Mid West (Grampians) Region

Emergency Response Plan

SES

Flood Sub Plan

Published by Victoria State Emergency Service

Melbourne, 30 September 2018.

This publication is intended to be consistent with the State Emergency Response Plan (SERP), published by Emergency Management Victoria (EMV) in 2016.

Authorised by the Victoria State Emergency Service (VICSES), 168 Sturt Street, Southbank.

An electronic version of the plan can be obtained at: https://www.ses.vic.gov.au/em-sector/vicses-emergency-plans.

Version Control

Grampians Region
Emergency Response Plan – Flood Sub-plan
Version 1, 30/9/2018

Mid West (Grampians) Region Emergency Response Plan – Flood Sub-plan Certification

The Mid West (Grampians) Region Emergency Response Plan – Flood Sub-plan deals with response to flood incidents within the Grampians area of responsibility.

The following plan is intended to provide the framework for the Mid West (Grampians) Region to effectively and efficiently respond to future emergencies caused by floods, and will remain current until rescinded by authority of the VICSES Chief Officer Operations.

_____ Date: _____

Tim Wiebusch
Chief Officer Operations

This plan is produced by VICSES and has been adapted from the SERP – Flood Sub-plan. All information contained in this plan was current at time of publication.

VICSES would like to acknowledge the significant contribution of key stakeholders to ensure the content contained within this plan is of a high quality to support response activities.

For further details about this plan, please contact the Mid West (Grampians) Region:

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State Emergency Management Priorities

The State Emergency Management Priorities are:

- Protection and preservation of life is paramount. This includes:
  - Safety of emergency response personnel.
  - Safety of community members including vulnerable community members and visitors/tourists.
- Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.
- Protection of critical infrastructure and community assets that support community resilience.
- Protection of residential property as a place of primary residence.
- Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability.
- Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment.

Table of Contents

1. Introduction

1.1. Purpose

The purpose of this plan is to provide strategic guidance for the effective emergency management of floods in the Mid West (Grampians) Region.

1.2. Objective

The objective of the Mid West (Grampians) Region Flood Emergency Response Plan – Flood Sub-plan is to outline the regional arrangements for ensuring an integrated and coordinated approach to the management of flood events across the Mid West (Grampians) Region, in order to reduce the impact and consequences of these events on the community, infrastructure and services.

1.3. Scope

This Mid West (Grampians) Region Emergency Response Plan – Flood Sub-plan includes:

- Description of potential risks and consequences of floods to the social, built, agricultural and natural environments within the Mid West (Grampians) Region.
- Regional specific emergency management arrangements for the management of floods.
- Links to sources of information where the reader can obtain further detail.

1.4. Authorising environment

The *Emergency Management Act (1986 and 2013)* is the empowering legislation for the management of emergencies in Victoria.

The Emergency Management Manual Victoria (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.

The Mid West (Grampians) Region Emergency Response Plan (yet to be developed) will detail specific arrangements for the management of emergencies within the Grampians Region. This plan has been developed as a subordinate plan of the Grampians Region Emergency Response Plan and the SERP – Flood Sub-plan. This plan has been shared with the Regional Emergency Management Committee for comment, and approved by the VICSES Chief Officer Operations.

Other relevant legislation includes:

- *Victoria State Emergency Service Act 2005*
- *Essential Services Act 1958*
- *Planning and Environment Act 1989*
- *Local Government Act 1989*

1.5. Activation of the plan

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

1.6. Audience

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

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

1.7. Linkages

This plan is a sub-plan of the SERP – Flood Sub-plan and the Mid West (Grampians) Region Emergency Response Plan (yet to be developed). It reflects legislation, the arrangements in the SERP, the strategic direction for emergency management in Victoria and the accepted State practice for managing emergencies.

This plan outlines regional response arrangements which impact arrangements detailed in Municipal Flood Emergency Plans (MFEPs) developed at municipal level and are also subordinate plans to Municipal Emergency Management Plans (MEMPs). It is likely that flood events will occur in conjunction with severe weather.

For arrangements regarding management of severe weather events, refer to the SERP – Storm Sub-plan and Mid West (Grampians) Region – Storm Sub-plan at www.ses.vic.gov.au.

Arrangements within this plan have not been repeated from the fore mentioned plans, unless necessary to ensure context and readability. All available VICSES plans can be accessed at www.ses.vic.gov.au, and more information on MFEPs can be accessed on respective council websites or as outlined in Section 4.5 Municipal Flood Planning.

Arrangements for the management of secondary consequences are contained in the following:

- Health response – State Health Emergency Response Plan (SHERP).
- Rescue – Victorian Urban Search and Rescue (USAR) Response Arrangements.

1.8. Exercising and evaluation

This plan will be exercised within one year from the date of approval and once every three years thereafter as part of a phased cycle. Region Flood Scenarios have been created to support this function and are available in Attachment 1 – Region Flood Scenarios. Exercises 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 State Exercising Framework.

Any operational activity in the Mid West (Grampians) Region requiring the management of a flood event will be regarded as exercising of the plan. The event is to be evaluated and reviewed, as outlined above.

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. Flood risk within the Mid West (Grampians) Region

2.1 Region description

The Mid West (Grampians) Region of Victoria covers 48,620 square kilometres, and is the second largest region in the state, encompassing many communities that are culturally rich and diverse.

Geographically this area is diverse and includes:

- A population of more than 200,000 people from approximately 50 nationalities.
- Approximately 100,000 private dwellings.
- The Grampians National Park, attracting more than 1 million tourists per year.
- Most of the state's grain growing production.
- Borders South Australia.

The Region contains eleven local government areas, including West Wimmera, Hindmarsh, Yarriambaick, Horsham, Northern Grampians, Pyrenees, Ararat, Hepburn, Ballarat, Moorabool and Golden Plains. Refer to map below of the Grampians Region.

The Mid West (Grampians) Region comprises six Bureau of Meteorology (BOM) weather districts (Mallee, Wimmera, South West, Northern Country, Central and North Central) and four Catchment Management Authorities (CMAs) (Glenelg Hopkins, Corangamite, Wimmera and North Central).

The Mid West (Grampians) Region has a significant history of major level riverine flooding, most recently throughout 2016, 2012, 2011 and 2010.

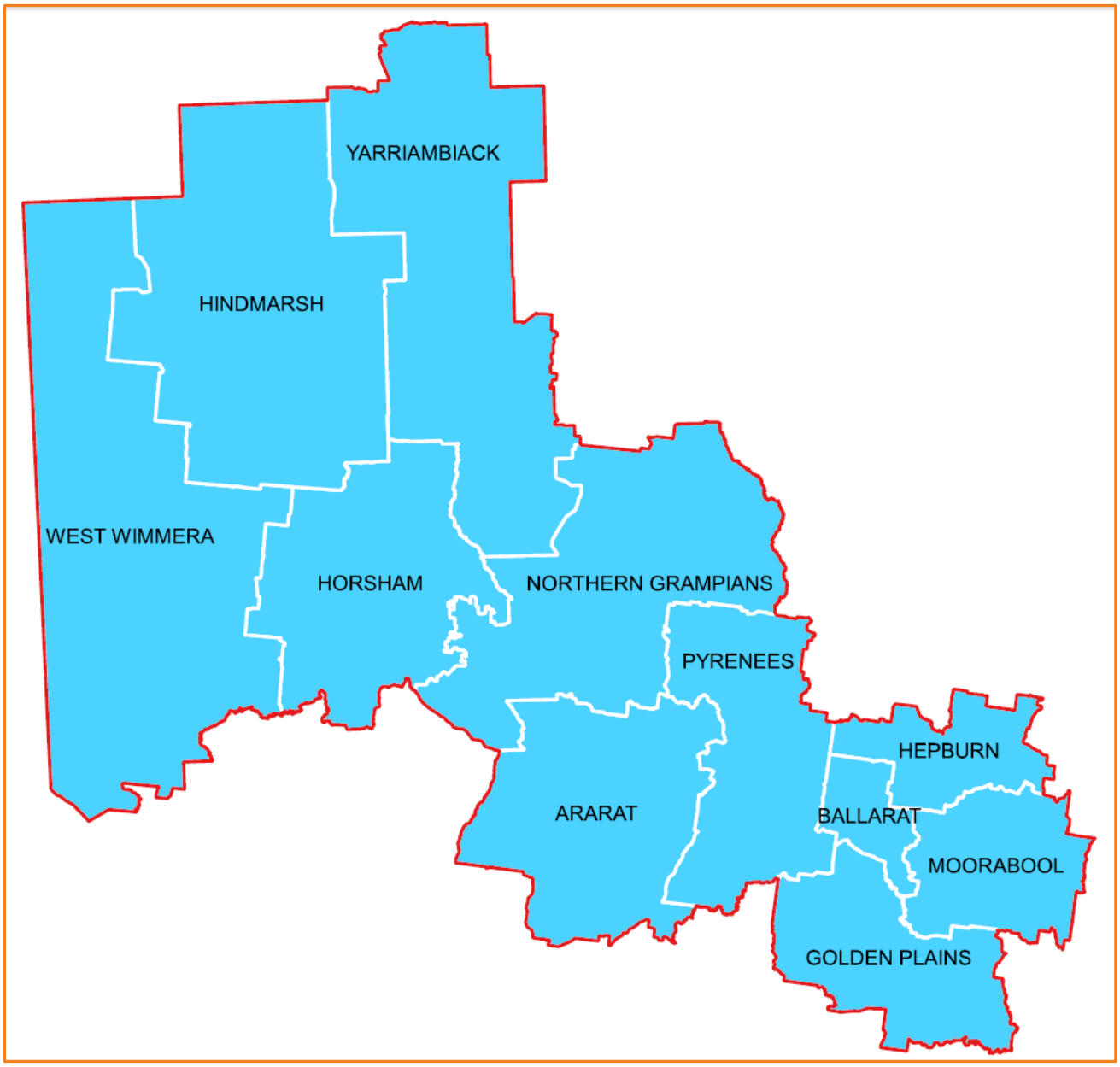


Figure 1. Grampians local government areas.

2.2 The flood hazard

Flooding may be defined as an overflowing or influx of water from its normal confines onto land not usually submerged. Within the Mid West (Grampians) Region the following mechanisms may cause flooding:

- **Heavy rainfalls**, which cause run-off to enter watercourses, overtopping the banks of rivers and creeks, overflowing lakes, detention basins and stormwater drains, causing local overland flooding, or resulting in releases or spills from dams. Many factors contribute to the extent and nature of flooding caused by heavy rainfall such as the amount and duration of rainfall, the spatial distribution of rainfall, prior weather conditions and characteristics of a catchment including its size, shape, soil types, vegetation and land use. The characteristics of a river also influence the extent of flooding. These characteristics include the size and nature of the river, the presence of vegetation in and around the river, flood control structures and embankments that may restrict floodwater and downstream river levels1[1].
- **Dam failure**, which involves the failure of a dam structure. There are a number of significant dams throughout Victoria that both store and provide water to communities across the State which have the potential to cause flooding in the event of failure. While dam safety risk management processes are in place and the possibility of dam failure is considered low, consequences could be catastrophic in some circumstances.
- **Levee failure**, which involves the failure of a levee structure. There are a large number of levees across Victoria, created to redirect flood water to minimise impacts of flooding. Levee failure can result from poorly created and/ or maintained levee structures or overtopping of levee structures due to significant water flows exceeding the structures' capacity.

