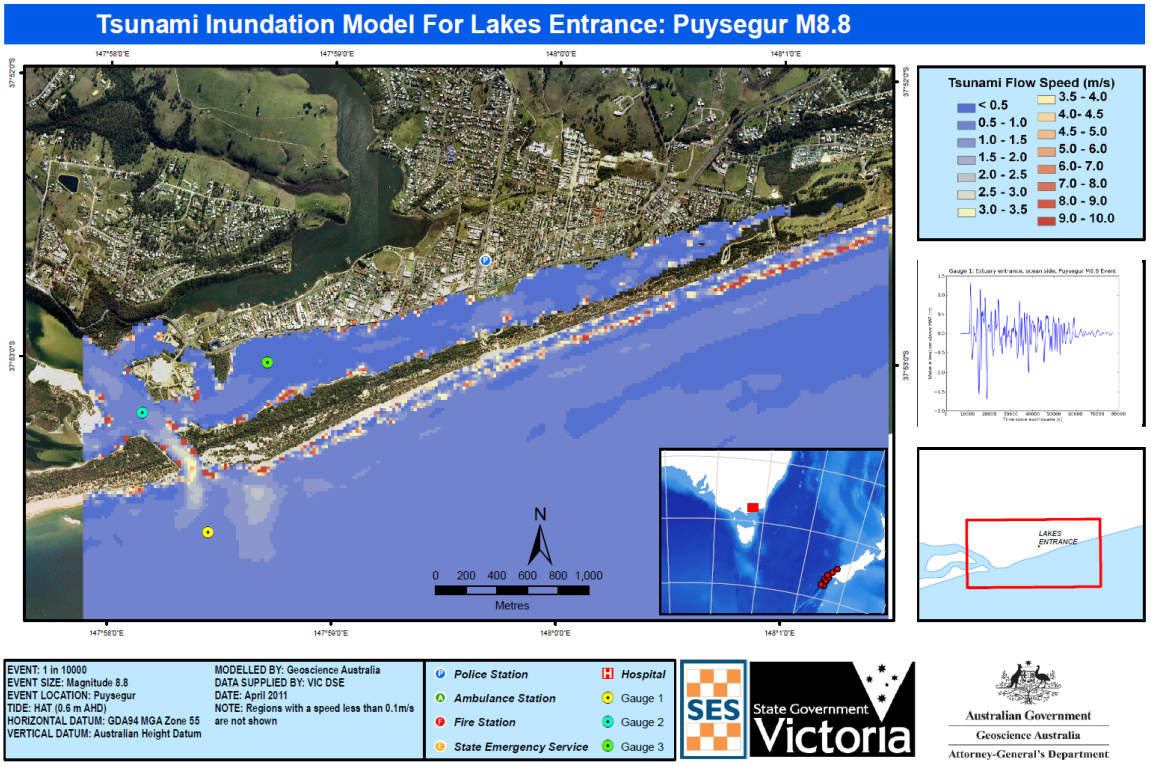
The tsunami events modelled are representative of the most significant sources of tsunami hazard to the Victorian coast, and are generated from the Puysegur Trench (to the southeast), the New Hebrides Trench (to the north-east), the Java Trench (north-west), the Kermadec Trench (east) and the South Sandwich Island Trench subduction zone segments. The map below shows the major faults and illustrates the main tsunami sources used in this study.[14]'

[14] Geoscience Australia, 2011, National Tsunami Inundation Modelling: Tsunami Inundation Scenarios for Four Victorian Communities