Flooding in Victoria is influenced by our variable climate, typified by periods of wet and dry conditions. A major factor in this variability is the El Nino – Southern Oscillation phenomena. La Niña, the positive phase, is associated with colder than average sea surface temperatures in the central and eastern tropical Pacific region, along with higher than average winter, spring and early summer rainfall over much of Australia which can result in more flooding. Flooding in Victoria can also be influenced by the north/south movement of the strong westerly winds and their associated cold fronts. A shift northwards results in more storms over southern Australia.

Intense heavy rainfall over a short period of time can cause flash flooding to occur within minutes to hours. Flash flooding can be defined as 'flooding occurring within about 6 hours of rain, usually the result of intense local rain and characterised by the rapid rises in water levels (BOM, 2012)[2].

Flash flooding typically occurs in small catchments. As there is little warning time, flash flooding is difficult to predict and manage. In larger catchments, floods can occur over several days to weeks, and are easier to forecast and manage.

The Mid West (Grampians) Region is subject to riverine flooding from several major river systems, as experienced in the 2010 and 2011 floods. Riverine flooding associated with the Wimmera River, Werribee River, Mount William Creek, Avoca River, Leigh River and Hopkins River has impacted many communities in the Grampians Region. There is high riverine flood risk in the following council areas: West Wimmera, Hindmarsh, Yarriambaick, Horsham, Northern Grampians, Pyrenees, Ararat, Hepburn, Ballarat, Moorabool and Golden Plains. Refer to figure 3 showing the 100 year ARI flood extent for waterways in the Mid West (Grampians) Region.

Council areas that have a high risk of flash flooding include;

- Ararat
- West Wimmera
- Ballarat
- Hepburn
- Golden Plains

1 Queensland Government (2011) Understanding floods: Questions and Answers. [Available Online]

[2] Bureau of Meteorology (nd) Arrangements for Flood Warning Services in Victoria from the Weather Services Handbook, February 2001, [Available Online]

- Hindmarsh
- Horsham
- Northern Grampians
- Moorabool
- Pyrenees
- Yarriambiack

Many towns are prone to flash flooding, refer to figure 2 showing towns with significant number of buildings subject to stormwater flooding during a 100 year ARI storm event.

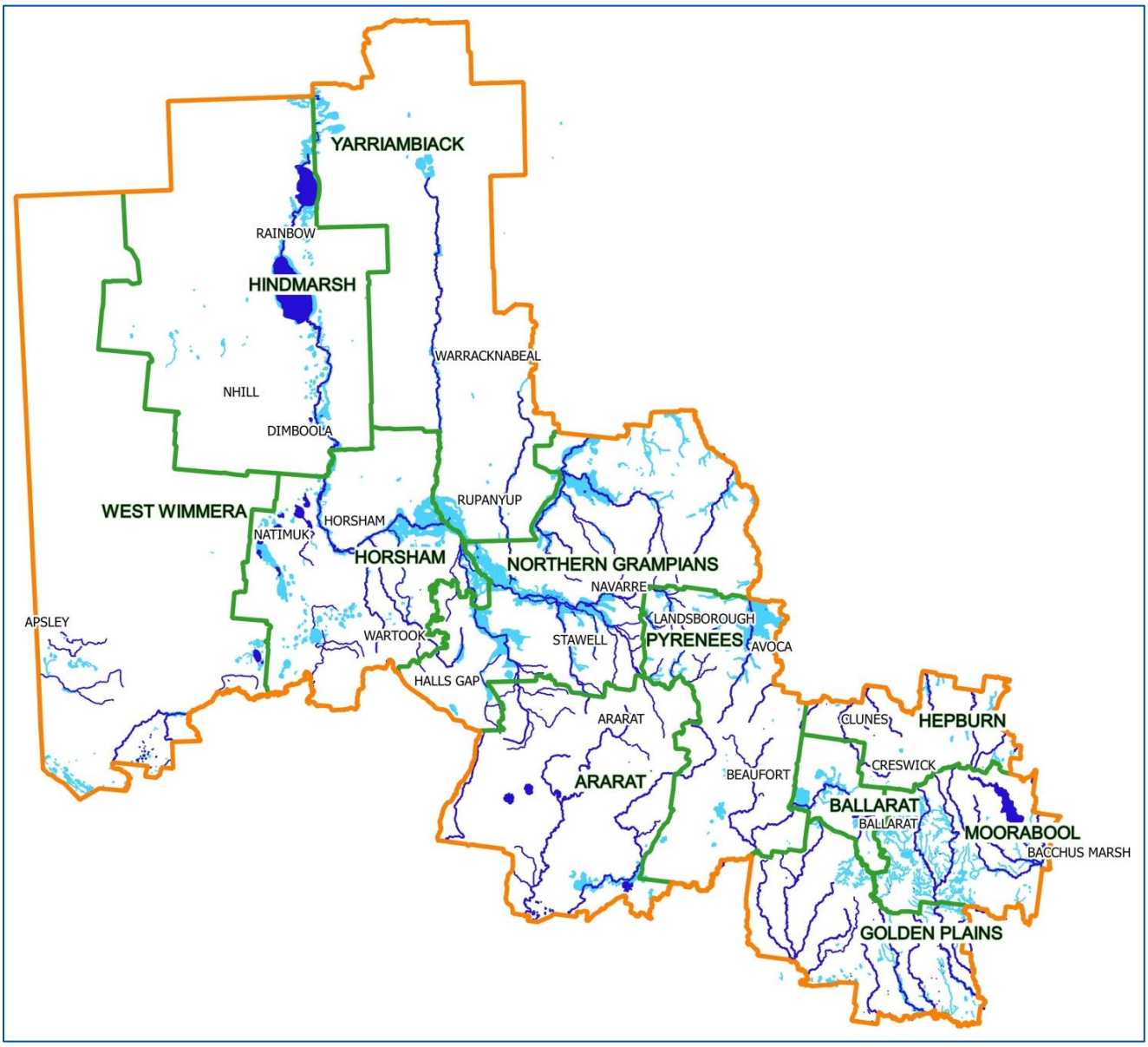


Figure 2. Towns with significant number of buildings subject to stormwater flooding during a 100 year ARI storm event.

A map of areas susceptible to 1% probability of riverine flooding (1% AEP), otherwise known as a 1 in 100 year flood event, in the Mid West (Grampians) Region is provided below:

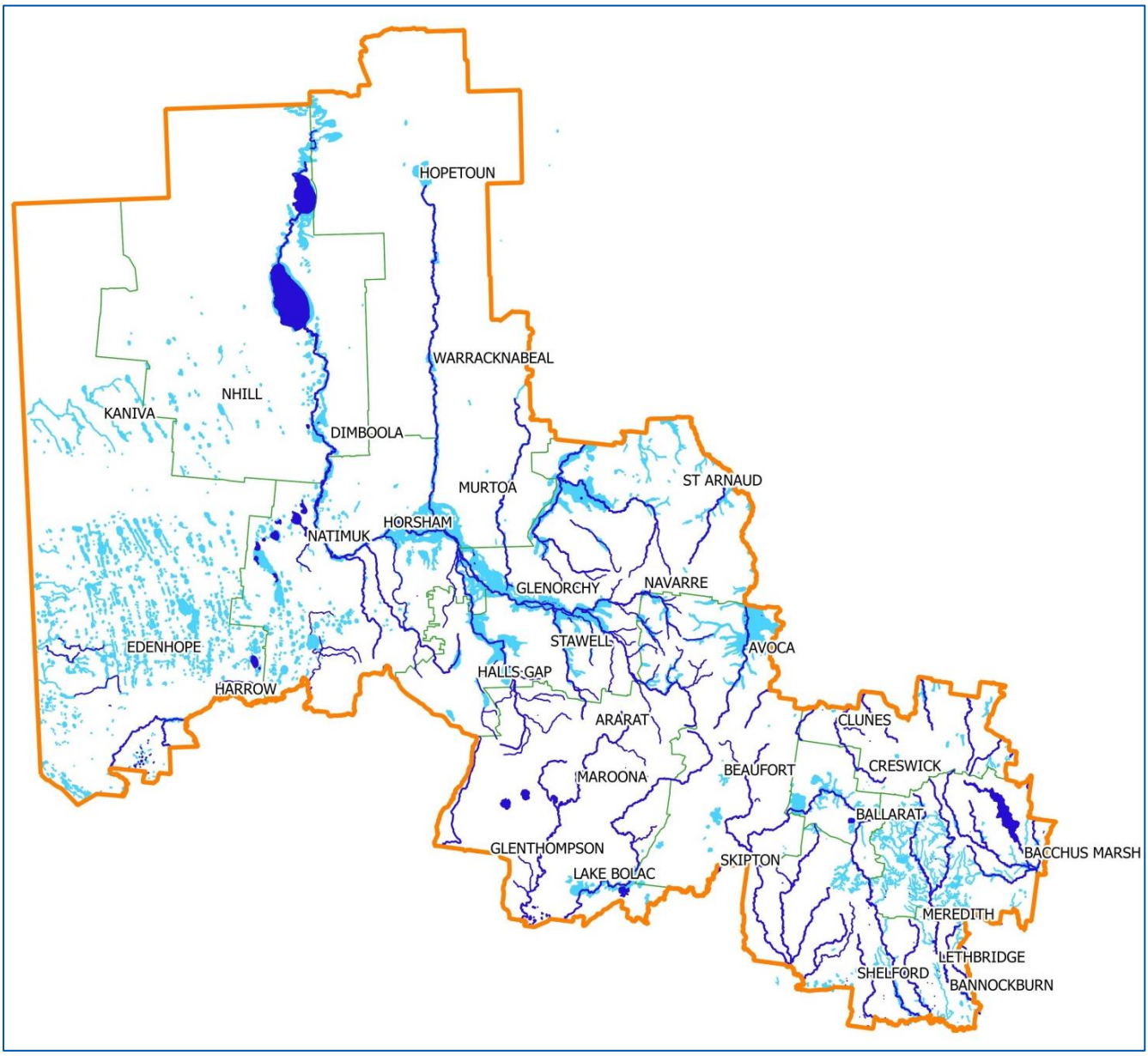


Figure 3. 100 year flood extent for waterways in the Grampians Region.