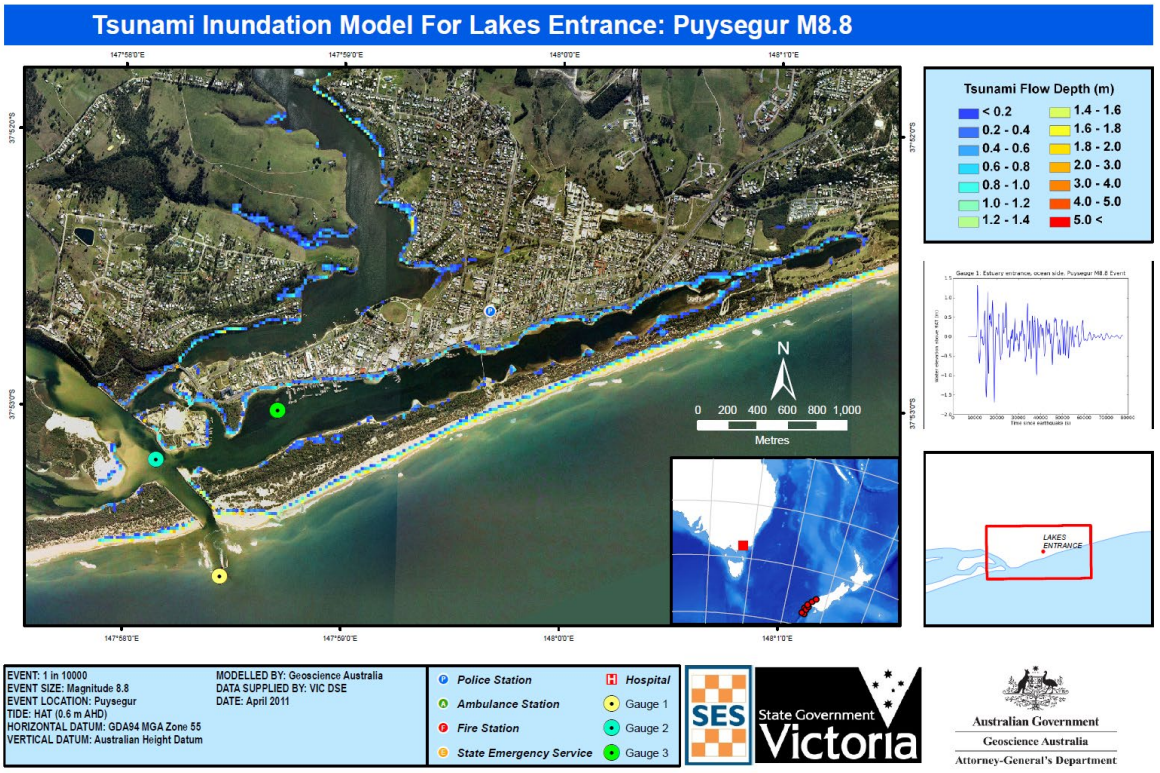


Maps developed for a possible Puysegur M8.8 tsunami event impacting Lakes Entrance are provided below, illustrating the likely speed and depth of onshore inundation, are provided below.

Tsunami mapping for Lakes Entrance – Speed (2010)



Tsunami mapping for Lakes Entrance – Depth (2010)



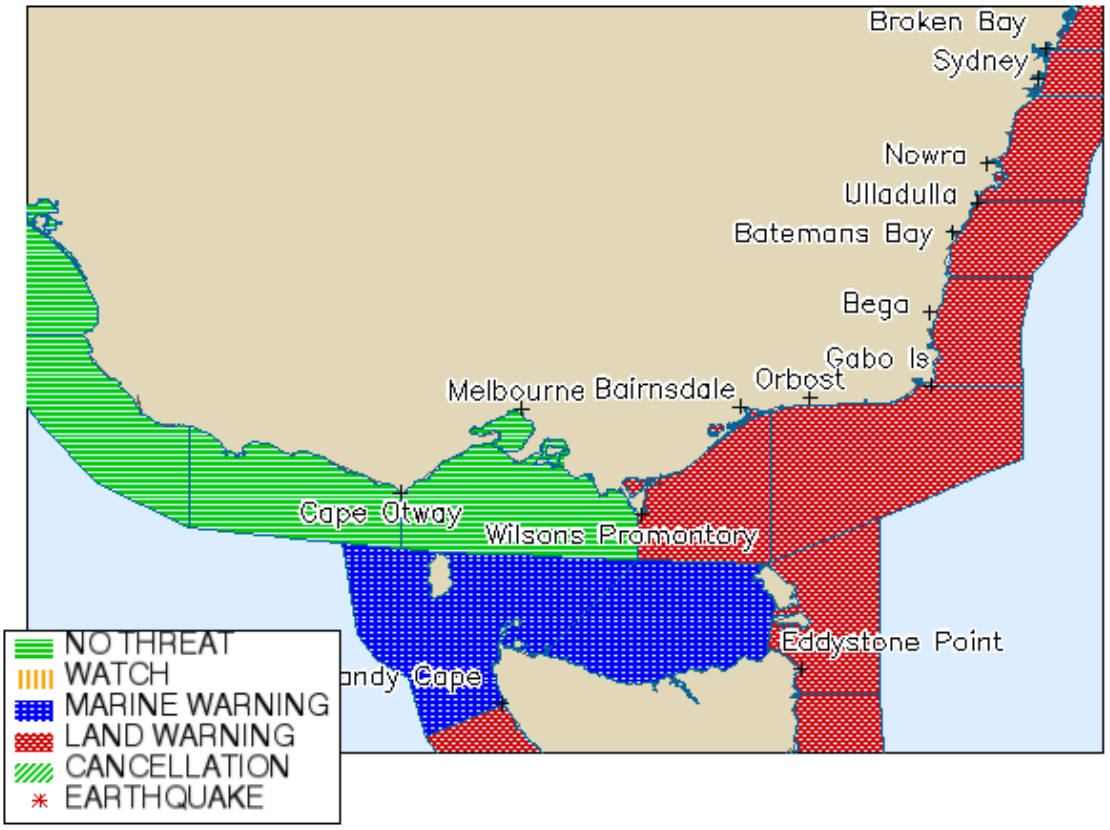
Appendix B – M8.8 Puysegur Trench Tsunami Warning example