2.3 Mid West (Grampians) Region Catchments, Schematics and Intelligence Cards

The following major catchments are contained within the Mid West (Grampians) Region:

- Wimmera
- Corangamite
- Glenelg Hopkins
- Mallee
- North Central
- Port Phillip and Westernport

A map of major catchments in the Mid West (Grampians) Region is presented in Attachment 2.

Catchment Flood Intelligence Maps and Catchment Schematics for each of the Mid West (Grampians) Region catchments are also included in Attachment 3.

Flood Intelligence Cards for each of the Grampians Region catchments can be accessed in the MFEPs which are listed in Attachment 4.

2.4 Regional flood risks

Region flood risks including urban, rural and communities at risk of experiencing isolation in the Mid West (Grampians) Region are outlined in the respective MFEPs. Please refer to Attachment 4 for a full list of plans. The tables below provide a brief summary of key urban, rural and communities at risk of flooding in the Grampians Region.

Urban flood risks across the region:

City/ town	Population affected	Properties affected in 5% AEP (20 year ARI)	Properties affected in 2% AEP (50 year ARI)	Properties affected in 1% AEP (100 year ARI)	Warning time (hrs)
Wimmera Catchment					
Horsham (including Riverside, east Horsham)	14,543	76	170	184	1 day (from Glenorchy peak to steep rises)
Stawell	6,150	4 (only south east was modelled)	5 (only south east was modelled)	6 (only south east was modelled). During January 2011, 100 buildings were impacted by flooding	3-6 hours
Halls Gap	613	No damage estimate – overland flooding	No damage estimate – overland flooding	No damage estimate – overland flooding The January 2011 flood caused extensive damage: 8 shops, 3 motels, 3 caravan parks, 14 houses impacted	3-6 hours
Dadswells Bridge	172	8	11	14. During January 2011, 9 buildings were damaged	Less than 2 days for the peak to arrive. 12 hours from start of rain to steep rise
Natimuk	450	33	49	58	7 hours
Warracknabeal	2,745	8	78	177	2 day (from Glenorchy peak to steep rises)
Rupanyup	549	10	122	190. During January 2011, 18 buildings were threatened	24-32 hours (from Glenorchy peak to Rupanyup peak)
Dimboola	1,662	23	47	68. During January 2011, 9 houses were flooded above floor	1 day (from Walmer gauge peak to steep rises)
Jeparit	632	0	1	15	3.4 day (from Walmer gauge peak to steep

					rises)
Navarre	241	1	5	15	3-6 hours
Glenorchy	271	14	17	38	7-16 hours to steep rises in floodwater
Apsley	324	No flood modelling	No flood modelling	No flood modelling	3-6 hours
Nhill	2,278	No flood modelling	No flood modelling	No flood modelling	3-6 hours
Rainbow	525	No flood modelling	No flood modelling	No flood modelling	3-6 hours
Edenhope	976	No flood modelling	No flood modelling	No flood modelling	3-6 hours
Pomonal	322	0	0	0	3-6 hours
Moyston	348	1	1	1	3-6 hours
Wartook	200?	No flood modelling available yet.	No flood modelling available yet.	No flood modelling available yet.	3-6 hours
Brim	261	0	0	0	Steep rise when the peak arrives in Warracknabeal. 1.5 to 5 days for the peak to travel between Warracknabeal and Brim
Landsborough	256	3	3	4	3 hours
Murtoa	991	No flood modelling	No flood modelling	No flood modelling. January 2011 a significant number of buildings were impacted by flooding	3-6 hours
Corangamite Catchment					
Lethbridge	1,014	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Bannockburn	5,283	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Shelford	253	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Inverleigh	1,182	No flood modelling available yet.	No flood modelling available yet.	No flood modelling available yet	No flood modelling available yet
Buninyong	3,714	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Ballarat CBD	14,828	5,338	No data	6,447	4-6 hours
North Central Catchment					
Creswick	3,170	93	112	138	Creswick Creek

					will begin to rise within 30 minutes from rainfall. Creswick Creek peaks in 4-6 hours of rain
Clunes	1,728	23	52	70	Stormwater flooding will begin in minutes of intense rainfall. Properties impacted after 6-8 hours, with the Creswick Creek peaking 12-18 hours
Avoca	1,193	No flood modelling	No flood modelling	No flood modelling	No flood modelling
St Arnaud	2,619	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Moonambel	171	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Port Phillip and Westernport					
Bacchus Marsh	20,992	unknown	unknown	unknown	Impacted by flash flooding 3-6 hours. River levels begin to rise in 12-15 hours (MFEP)
Mallee Catchment					
Beulah	207	6	34	50	Steep rise when peak arrives in Brim. Peak travel time is 1.5-5 days between Brim to arrive in Beulah
Hopetoun	555	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Glenelg Hopkins Catchment					
Streatham	156	No flood modelling	No flood modelling	No flood modelling	No flood modelling
Miners Rest	3,095	112	160	187	2.5-3 hours steep rise in floodwater
Harrow	315	1	5	5	20-36 hours steep rise in floodwater
Chetwynd	223	No flood modelling available yet	No flood modelling available yet	No flood modelling available yet	20-36 hours steep rise in floodwater
Ararat	8,070	201	256	294	1-2 hours steep rise in floodwater

Beaufort	1,539	209	211	261	3-6 hours steep rise in floodwater
Invermay, Mt Rowan Upper Burrumbeet Creek	1,118	1,280 (overestimate)	1,877 (overestimate)	1,998 (overestimate)	3-6 hours steep rise in floodwater

Summary of rural flood risks:

Area	Description of flood risk
The lower Wimmera River Catchment, downstream of Glenorchy	Where the topography is flat to the north of the Great Dividing Range, large areas of rural land is impacted by flooding
Yarriambiack Creek Catchment	
Richardson River Catchment	
Dunmunkle Creek Catchment	

Communities at risk of experiencing isolation:

City/town Wimmera Catchment	Population impacted	Primary access routes
Wartook	Approx. 20 properties	Where MacKenzie River intersects Northern Grampians Road
Riverside	Up to 187 properties	Riverside Road
Natimuk	13	Lake Ave, Natimuk
Dadswells Bridge	Approx. 7 properties	Western Highway

2.5 Major dams

While not responsible for dam management, VICSES is responsible for the response to flooding caused by dam failure – when water overflows dam walls. More information regarding dams in the Grampians Region may be accessed within the respective MFEPs listed in Attachment 4.

Major dams located within the region:

Dam name	Location	Capacity (Megalitres)
The Gong (City of Ballarat)	Buninyong	1,902
Lake Burrumbeet	Burrumbeet	38,000
Merrimu Reservoir (Southern Rural Water)	North of Bacchus Marsh	32,516
Pykes Creek (Southern Rural Water)	East of Ballan	22,119
Bungal (Central Highlands Water)	Lal Lal	59,549
Moorabool (Central Highlands Water)	Bolwarrah	6,738
Bostock (Central Highlands Water)	West of Ballan	7,455
Wombat Creek Dam (Central Highlands Water)	South of Wombat Creek	547
Evansford Reservoir (Central Highlands Water)	Waubra Talbot Road	1,344
Cosgrave Reservoir (Central Highlands Water)	Creswick-Dean Road	682
Gong Gong Reservoir (Central Highlands Water)	East of Ballarat	1,909

Hepburns Lagoon (Goulburn-Murray Water)	North of Newlyn	3000
Newlyn (Goulburn-Murray Water)	Newlyn	3,300
Pincotts Reservoir (Central Highlands Water)	East of Ballarat	218
Talbot (CHW)	Talbot	846
White Swan Reservoir (Central Highlands Water)	White Swan Road	14,107
Kirks Reservoir (Central Highlands Water)	East of Ballarat	398
Korweiguboora (Central Highlands Water)	North of Ballan	2091
Musical Gully (Central Highlands Water)	North of Beaufort	252
Lake Beaufort	North of Beaufort,	260
Lake Bellfield (GWMWater)	South of Halls Gap	78,560
Wartook (GWMWater)	East of Zumsteins, Grampians National Park	29,300
Wilsons (Central Highlands Water)	Wallace	1,010
Lake Lonsdale (GWMWater)	West of Stawell	53,300
Pine Lake (GWMWater)	East of Horsham on the Western Highway	64,200
Toolondo Reservoir (GWMWater)	South of Horsham	92,430
Mt Cole (GWMWater)	North/West of Beaufort	810
Lake Fyans (GWMWater)	Lake Fyans	18,460
Taylors Lake (GWMWater)	East of Horsham on the Western Highway	35,770

2.6 Levee management

Significant levee systems existing within the Grampians Region:

Levee name	Area protected	Design height (ARI)	Additional information
Horsham	Northern section of the Wimmera River from Pryors Rd to St Brigids College	Protection for a 20 year ARI. Overtops during a 50 year ARI event	Not maintained, has many sections eroded
Jeparit	East of the town from the Jeparit Museum	Protection up to a 50 year ARI event	Not maintained, has many sections eroded
Warracknabeal	Warracknabeal	Currently constructing a levee with a protection level up to a 100 year event, with 100 mm freeboard	Not yet completed, has started construction

2.7 Regional resources

Regional resources available within the Mid West (Grampians) Region are included in the MFEPs that are listed in Attachment 4 – MFEP and LFG List.

Key regional resources used for flood response include sandbag filling machines, sandbags, sand, ‘road closed’ signs and ‘water over road’ signs.

A full list of regional resources can be found in Attachment 5 – Regional Resources.

Additional expert multi-agency resources may be accessed during operations through the Australasian Inter-Service Incident Management System (AIIMS) structure.

A map of VICSES Unit boundaries is provided in Attachment 6 – VICSES Unit Map and accessible via Emergency Management – Common Operating Picture (EM-COP) for registered users.

3. Consequences

3.1 Possible flood consequences

The Mid West (Grampians) Region has many flood prone communities. The effects of flooding on the community can include:

- Inundation of properties.
- Damage to essential infrastructure, public and private assets and property.
- Inundation of farmland, damage to crops and loss of livestock and fodder.
- Short or long term displacement of people.
- Isolation of properties or communities.
- Disruption to essential services.
- Death and injuries.

Significant community disruption can occur as a result of damage to essential infrastructure, which may lead to cascading secondary consequences. For example a loss of power may result in a loss of telecommunications, traffic signals and disruption to supply chains, among other impacts. Damage and flooding of road infrastructure may result in isolation of properties and/ or communities.

3.2 Flood history

The following table provides information relating to historical floods within the Mid West (Grampians) Region in which one or more of the consequences listed above occurred.