The realistic worst case scenario example of a M8.8 Puysegur Trench Tsunami Warning illustrates the potential tsunami threat and associated for the east coast of Victoria.

The warning includes a graphic depiction of the likely threat area of the hazard and text that explains the threat area, potential impacts and recommended actions.

It is acknowledged that the possible impact of a tsunami event is influenced by a large number of variables that influence hazard behaviour and will be unique for each tsunami event, and as such this example should be viewed as a guide only.

M8.8 Puysegur Trench Tsunami Warning example:



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Australian Government Bureau of Meteorology

MEDIA:

PLEASE USE THE STANDARD EMERGENCY WARNING SIGNAL (SEWS)

TOP PRIORITY FOR IMMEDIATE AND FREQUENT BROADCAST

****

TSUNAMI WARNING NUMBER 2 FOR VICTORIA Issued by the Joint Australian Tsunami Warning Centre (JATWC) at 9:24 AM AEDT on Monday 08 October 2018

The tsunami threat assessment is UNCHANGED in this message

****

TSUNAMI THREAT TO LOW LYING COASTAL AREAS AND THE MARINE ENVIRONMENT

****

SUMMARY: Tsunami warning for VICTORIA.

LAND THREAT

For all low-lying coastal areas from Wilsons Promontory to 60nm east of Gabo Island including Central Gippsland Coast, Gippsland Lakes, East Gippsland Coast there is a threat of MAJOR LAND INUNDATION, FLOODING, DANGEROUS RIPS, WAVES AND STRONG OCEAN CURRENTS commencing after 11:15 am (AEDT) Monday and persisting for several hours.

People in affected land threat areas are strongly advised by VICTORIA STATE EMERGENCY SERVICE to go to higher ground at least 10 metres above sea level or move to at least one kilometre inland.

The NEXT UPDATE will be issued by 10:54 AM AEDT on Monday 08 October 2018

For latest and further information on tsunami warnings, please call 1300 TSUNAMI (1300 878 626) or visit www.bom.gov.au/tsunami

FOR URGENT EMERGENCY ASSISTANCE call 000

FOR EMERGENCY SERVICE ADVICE or GENERAL ASSISTANCE call:

VICTORIA STATE EMERGENCY SERVICE on 132 500

****

DETAILS:

LAND THREAT - TSUNAMI THREAT TO LOW LYING COASTAL AREAS

A threat of MAJOR LAND INUNDATION, FLOODING, DANGEROUS RIPS, WAVES AND STRONG OCEAN CURRENTS exists from Wilsons Promontory to 60nm east of Gabo Island including Central Gippsland Coast, Gippsland Lakes, East Gippsland Coast commencing after 11:15 am (AEDT) Monday and persisting for several hours.

The tsunami threat will commence any time after the following local times and will persist for several hours:

Mallacoota after 11:15 am (AEDT) Monday

Lakes Entrance after 11:45 am (AEDT) Monday

Golden Beach after 12:30 pm (AEDT) Monday

Wilsons Promontory after 1:45 pm (AEDT) Monday

COMMUNITY RESPONSE ADVICE FROM VICTORIA STATE EMERGENCY SERVICE FOR AREAS UNDER LAND THREAT:

People are strongly advised by VICTORIA STATE EMERGENCY SERVICE to go to higher ground, at least ten metres above sea level, or if possible move at least one kilometre away from all beaches and the water's edge of marinas, harbours and coastal estuaries.