Year	Catchments impacted	Description
September 2016	Wimmera, North Central, Glenelg Hopkins and Corangamite Catchments	Flooding impacted Horsham, Dimboola, Jeparit, Halls Gap, Inverleigh, Avoca
2012	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat
January 2011	Wimmera, North Central, Glenelg Hopkins, Corangamite and Mallee Catchments	Flooding impacted Horsham, Dimboola, Jeparit, Stawell, Murtoa, Natimuk, Harrow, Ararat, Ballarat, Miners Rest, Halls Gap, Creswick, Clunes, Avoca, Inverleigh, Dadswells Bridge, Bacchus Marsh, Landsborough, Warracknabeal, Rupanyup, Chetwynd, Navarre, Wickliffe and Beulah. Roads were damaged, hundreds of buildings, sports grounds and facilities were impacted
September 2010	Wimmera, North Central, Glenelg Hopkins and Corangamite Catchments	Flooding impacted Horsham, Dimboola, Jeparit, Stawell, Murtoa, Natimuk, Harrow, Creswick, Clunes, Ararat, Ballarat, Miners Rest, Beaufort, Wickliffe, Dadswells Bridge, Bacchus Marsh, Landsborough, Warracknabeal, Beulah, Rupanyup. Most towns were impacted by minor flooding.
August 2010	Glenelg Hopkins Catchment	Minor flooding in Ararat
2005	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat
2001	Corangamite Catchment	Minor flooding in Shelford, no significant damages
1996	Wimmera Catchment	Minor flooding in the Wimmera River at Glenorchy, Horsham, Dimboola and Jeparit
1995	Corangamite and Western Port	Minor flooding in Shelford, no significant damages.

	Catchment	Werribee River broke its bank, also local flooding in the Parwan Creek
1993	Western Port Catchment	Minor flooding in Bacchus Marsh, no significant damages
1992	Wimmera Catchment	Significant flooding in Halls Gap, a number of buildings flooded. Flooding in Mount William Creek at Dadswells Bridge
1991	North Central, Glenelg Hopkins and Corangamite Catchments	Largest recent flood event for Ballarat CBD and Miners Rest. Significant flooding in Gnarr Creek, with the Lydiard Street and Bridge Mall areas most severely affected. Flooding in Canadian Creek at East Ballarat
1990	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat
1989	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat
1988	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat
1986	Glenelg Hopkins Catchment	Minor flooding in Yam Holes Creek at Beaufort in and Hopkins River at Wickliffe. No significant damages
1981	Wimmera Catchment	Flooding impacted Horsham, Dimboola, Jeparit, Stawell, Murtoa, Natimuk, Harrow, Creswick, Clunes, Ararat, Dadswells Bridge, Landsborough, Warracknabeal, Beulah, Rupanyup. Most towns were impacted by minor flooding
1983	Glenelg Hopkins and Western Port Catchment	Minor flooding in Yam Holes Creek at Beaufort, Hopkins River at Wickliffe, Werribee River and Lerderderg River in Bacchus Marsh. No significant damages
1978	Corangamite Catchment	Minor flooding in Shelford, no significant damages
1975	Wimmera Catchment	Flooding in Mount William Creek at Dadswells Bridge
1933	Glenelg Hopkins Catchment	Flooding in the Hopkins River at Ararat
1909	Wimmera, North Central, Glenelg Hopkins and Corangamite Catchments	Flooding impacted Horsham, Dimboola, Jeparit, Stawell, Murtoa, Natimuk, Harrow, Creswick, Clunes, Ararat, Ballarat, Miners Rest, Beaufort, Wickliffe, Dadswells Bridge, Bacchus Marsh, Landsborough, Warracknabeal, Beulah, Rupanyup. Most towns were impacted by minor flooding
1891	Western Port Catchment	Major flooding in the Werribee River. Significant damages
1877	Corangamite Catchment	Flooding in Canadian Creek at East Ballarat

4. Community Resilience

4.1 Shared and individual responsibility for action

The National Strategy for Disaster Resilience, developed by the Council of Australian Governments, 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 flooding include:

- Individuals being aware of their flood risk, and following advice from emergency services when responding to warnings.
- Local governments and communities including flood risk within their Community Emergency Risk Assessment (CERA) activities, including consideration within emergency management planning 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 where possible.
- Government agencies undertaking:
    - Risk assessments to gain an appreciation of flood risk.
    - Engaging with the community regarding flood risk.
    - Working with communities to plan the management of flood risk.
    - Providing emergency information and flood warnings.
    - Ensuring an effective, well-coordinated response during floods.
    - Helping communities to recover and learn following a flood and build their resilience to future events.

VICSES has developed a Community Resilience Strategy and delivers programs to at-risk communities to provide information on what to do before, during and after floods. More information can be found at www.ses.vic.gov.au/get-ready.

4.2 Flood warning services

Flood warnings and notifications are provided by BOM, Melbourne Water and VICSES to the Victorian community. The flood warning services provided by BOM is dependent on local infrastructure, including flood gauges. The service is documented in the Service Level Specification for Flood Forecasting and Warning Services for Victoria which can be accessed at www.bom.gov.au/vic/flood/ and a map of flood gauges for the Mid West (Grampians) Region can be seen in Attachment 7– Maps of Regional Flood Gauges.

VICSES provides warnings and emergency information to the community by publishing Flood Community Notifications using EM-COP Public Publisher to the VicEmergency website at www.emergency.vic.gov.au/respond/.

Flood Community Notifications are informed by BOM, Melbourne Water, CMAs and local information and intelligence.

4.3 Melbourne Water Flood Management Strategy

Melbourne Water's Flood Management Strategy – Port Phillip and Westernport outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at www.melbournewater.com.au/yourfloodstrategy.

The flood strategy builds on the work of the previous strategy from 2007 and adds new emphasis on:

- Collaboration with the community and all organisations in a flood management role.

- Climate change and planning for future risks
- Enhanced transparency around decision making.
- Improving information on different kinds of flood risk.
- Applying the right mix of solutions to achieve the best social, economic and environmental outcomes.

Glenelg Hopkins CMA Regional Catchment Strategy

Glenelg Hopkins CMA Regional Catchment Strategy outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at http://www.ghcma.vic.gov.au/about-us/strategies-plans-and-reports/.

The flood strategy builds on the previous strategy, and adds new emphasis on:

- Encouraging communities to act responsibly to manage their own risks.
- Reducing flood risks through improved flood intelligence and mitigation.
- Providing emergency agencies with the required support to manage flooding.

Corangamite CMA Regional Catchment Strategy

Corangamite CMA Regional Catchment Strategy outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at http://www.ccma.vic.gov.au/admin/file/content2/c7/Corangamite%20RFMS%20-%20TEXT%20for%20WEB.pdf.

The flood strategy builds on the previous strategy, and adds new emphasis on:

- Building a flood-resilient community.
- Assessing flood risk and sharing information with other agencies and the community.
- Reducing flood risks through improved mitigation infrastructure, flood warnings and emergency management planning.
- Avoiding future flood risk through improved land use planning and building standards.

Mallee CMA Regional Catchment Strategy

Mallee CMA Regional Catchment Strategy outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at http://www.malleecma.com.au/resources/corporate-documents/mallee-floodplain-management-strategy-2018-28.

The flood strategy builds on the previous strategy, and adds new emphasis on:

- Assessment of regional flood risks.
- Developing priority actions for each municipality to reduce flood risk.
- Developing a monitoring, evaluation and reporting framework to support decision making and continuous improvement.

Wimmera CMA Regional Catchment Strategy

Wimmera CMA Regional Catchment Strategy outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at http://www.wcma.vic.gov.au/docs/default-source/flooddocs/wimmera-fms-dec17.pdf?sfvrsn=4.

The flood strategy builds on the previous strategy, and adds new emphasis on:

- Strengthening community engagement in regional planning and priority setting.
- Clarifying roles and responsibilities of key agencies in floodplain and catchment management.
- Strengthening coordination of partners implementing the regional strategies.
- Improving state and regional floodplain management reporting using a consistent set of indicators.

North Central CMA Regional Catchment Strategy

North Central CMA Regional Catchment Strategy outlines how flood management agencies will work together to manage flood risks and increase community preparedness. It is aligned with the Victorian Floodplain Management Strategy, emergency management arrangements and planning policy. The strategy is available at http://www.nccma.vic.gov.au/sites/default/files/publications/north_central_floodplain_management_strategy_consultation_draft.docx

The flood strategy builds on the previous strategy, and adds new emphasis on:

- Updating planning controls to reflect the best available information.
- Resolving flood mitigation infrastructure ownership and maintenance accountabilities.
- Addressing gaps in flood knowledge through flood mapping projects.
- Raising flood awareness and improving warning systems.
- Developing an understanding and awareness of flood flow distributions.
- Incorporating Traditional Owner knowledge into floodplain management activities.

4.4 Flood intelligence

Flood intelligence supports decision making and planning for flooding by providing reliable and accurate information relating to:

- The level, depth and velocity of floodwater and its consequences.
- Determination of actions to be undertaken in response to the identified consequences.

VICSES works closely with CMAs, the Department of Environment, Land, Water and Planning (DELWP), other agencies and trusted local sources to ensure available resources and platforms containing flood information and intelligence are utilised.

DELWP maintains FloodZoom, the Victorian flood intelligence platform. FloodZoom is a web-based platform that assists VICSES and other emergency services agencies to identify the possible local consequences of flooding and supports CMAs in land use planning and flood risk assessments.

EMV maintains the online multi-agency operational platform, EM-COP used for sharing flood intelligence with the sector, before, during and after flood emergencies.

Where there are gaps in telemetered stream and rainfall monitoring networks, the Mid West (Gippsland) Region works closely with local contacts to ensure that local knowledge provided is incorporated into decision making before, during and after flood events. Flood observers are listed within MFEPs.

4.5 Municipal flood planning

Municipal flood emergency planning is managed by Municipal Emergency Management Planning Committees (MEMPCs). MFEPs are created by municipalities that are considered to have a high susceptibility to flooding. MFEPs can be found online on respective council websites, FloodZoom for registered users, and on the VICSES website at www.ses.vic.gov.au.

A list of MFEPs finalised within the Mid West (Grampians) Region is available at Attachment 4 – MFEP and LFG List.

4.6 Community engagement

Community engagement programs to build community resilience for flooding are conducted in accordance with the VICSES Community Resilience Strategy, as outlined in Section 4.1. Programs include local engagement initiatives, including the development of a series of local flood guides that provide information of local flood risks to specific communities. These guides can be found at www.ses.vic.gov.au/get-ready.

4.7 Household and business plans

The Emergency Management Commissioner encourages every household and business to have a written emergency plan. Information on the development of household and business plans can be found at www.ses.vic.gov.au.

Local caravan owners can prepare for emergencies through use of the online planning tool, available at www.ses.vic.gov.au/get-ready/caravan-park-information.

4.8 Community safety advice

VICSES provides advice to community in the form of key safety messages for minor, moderate and major flooding, including advice for safe evacuation. A full list of community safety advice messages can be viewed online via EM-COP, located in the IMT Toolbox.

5. Managing a flood event

5.1 Roles and responsibilities

Roles and responsibilities of agencies involved in responding to floods are detailed in the SERP – Flood Sub-plan.

5.2 Concept of operations

The concept of operations for responding to floods is detailed in the SERP – Flood Sub-plan.

5.3 Escalation and notification

BOM publishes Flood Watches and Warnings, as detailed in Section 4.2, on its public website (www.bom.gov.au) and provides them to pre-identified agencies, organisations and media outlets, including pager and email warning messages to VICSES at the State and regional level.

Upon the receipt of a warning, the Regional Duty Officer (RDO) will notify the affected and/or potentially affected communities by issuing Flood Community Notifications, and the Regional Agency Commander (RAC) will notify the Regional Controller (RC) and/or Regional Emergency Management Team (REMT) members for flood response.

The escalation and notification process for flood response is operationalised within the VICSES *Standard Operating Procedure (SOP) 009 – Flood Notification and Activation Process.*

5.4 Strategic response planning

The actions listed below are the responsibility of VICSES at the regional and State tiers. Responsibility for these actions may transition to the RC to support multi-agency response when significant impacts caused by a flood event occur. Associated flood readiness levels and Incident Control Centre (ICC) footprints can be accessed within *Joint Standard Operating Procedure* (*JSOP) 2.03 Incident Management Team (IMT) Readiness Arrangements* or the *VICSES Flood Readiness and Activation Trigger Considerations (v3.0)*, also available via Attachment 8 – IMT Readiness Levels – Flood.

On receipt of advice from BOM of the potential for significant flooding, the RAC will undertake strategic level planning in anticipation of an event. Key considerations will include:

- Establishing the control structure for managing the event.
- Provision of warnings and emergency information to the community.
- Preparations for possible evacuations including implementation of evacuation and emergency relief plans and identification of evacuation points.
- Confirming agencies at all tiers are activated and appropriate response arrangements are in place.
- Identifying the likely consequences of the flood event 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, including identification of need for inter-state assistance.
- Ensuring that flood mitigation structures have been checked and any issues identified.
- Identifying mass gatherings and large public events that may be at risk, and arrangements to ensure the safety of individuals attending.
- 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 (EMLOs) from key support agencies to the State Control Centre (SCC) and Regional Control Centres (RCCs), where appropriate.
- Arranging for regular meetings of the REMTs and Incident Emergency Management Teams (IEMT).

- Providing situation reports to the State Control Team (SCT).

5.5 Cross border arrangements

For the Mid West (Grampians) Region, cross border mutual arrangements exist with VICSES and the Country Fire Service (CFS) in the neighbouring area of South Australia. This is for road rescue response and all hazard response. An annual cross border liaison meeting is held with all emergency service organisations to discuss cross border issues.

For flood incidents within the Victoria/ South Australia central border area, units will be deployed to support areas within their border areas, not cross border. Information is shared across border mainly to assist South Australia SES to prepare for flood risk for creeks that may impact on Naracoorte.

5.6 Regional Control Centre

The Region Response Plan outlines pre-determined facilitates that are suitable for the establishment of a RCC for the management of emergency events, including for flood response, in the Mid West (Grampians) Region. These include:

- Ballarat, 19 Learmonth Road, Wendouree.
  Facility owner CFA, contact Stephen Walls, Regional Commander, CFA, 0417 342 851.

A map of RCC footprints can be viewed at Attachment 9 – Regional Control Centre Footprint Map.

5.7 Incident Control Centres

The Regional Response Plan outlines ICC locations that have been pre-determined for emergency response, including flood response, in the Mid West (Grampians) Region. These are detailed in the table below:

Location	Catchments within footprint	Local Government Areas within footprint
Horsham ICC, **110 Natimuk Road, Horsham**	Wimmera, Mallee, Glenelg Hopkins, North Central	West Wimmera, Hindmarsh, Horsham, Northern Grampians, Ararat, Yarriambaick.
Ballarat ICC, **25 Vickers St, Sebastopol**	Wimmera, Glenelg Hopkins, North Central, Corangamite, Port Phillip and Westernport	Pyrenees, Ballarat, Moorabool, Golden Plains, Hepburn.

A map of ICC footprints is available online via EM-COP.

5.8 Divisional Command Points

Facilities suitable for use as Divisional Command Points (DCPs):

Location	Local Government Area
Ballarat, VICSES, DCP	Ballarat
Daylesford, VICSES, DCP	Hepburn
Ararat, VICSES, DCP	Ararat
Stawell, VICSES, DCP	Northern Grampians
Bacchus Marsh, CFA, LCP	Moorabool
Ballan, CFA, LCP	Moorabool
Linton, CFA, LCP	Golden Plains

Rokewood, CFA, LCP	Golden Plains
Beaufort, CFA, LCP	Pyrenees
Elmhurst, CFA, LCP	Ararat
Avoca, CFA, LCP	Pyrenees
St Arnaud, CFA	Northern Grampians
Willaura, CFA	Ararat
Warracknabeal, CFA	Yarriambaick
Hopetoun, CFA	Yarriambaick
Rainbow, CFA	Hindmarsh
Nhill, CFA	Hindmarsh
Edenhope, CFA	West Wimmera
Harrow, CFA	West Wimmera

A map of DCPs can be viewed at Attachment 10 – Divisional Command Point Location Map.

5.9 Regional resource requirements

Likely resource requirements for significant (major) flood events within each ICC footprint are detailed in Attachment 1 – Region Flood Scenarios.

Glossary

AEP	Annual Exceedance Probability
AIIMS	Australasian Inter-Service Incident Management System
ARI	Average Recurrence Interval
BOM	Bureau of Meteorology
CFA	Country Fire Authority
DCP	Divisional Command Point
DELWP	Department of Environment, Land, Water and Planning
EM-COP	Emergency Management – Common Operating Picture
EMLO	Emergency Management Liaison Officer
EMMV	Emergency Management Manual Victoria
EMV	Emergency Management Victoria
ICC	Incident Control Centre
IEMT	Incident Emergency Management Team
IMT	Incident Management Team
JSOP	Joint Standard Operating Procedure
MEMP	Municipal Emergency Management Plan
MFEP	Municipal Flood Emergency Plan
RAC	Regional Agency Commander
RC	Regional Controller
RCC	Regional Control Centre
RDO	Regional Duty Officer
REMT	Regional Emergency Management Team
SCC	State Control Centre
SCT	State Control Team
SERP	State Emergency Response Plan
SOP	Standard Operating Procedure
USAR	Urban Search and Rescue
VICSES	Victoria State Emergency Service

Attachments

Attachment 1 – Region flood scenarios

Region flood scenarios have been developed to support periodic training requirements (outlined in Section 1.8), provide opportunity to document anecdotal and/ or known flood impacts based on historic events, and provide an indication of the resource requirements and associated gaps for operational response.

The below scenarios are based on likely flood scenarios of varying intensity.

Scenario 1 – Heavy rainfall leading to minor to moderate stromwater and riverine flooding

In September 2010 a major rainfall event impacted parts of the Mid West (Grampians) Region as a low pressure system over South Australia deepened and moved over Bass Strait, with an associated trough extending north into NSW. Most waterways north of the Great Dividing Range experienced major flooding. The event resulted in widespread agriculture impacts, with minimal damage to buildings.

Scenario 2 – Major riverine flooding

Significant widespread rainfall in January 2011 to an already wet catchment affected all of the Grampians. It was the wettest January on record. The region received almost three times its usual rainfall. The highest monthly rainfall was recorded at Halls Gap with 297mm and 289mm at Mount William. The extreme rainfall was generated by the passing of complex and persistent low pressure systems. A broad slow moving trough centred over western Victoria and a ridge of high pressure to the south of Tasmania. The two systems created exceptionally humid conditions and unstable easterly flow across Victoria. Major and moderate flooding was experienced across the Mid West (Grampians) Region, with many gauges reaching the highest flood levels on record, and stormwater flooding also causing significant damages in most towns.

Resource requirements for an event within the Ballarat Incident Control Centre footprint

The below resource requirements have been identified based upon a major flood scenario (100 year flood event, similar to what was experienced in January 2011) resulting in significant impacts across Moonambel, Landsborough, Shelford, Inverleigh, Creswick, Clunes, Avoca, Beaufort, Bacchus Marsh, Lethbridge, Bannockburn, Streatham, Buninyong, Ballarat CBD and Miners Rest locations, and impacting approximately 192,606 people, isolating people and inundating more than 20,000 properties in total. The event which the scenario is based upon could last for more than seven days.

Resources listed are those that would be required at the peak of an event, and would represent the resources of all agencies with responsibilities under the SERP – Flood Sub-plan.

DCP locations that would be established are shown in Attachment 10 – Division Command Control Location Map.

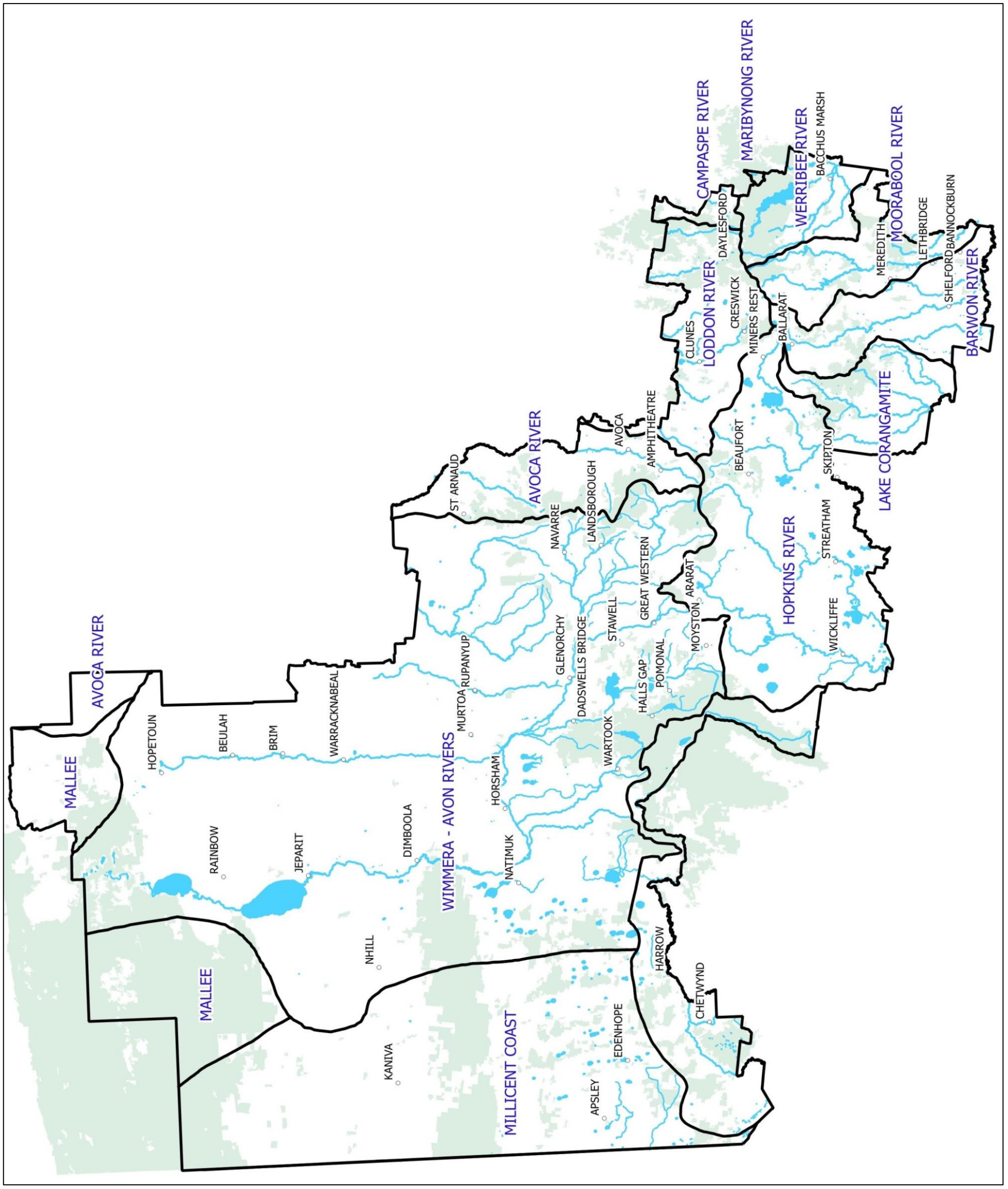
Resource requirements for an event within the Horsham Incident Control Centre footprint