Take only essential items that you can carry including important papers, family photographs and medical needs.

It will be in your own interests to walk to safety if possible to avoid traffic jams.

If you cannot leave the area take shelter in the upper storey of a sturdy brick or concrete multi-storey building.

Boats in harbours, estuaries or shallow coastal water should return to shore.

Secure your boat and move away from the waterfront.

Vessels already at sea should stay offshore in water at least 25 metres deep until further advised.

Do not go to the coast to watch the tsunami.

Check that your neighbours have received this advice.

CAUTION:

Tsunami waves are more powerful than the same size beach waves. There will be many waves and the first wave may not be the largest. Take care in other coastal areas where low-level effects may be observed.

TSUNAMI SOURCE:

An undersea earthquake of magnitude 8.8 has occurred at 08:50 AM AEDT on Monday 08 October 2018 near OFF W. COAST OF S. ISLAND, N.Z. (47.26S, 165.81E).

The NEXT UPDATE will be issued by 10:54 AM AEDT on Monday 08 October 2018

For latest and further information on tsunami warnings, please call 1300 TSUNAMI (1300 878 626) or visit www.bom.gov.au/tsunami

FOR URGENT EMERGENCY ASSISTANCE call 000

FOR EMERGENCY SERVICE ADVICE or GENERAL ASSISTANCE call:

VICTORIA STATE EMERGENCY SERVICE on 132 500

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The JATWC is operated by the Australian Bureau of Meteorology and Geoscience Australia

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Appendix C – VICSES Tsunami EM-COP Public Publishing Business Rules, 2018

VICSES Tsunami EM-COP Public Publishing Business Rules

December 2018

Contents

1 Tsunami community notification business rules

This document provides guidance for personnel issuing VICSES tsunami community notifications, and supports the core EM-COP Public Publishing Business Rules.

1.1 Tsunami community notifications

VICSES is the control agency for tsunami, with a shared responsibility to ensure critical tsunami emergency information is disseminated to the community. EM-COP community notifications are only issued by VICSES when triggers outlined in section 1.3 of this document are met.

VICSES is not a predictive agency and does not issue tsunami warnings or community notifications via the warnings platform prior to the release of an official warning by the Joint Australian Tsunami Warning Centre.

1.2 Responsibility for issuing and authorisation of community notifications

Tsunami community notifications are managed by the VICSES State Duty Officer (SDO) and / or State Agency Commander (SAC), because the hazard frequently crosses regional borders and impacts may be widespread. Responsibility may be delegated to State Control Centre (SCC) Public Information Section (PIS).

The VICSES SAC may determine that community notifications are managed at the incident tier by exception.

Business as usual:

- Issuer: State Duty Officer (SDO) or Warnings and Advice Duty Officer (WADO) if time critical (note: WADO must be requested to issue community notification by SDO/SAC)
- Authorisation: VICSES State Agency Commander (SAC)

ICC/RCC/SCC:

- Issuer: SCC Information and Warnings Officer (IWO) / SCC Public Information Officer (PIO)
- Authorisation: State Response Controller (SRC) or delegated to VICSES State Agency Commander (SAC)

1.3 Community notification triggers, publish, update and expiry times

Triggers:

VICSES will issue a tsunami EM-COP community notification if the below trigger is met:

- An official Tsunami Watch (or Cancellation) or Tsunami Warning (or Cancellation) is issued by the Joint Australian Tsunami Warning Centre (JATWC), which describes a potential or actual threat to Victoria.