The below resource requirements have been identified based upon a major flood scenario (100 year flood event, similar to what was experienced in January 2011) resulting in significant impacts across Stawell, Halls Gap, Dadswells Bridge, Natimuk, Warracknabeal, Rupanyup, Dimboola, Jeparit, Navarre, Glenorchy, Apsley, Nhill, Rainbow, Edenhope, Pomonal, Moyston, Wartook, Brim, Murtoa, Miners Rest, Harrow, Chetwynd, Ararat, Harrow, Chetwynd, Beulah, Hopetoun, St Arnaud and Streatham locations and impacting approximately 46,220 people, isolating more than 1,000 people and inundating 1,333 properties in total. The event which the scenario is based upon could last for more than two weeks.

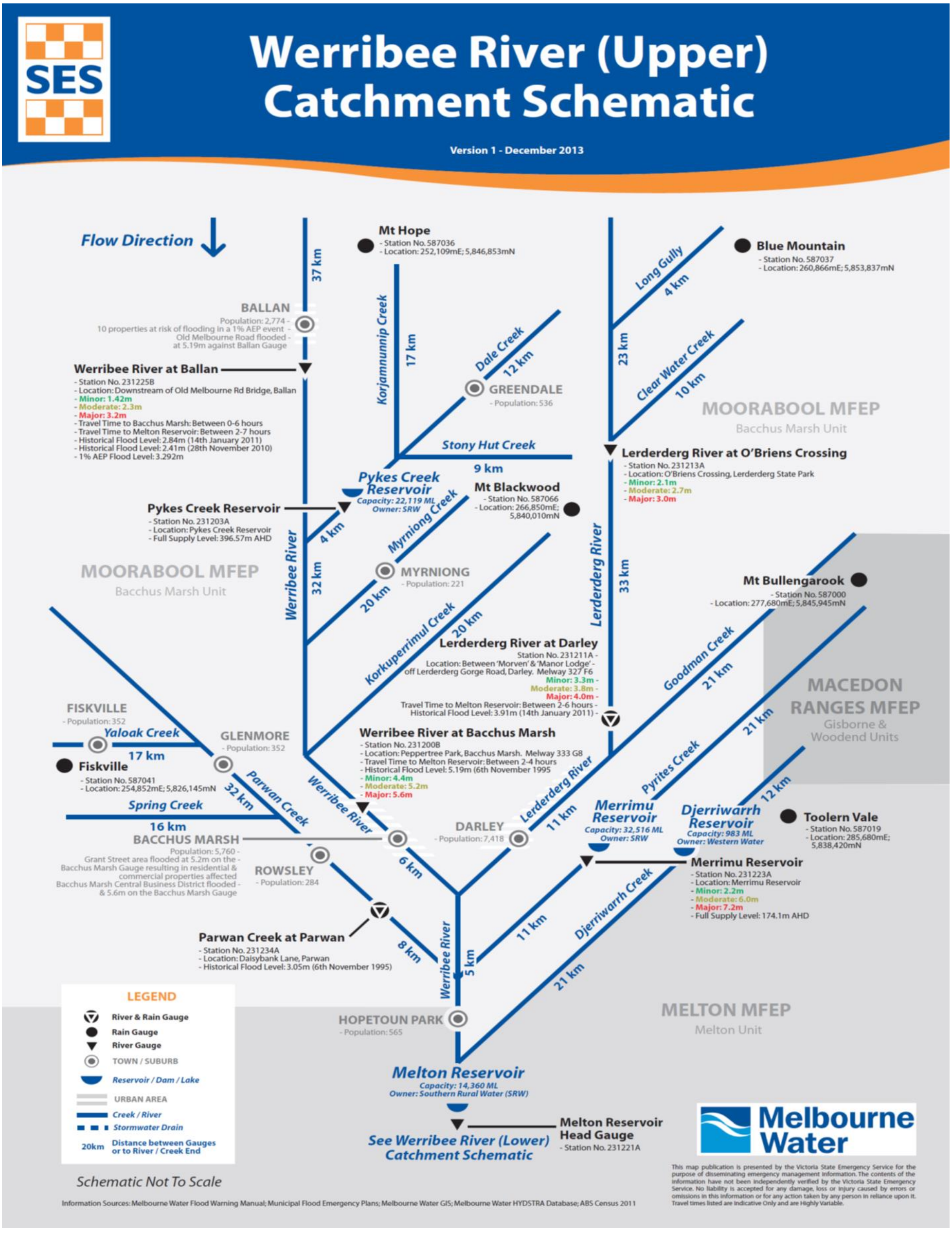
Resources listed are those that would be required at the peak of an event, and would represent the resources of all agencies with responsibilities under the SERP – Flood Sub-plan.

DCP locations that would be established are shown in Attachment 10 – Division Command Control Location Map.

Attachment 2 – Catchment maps

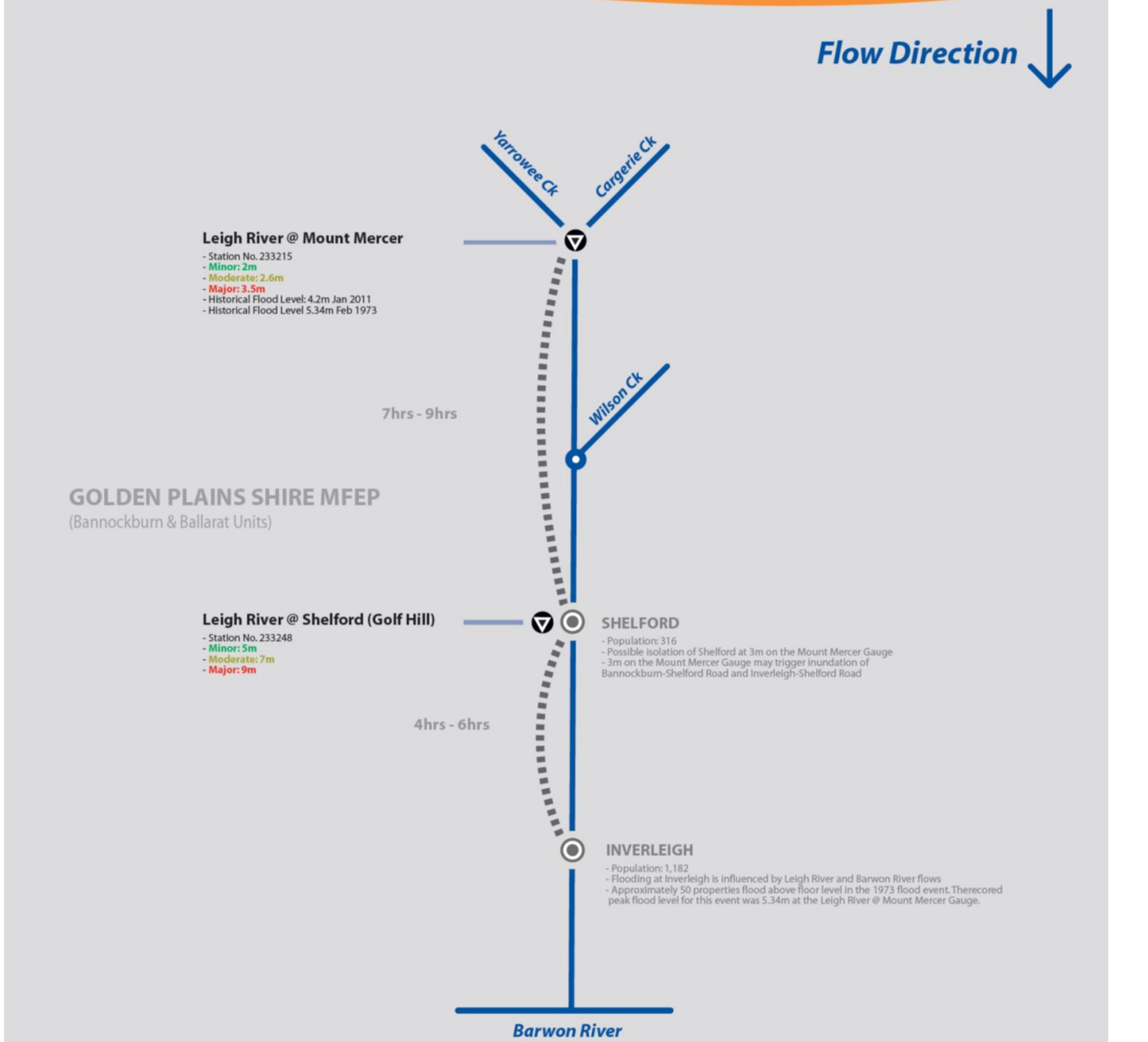


Attachment 3 – Flood Schematic Maps and Catchment Flood Intelligence maps



Leigh River Catchment Schematic

Draft 1- May 2014



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Information sources from Department of Environment and Primary Industries, Bureau of Meteorology, Australian Bureau of Statistics, Municipal Flood Emergency Plans

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE

Schematics Not To Scale

Wimmera River Catchment Schematic

Version 1 - May 2014

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE

Schematics Not To Scale

Information Sources: Department of Environment and Primary Industries; Bureau of Meteorology; Australian Bureau of Statistics; Municipal Flood Emergency Plans

Flow Direction North of Divide

LEGEND

- River & Rain Gauge
- River No
- TOWN / SUBURB
- *Reservoir / Dam / Lake*
- *Creek / River*
- *Typical flood peak travel time*