Message Type	Trigger	Publish	Update	Expiry
Advice Tsunami Watch 	JATWC issues Tsunami Watch for potential or actual threat to Victoria	<30 minutes of notification	Update < 30 minutes of any update to JATWC watch	Set message to expire 30 minutes after the JATWC watch is due to expire
Emergency Warning Marine Warning 	JATWC issues Marine Threat Tsunami Warning for potential or actual threat to Victoria	<30 minutes of notification	Update < 30 minutes of any update to JATWC warning	Set message to expire 30 minutes after the JATWC warning is due to expire
Emergency Warning Land Warning 	JATWC issues Land Threat Tsunami Warning for potential or actual threat to Victoria	<30 minutes of notification	Update < 30 minutes of any update to JATWC warning	Set message to expire 30 minutes after the JATWC warning is due to expire
Prepare to Evacuate 	JATWC issues Marine or Land Threat Tsunami Warning **and** evacuation of any location within Victoria is likely to be required	<30 minutes of notification	Update every 2 – 4 hours or as situation changes	2 – 4 hours (6 hours max)
Evacuate Now 	JATWC issues Marine or Land Threat Tsunami Warning **and** evacuation of any location within Victoria is required	<30 minutes of notification	Update every 2 – 4 hours or as situation changes	2 – 4 hours (6 hours max)
Evacuate Now Update 	Evacuation remains in place, but it is too late to leave the evacuation area	<30 minutes of notification	Update if situation changes	2 – 4 hours (12 hours max)

Message Type	Trigger	Publish	Update	Expiry
All Clear **Safe to Return**	Once evacuation is no longer required and it is safe for persons to return (must be issued as part of evacuation de-escalation process)	<30 min of notification	Does not generally require updating – publish once only	Unpublish after 24 hrs
Advice **All Clear** JATWC Watch or Warning Cancellation	JATWC issues Tsunami Watch Cancellation or Tsunami Warning Cancellation for Victoria	<30 min of notification time	Does not generally require updating – publish once only	24 hours

1.4 Incident naming

- **Major emergencies** – apply JSOP J03.02 (Incident Naming – Major Emergencies):
  - Hazard Type – Widely Known Location – Local Reference

    (e.g.: Tsunami – Gippsland – Central Gippsland Coast)

When initially creating an EM-COP incident, the platform does not allow incident names to include spaces, however, the incident name can be altered manually when creating a community notification. VICSES SAC / SDO to provide direction on naming convention for each event.

1.5 Location

- **JATWC Watch, Warning or Cancellation**
  - Enter locations as described in JATWC watch/warning/cancellation product under summary (see example text highlighted below – change 'nm' to 'nautical miles'):

    "For all low-lying coastal areas from Wilsons Promontory to 60 nautical miles east of Gabo Island"
- **Evacuation Products**
  - Describe the location where people are being instructed to evacuate from.

1.6 Polygons

- **JATWC Watch, Warning or Cancellation**
  - Use the selectable 'Coastal Regions' area polygon, to identify the locations described in the JATWC watch/warning/cancellation product
- **Evacuation Products**
  - Use a hand drawn vertex or circle polygon to indicate the locations relevant to the evacuation messaging

1.7 Agency issuing warning

Always select SES as the agency issuing from the drop down list. This ensures it is published to VICSES social media channels.

1.8 Recipient list

The State Wide Mandatory list must be selected, in addition to relevant Emergency Management Region(s) that the coastal polygons intersect with.

1.8.1 SMS notification

The SMS notification is automatically selected for all warning messages and above.

An SMS **shouldn't** be sent:

- For Advice, All Clear or Community Information products
- If an insignificant change is being made to the warning (e.g. correcting a typo) if it's a long running event and the warning is being updated without significant change.

1.9 Message creation

- ***Critical details*** – include any verified local event intelligence, including the 'SUMMARY', 'DETAILS' and 'TSUNAMI SOURCE' information included in JATWC products (note: 'TSUNAMI SOURCE' is included within the 'SUMMARY' of a Tsunami Watch).

  Ensure you check content and spell out, in full, any abbreviations.

  Example:

  There is now a threat of MAJOR LAND INUNDATION, FLOODING, DANGEROUS RIPS, WAVES AND STRONG OCEAN CURRENTS commencing after 12:15 pm (AEDT) Monday and persisting for several hours.

  The tsunami threat will commence any time after the following local times and will persist for several hours:

  Mallacoota after 12:15 pm (AEDT) Monday
  Lakes Entrance after 1:00 pm (AEDT) Monday
  Port Fairy after 1:30 pm (AEDT) Monday
  Warrnambool after 1:30 pm (AEDT) Monday
  Golden Beach after 1:30 pm (AEDT) Monday
  Portland after 1:45 pm (AEDT) Monday
  Lorne after 2:30 pm (AEDT) Monday
  Wilsons Promontory after 2:45 pm (AEDT) Monday
  Phillip Island after 3:30 pm (AEDT) Monday

  An undersea earthquake of magnitude 8.4 occurred at 10:00 AM AEDT on Monday 06 February 2017 off the West Coast of the South Island of New Zealand.

- ***What you should do*** – select relevant drag and drop statements

- ***Impacts in your area*** – include any verified intelligence or local knowledge

1.10 Additional alerting tools

1.10.1 Emergency Alert

The use of Emergency Alert is governed by Joint Standard Operating Procedure J04.01.

1.10.2 Sirens

Community Alerting Sirens are activated at the discretion of the State Response Controller, VICSES State Agency Commander or Incident Controller to alert the community of an imminent threat to the community and community members should immediately seek further information.

1.11 Redundancy

If you are unable to publish a community notification, the Redundancy Warnings Work Instruction (available via the IMT Toolbox > Public Information > Redundancy) should be applied.

Initially, you should:

- Contact the rostered State-wide Warnings and Advice Duty Officer via telephone 1300 877 990 (may be diverted to SCC Public Information Section if activated).

1.12 Continual improvement

These business rules are reviewed annually and are subject to ad-hoc amendments as required.

2 Document Information

Document details

Criteria	Details
Document title:	VICSES Tsunami EM-COP Public Publishing Business Rules
Agency	Victoria State Emergency Service
Document owners:	Chief Officer, Operations, VICSES Director, Community Resilience and Communications, VICSES

Version	Date	Description	Author
0.1	28/02/2017	Initial Draft	VICSES
1.0	01/03/2017	Final	VICSES
2.0	27/04/2018	Final, additional templates added, guidance enhanced	VICSES
2.3	11/12/2018	Minor updates	VICSES

Reference list

- EMMV Part 8 (Standard Emergency Warning Signal)
- Service Level Specification for Flood Forecast and Warnings Services in Victoria
- JSOP J03.02 Incident Naming - Major Emergencies
- JSOP J03.12 Evacuation for Major Emergencies
- JSOP J04.01 Public Information and Warnings
- VICSES SOP 047 Flood Notification and Activation Process
- Victorian Warnings Protocol
- Emergency Management Public Information & Communications Manual

Appendix D – Roles and responsibilities of supporting agencies

AMBULANCE VICTORIA	• Provide State Health Commander to command the pre-hospital and field response to an emergency in line with the SHERP. • Continue response to emergency medical '000' calls in altered environment. • Support relocation/evacuation of health and aged care facilities. • Treat sick and injured people, including the provision of pre-hospital care and transport.
AUSTRALIAN RED CROSS	• Support Victoria Police with the registration of evacuees. • Support relief and recovery operations.
AUSTRALIAN MARITIME SAFETY AUTHORITY (AMSA)	• Promote maritime safety and the protection of the marine environment. • Prevent and combat ship-sourced pollution in the marine environment. • Provide infrastructure to support safety of navigation in Australian waters. • Provide a national search and rescue service to the maritime and aviation sectors.
VOLUNTEER MARINE SEARCH AND RESCUE ORGANISATION	• Support with the warning of the at-risk communities. • Support Victoria Police with the evacuation of at-risk communities. • Support marine property protection tasks. • Support emergency relief agencies with the resupply of isolated properties and/or communities. • Support water rescue operations where training and equipment are suitable (note: operations involving volunteer marine search and rescue vessels will typically be restricted to navigable waters on coastal estuaries and lakes).

BUREAU OF METEOROLOGY (BOM)	• Issue Tsunami Watches and Warnings and distribute to media outlets, emergency management agencies and the community. • Liaise directly with SES State Duty Officer during an event (via the Bureau's Victoria State Forecasting Centre), including informing of any observations of tsunami at ocean buoys and tide gauges. • Support in exercising Tsunami Emergency Plans.
COUNTRY FIRE AUTHORITY (CFA)	• Support incident management. • Provide access to ICC facilities. • Support the Initial Impact Assessment process. • Support Victoria Police with evacuations. • Provide skilled and equipped personnel to assist with damage control operations to limit danger to the public following a tsunami. • Provide resources for pumping floodwater out of buildings and from low-lying areas. • Undertake response to hazmat incidents. • Assist with mapping. • Support the deployment of the state USAR response team.
DEPARTMENT OF EDUCATION AND TRAINING (DET)	• Provision of on-site assistance and support for management of local issues involving students. • Management of closure and evacuation of schools. • Support the Initial Impact Assessment process.

DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS)	**Response** • Provide the State Health Coordinator to coordinate emergency response activities across the health system in line with the SHERP. • Provide advice on public health consequences via Chief Health Officer to Incident Controller. • Support the Initial Impact Assessment process. • Coordinate emergency relief and recovery at regional level. • Control agency for incidents involving retail food contamination, food/drinking water contamination, human illnesses/epidemics, radiological substances and biological materials. • Support service delivery to affected individuals, groups and/or communities. • Provision of advice in relation to potable water quality in an tsunami emergency. **Recovery** • Coordinate relief and recovery planning at regional levels. • Coordinate provision of psychosocial support at incident sites and across the community. • Coordinate the provision of emergency financial assistance to eligible community members. • Support councils and community recovery committees in recovery planning and managing recovery activities. • Provide support, advice, information and assistance to affected individuals, communities, funded agencies and municipal councils. • Assist with provision of temporary accommodation.

DEPARTMENT OF TRANSPORT (DoT) IN CONJUNCTION WITH VICROADS AND HEAD, TRANSPORT FOR TRANSPORT VICTORIA	**Preparedness** • Assist VICSES to identify infrastructure (ports, freight, road, rail) at-risk of tsunami for incorporation into planning and intelligence. • Develop awareness in boating and fishing industries regarding environmental emergencies and risk management planning. **Response** • Support the Initial Impact Assessment process. • Facilitate the provision of skilled personnel to provide engineering advice regarding damaged transport infrastructure. • Provide information regarding the status of the transport network and associated infrastructure. • Facilitate the provision of transport capabilities when requested to support evacuation, passenger transport and logistics purposes. • Maritime emergencies within three nautical miles of the Victorian Coastline: responsible for pollution response and supports Transport Safety Victoria in the management of ship casualties. Provision of information and advice related to transport services, access and safety. • Manage road closures and diversions. • Undertake traffic management planning. • Provide information to the Emergency Management Team and the community about road closures. • Provide skilled personnel to provide engineering assistance and advice regarding damaged structures. • Support the Initial Impact Assessment process. • Assist with the communication of warnings and information provision to the public through the use of variable message signs. • Clear debris from DoT managed roads. • Assist with the identification or provision of plant and skilled operators. **Recovery** • Coordinate and lead recovery related to transport and infrastructure for state owned assets. • Provision of information and advice related to transport services access and safety.

DEPARTMENT OF JOBS PRECINCTS AND REGIONS (DJPR)	**Response** • Critical infrastructure damage or disruption for the communications sector. • Essential service disruption to communications. **Relief / Recovery** • Food and grocery supply logistics continuity. • Animal welfare. • DJPR is responsible for the **recovery** functional area coordination of local economies, business, agriculture and telecommunications, in addition to a number of functional recovery activities aligned to the area of coordination, informed by the consequences of the event.
DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING (DELWP)	• Provide access to ICC facilities. • Support Incident Management. • Support the Initial Impact Assessment process. • Assist with mapping. • Provide skilled personnel to provide engineering advice regarding damaged structures. • Provide skilled and equipped personnel to assist with damage control operations to limit danger to the public following a tsunami. • Provision of human and physical resources. • Provide advice regarding major power and energy outages including any known need to disconnect electricity or gas. • Provide advice regarding the timetable for restoration of services as available. • Assist with the identification of interdependencies between tsunami damage and utility services.
EMERGENCY SERVICES TELECOMMUNICATIONS AUTHORITY (ESTA)	• Advise Triple Zero of flood warnings. • Provide facilities for EMLO. • Implement staffing arrangement to manage surge for an imminent event.
ENVIRONMENT PROTECTION AUTHORITY (EPA)	• Assess the environmental impact of the emergency. • Determine practical measures to protect the environment. • Advise emergency services on the properties and environmental impacts of hazardous materials. • Ensure that appropriate disposal methods are adopted for detritus and waste.
JOINT AUSTRALIAN TSUNAMI WARNING CENTRE (JATWC)	• Monitor and report earthquakes that have the potential to generate a tsunami. • Responsible for issuing tsunami watches and warnings for Australia including Victoria through Bureau of Meteorology.