HINDMARSH MFEP
(Dimboola, Nhill Units)

Lake Albacutya
Capacity: 290,000 ML
Owner: PARKS VICTORIA

Lake Hindmarsh
Owner: PARKS VICTORIA

JEPARIT
- Population : 632

DIMBOOLA
- Population : 1,662

Wimmera River @ Upstream Of Dimboola
- Station No : 415256
- Historical Flood Level : 3.92m September 1983
- Historical Flood Level : 3.83m September 1988
- Historical Flood Level : 4.82m September 2011

QUANTONG
- Population : 308

125.5hrs - 157hrs

Wimmera River @ Quantong Bridge
- Station No : 415261
- Minor : 2.7m
- Moderate : 3.7m
- Major : 4.8m

HORSHAM MFEP
(Horsham Unit)

McKenzie River

Wimmera River @ Horsham (Walmer)
- Station No : 415200
- Location : 1.5km upRiver McKenzie River Junctions
- Historical Flood Level : 4.27m January 2011

95hrs - 122hrs

HORSHAM
- Population : 14,285
- 35 properties at risk of flooding over-floor in a 1% AEP event

Burnt Creek @ Wonwondah East
- Station No : 415223
- Location : Dunns Rd - Laharum
- Historical Flood Level : 1.04m October 1992
- Historical Flood Level : 1.04m October 1996
- Historical Flood Level : 1.07m January 2011

Burnt Ck

Wimmera River @ Drung Drung
- Station No : 415239
- Location : approx 14km upRiver of Horsham on Drung - Jung rd
- Historical Flood Level : 3.92m September 1983
- Historical Flood Level : 3.83m September 1988
- Historical Flood Level : 4.82m September 2011

63hrs - 75hrs

Yarriambiack Ck

Yarriambiack Creek @ Wimmera Highway
- Station No : 415270
- Location : Upper River from Crossing point of wimmera highway at Jung on LHS bank
- Historical Flood Level : 2.06m September 1981
- Historical Flood Level : 2.06m September 1983
- Historical Flood Level : 2.38m January 2011

Wimmera River @ Glenorchy
- Station No : 415201
- Location : 2km downRiver Stawell Rupanyup bridge
- Minor : 4.0m
- Moderate : 4.75m
- Major : 4.9m

DADSWELLS BRIDGE
- Population : 172

GLENORCHY
- Population : 277

NORTHERN GRAMPIANS MFEP
(St Arnauds, Stawell Unit)

Lake Lonsdale
Capacity: 65,480 ML
Owner: GWMW

Mt William Ck

18hrs - 30hrs

Fyans Ck

Concongella Ck

HALLS GAP
- Population : 613

STAWELL
- Population : 6,150

Lake Bellfield
Capacity: 78,550 ML
Owner: GWMW

Wimmera River @ Glynwylln
- Station No : 415206
- Location : At the Glynwylln Road Bridge
- Historical Flood Level : 7.47m September 1988
- Historical Flood Level : 8.31m September 2010
- Historical Flood Level : 8.63m January 2011

Concongella Creek @ Stawell
- Station No : 415237
- Location : UpRiver of the Navarre Rd Bridge
- Historical Flood Level : 4.54m September 1983
- Historical Flood Level : 4.85m March 1988
- Historical Flood Level : 5.07m January 2011

Wattle Creek @ Navarre
- Station No : 415238
- Historical Flood Level : 4.68m January 2011
- Historical Flood Level : 4.64m September 2010
- Historical Flood Level : 4.6m January 1999

7hrs - 19hrs

Wattle Ck

Mt Cole Creek @ Crowlands
- Station No : 415245
- Historical Flood Level : 2.45m October 1986
- Historical Flood Level : 2.64m September 2010
- Historical Flood Level : 3.45m January 2010

Mt Cole Ck

Wimmera River @ Eversley
- Station No : 415207
- Historical Flood Level : 4.01m September1983
- Historical Flood Level : 4.74 September 2010
- Historical Flood Level : 5.837m January 2011

1% AEP 4.75m

Barwon River Catchment Schematic

Draft 4 - April 2014

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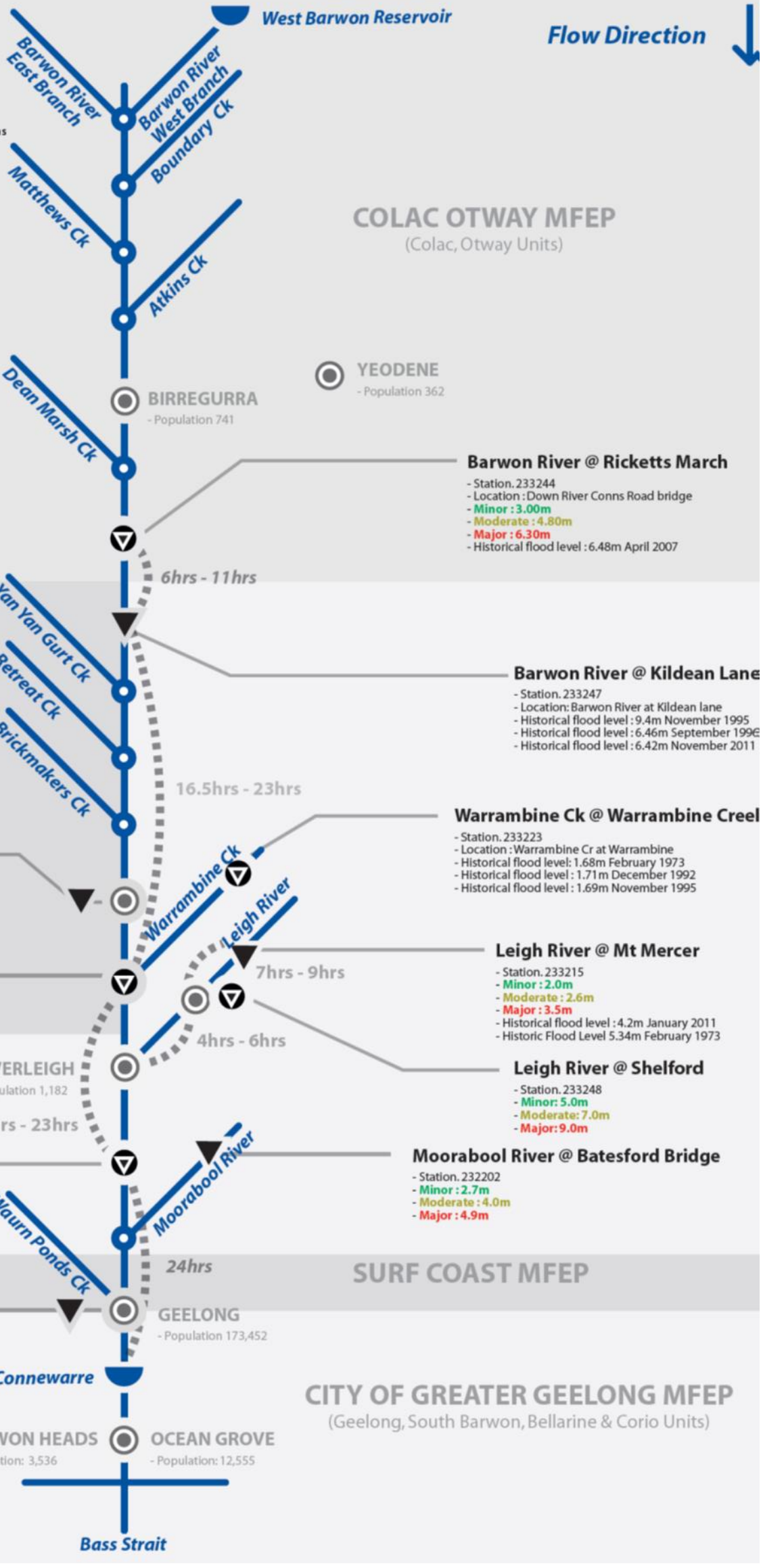
Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE

Schematics Not To Scale

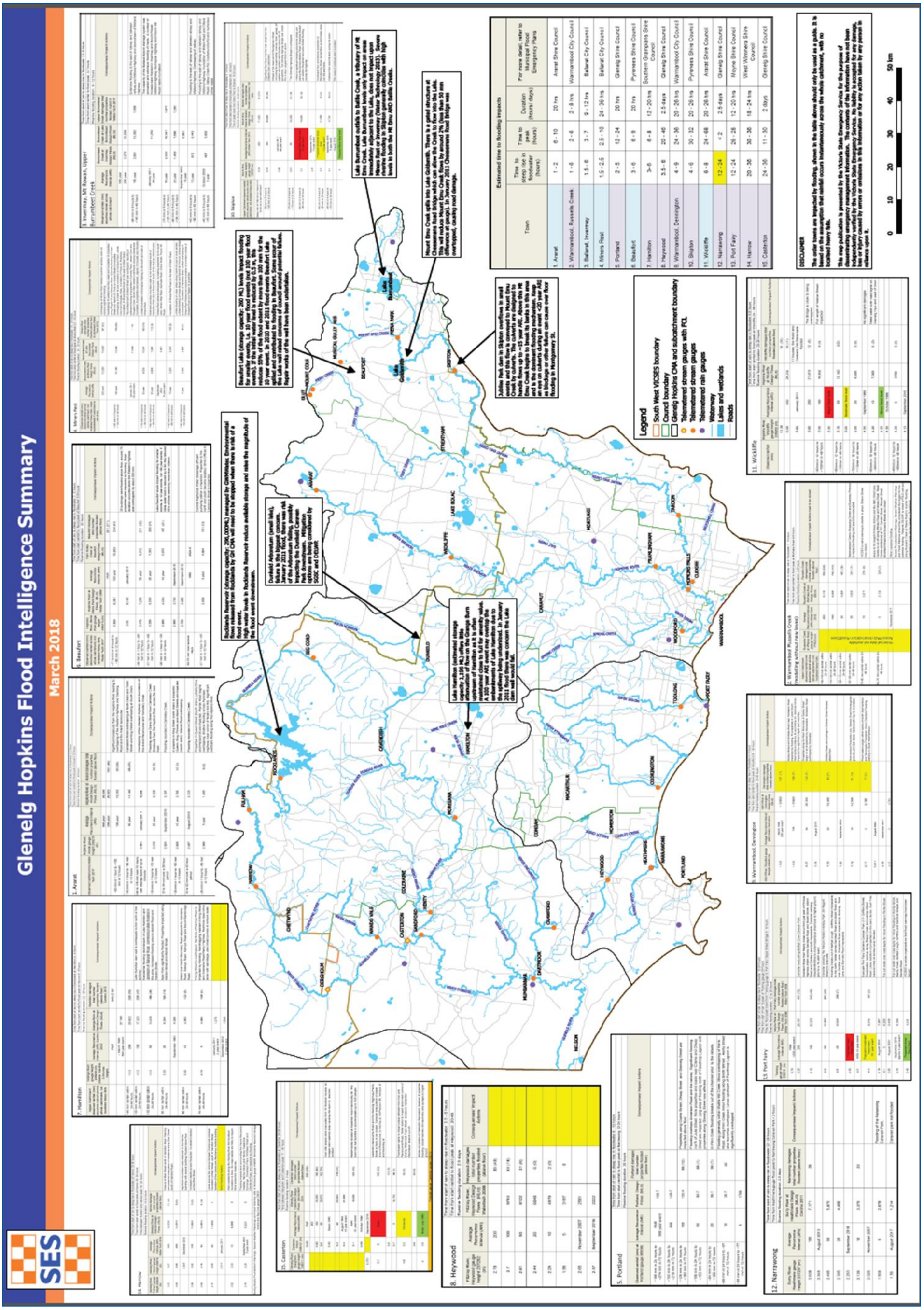
Information Sources: Department of Environment and Primary Industries; Bureau of Meteorology; Australian Bureau of Statistics; Municipal Flood Emergency Plans

LEGEND

- River & Rain Gauge
- River Gauge
- TOWN / SUBURB
- *Lake/Reservoir / Dam*
- *Creek / River*
- *Typical flood peak travel time*



A0 size Catchment Flood Intelligence Summary maps are available on FloodZoom. For the latest version of each map, please check FloodZoom.