LIFE SAVING VICTORIA	• Notify VICSES Regional Duty Officer when unusual ocean behaviour, which may be indicative of an imminent tsunami occurs, or when a tsunami has occurred. • Support VICSES with the warning of at-risk communities. • Evacuation of any public from the immediate sand/beach. • Pre-deployment of resources to staging areas. • Provide situational awareness such as monitor likely impact areas and provide reconnaissance of areas likely to have been impacted. • Support Victoria Police marine search and rescue operations of people in the immediate coastal environment (including the use of aircraft and rescue vessels). • Assist with search and rescue of people in the immediate coastal environment. • Assist with treatment of sick or injured people.
MELBOURNE WATER CORPORATION	• Provide skilled personnel to provide engineering advice regarding damaged structures. • Support the Initial Impact Assessment process. • Implement crisis and incident management plans when assets fail to perform their function (water supply and sewerage). • Provide information on impact to water assets or services. • Provision of emergency works to alleviate flooding and clearance of Melbourne Waters drainage assets after flooding has occurred.
METROPOLITAIN FIRE BRIGADE (MFB)	• Support incident management. • Provide access to ICC facilities. • Support initial impact assessment process. • Support the warning of at-risk communities. • Support Victoria Police with evacuations. • Provide skilled and equipped personnel to assist with damage control operations to limit danger to the public following a tsunami. • Undertake response to hazmat incidents. • Undertake urban fire suppression. • Assist with mapping. • Support the deployment of the state USAR response team.

MUNICIPAL COUNCILS	**Preparedness** • Ensure Municipal Emergency Management Planning arrangements are appropriate to support response to a tsunami event. • Assist with and contribute to tsunami education programs. **Response** • Provision of resources as available and needed by the community and response agencies. • Support the Initial Impact Assessment process. • Provision of engineering advice. • Provision of facilities for emergency services staging areas. • Assist with the delivery of public information. • Co-ordination of the provision and operation of emergency relief (includes catering, emergency relief centres, emergency shelters and material needs). • Assist with debris removal. • Assist with the provision of plant and skilled operators. • Management of roads and related assets within jurisdiction and support to wider joined up traffic management and evacuation planning. **Recovery** • Provision of information services to affected communities (e.g. using information lines, newsletters, community meetings and websites). • Provision and staffing of Recovery/Information Centre(s). • Formation and leadership of Municipal/Community Recovery Committees. • Post-impact assessment — gathering and processing of information. • Survey and determination regarding occupancy of damaged buildings. • Environmental health management — including food and sanitation safety, vector control, such as removing dead animals (domestic, native or feral) from waterways. • Oversight and inspection of rebuilding/redevelopment services. • Provision and management of community development services. • Provision and/or co-ordination of volunteer helpers. • Provision of personal support services (e.g. counselling, advocacy). • Recovery of locally owned transport assets and joined up approach to contribution to wider traffic management planning needs.

PARKS VICTORIA	• Control agency for waterway pollution within its operating area. • Support agency for emergency tsunami situations within its parks and reserves. • Support incident management through real-time information and intelligence in addition to IMT functions. • Rehabilitation of flora and fauna affected by an emergency within its parks and reserve. • Clearing and restoration of roads, bridges and other assets within its parks and reserves. • Close and facilitate staged relocation of at risk areas of Park Victoria estate (lands and ports).
VICTORIA POLICE	• Coordinate evacuation at the request of and in consultation with Incident Controller. • Coordinate USAR resources in consultation with Incident Controller. • If no tsunami warning is in effect, Victoria Police will notify VICSES State Duty Officer of any information they receive indicating the impact of a tsunami (e.g. information received via calls received by 000), including information from adjacent states. • Where other warning methods are unavailable or otherwise occupied, Victoria Police Water Police will assist with dissemination of Tsunami Watches, Warnings and Bulletins issued by the JATWC to commercial and recreational vessels including ports, and offshore rigs via marine radio distress and calling frequencies. • Coordinate registration of evacuees – with support from the Australian Red Cross. • Coordinate public enquiry system for disaster victims. • Coordinate disaster victim identification. • Assist with media management. • Traffic management planning. • Support Initial Impact Assessments.
VICTORIAN WATER AUTHORITIES (OTHER THAN MELBOURNE WATER)	• Provide skilled personnel to provide engineering advice regarding damaged structures where available. • Support the Initial Impact Assessment process. • Implement crisis and incident management plans when assets fail to perform their function (water supply and sewerage). • Provide information on impact to water assets or services.

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