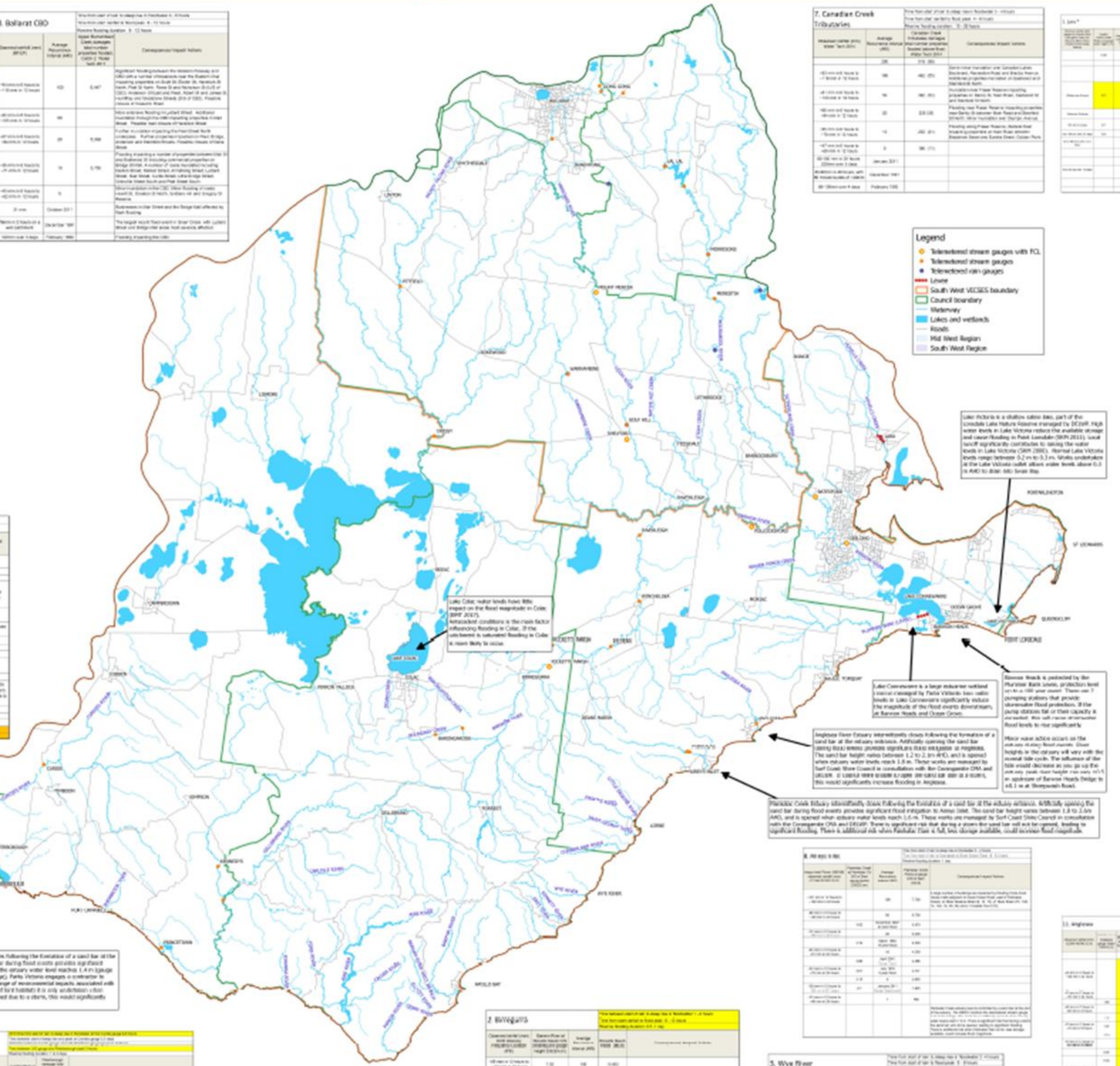


Corangamite Flood Intelligence Summary

July 2018

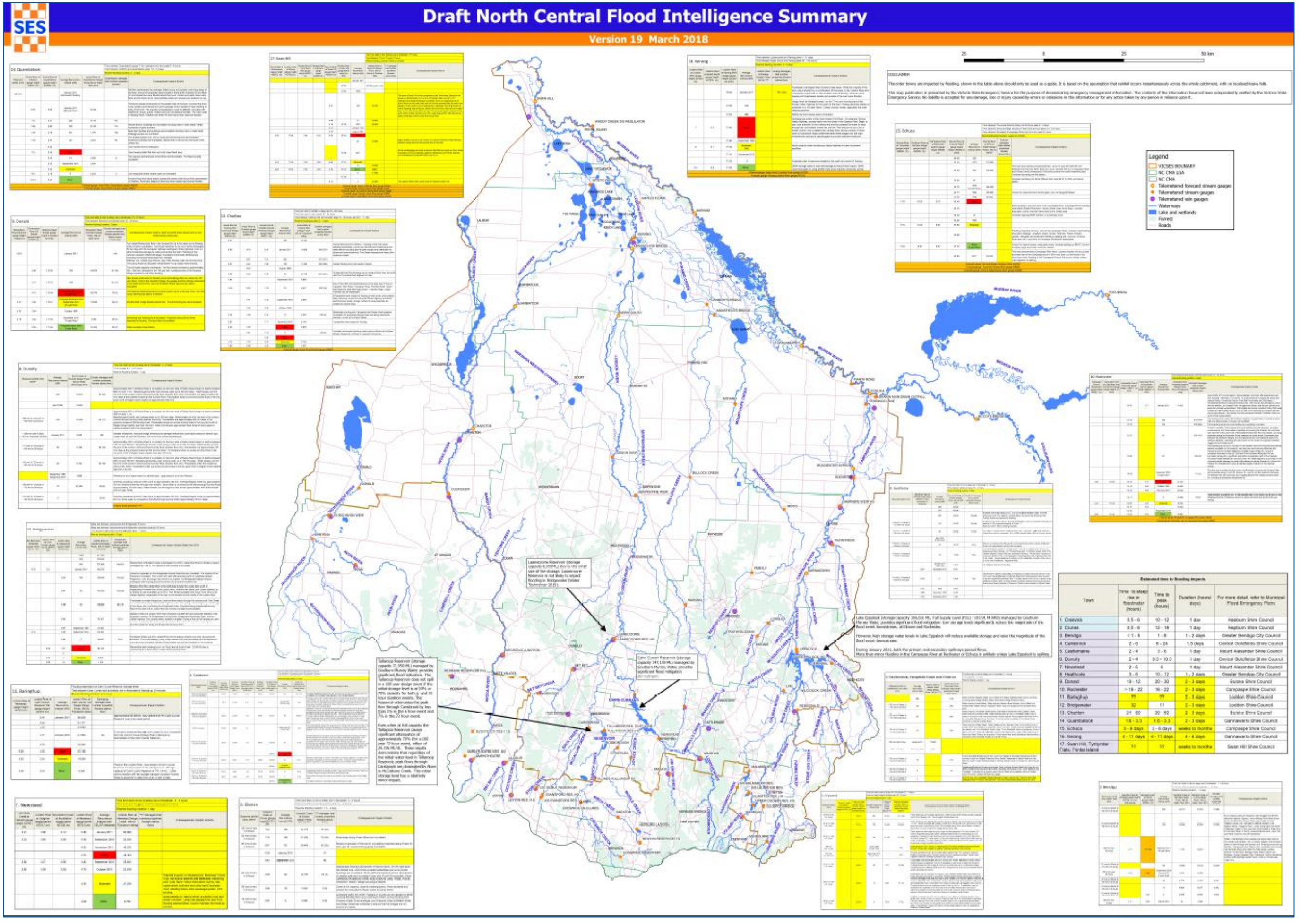
Town	Time to steep rise in floodwater (hours)	Time to peak (hours)	Duration (hours / days)	For more detail, refer to Municipal Flood Emergency Plans
Estimated time to flooding impacts				
1. Lara *	1-2	6 - 12	2 - 6 hours	City of Greater Geelong
2. Birregurra	1-6	8 - 12	0.5 - 1 day	Colac Otway Shire
3. Wye River	2 - 4	5 - 8	0.5 - 1 day	Colac Otway Shire
4. Colac	3 - 4	12 - 48	1 day	Colac Otway Shire
5. Apollo Bay	3 - 4	12 - 48	1 day	Colac Otway Shire
6. Aireys Inlet	3 - 4	12 - 48	1 day	Surf Coast Shire Council
7. Ballarat Canadian Creek and Tribs	3 - 4	4 - 6	0.5 - 1 day	City of Ballarat
8. Ballarat CBD	4 - 6	8 - 12	9 - 12 hrs	City of Ballarat
9. Shelford	4 - 6	4-6	2 days	Golden Plains Shire
10. Peterborough	4 - 6	48 - 60	1 - 2 days	Moyne Shire Council
11. Anglesea	6 - 8	24 - 36	1 day	Surf Coast Shire Council
12. Point Lonsdale *	6 - 24	12 - 28	2 - 4 days	City of Greater Geelong & Borough of Queenscliffe
13. Batesford	18-24	18-24	2 days	City of Greater Geelong
14. Winchelsea	20-21	20-21	2 days	Surf Coast Shire Council
15. Inverleigh	34-39	46 - 57	2 days	Golden Plains Shire
16. Geelong CBD	47-56	60 - 73	3 days	City of Greater Geelong
17. Barwon Heads *	57-78	81 - 114	3 - 4 days	City of Greater Geelong

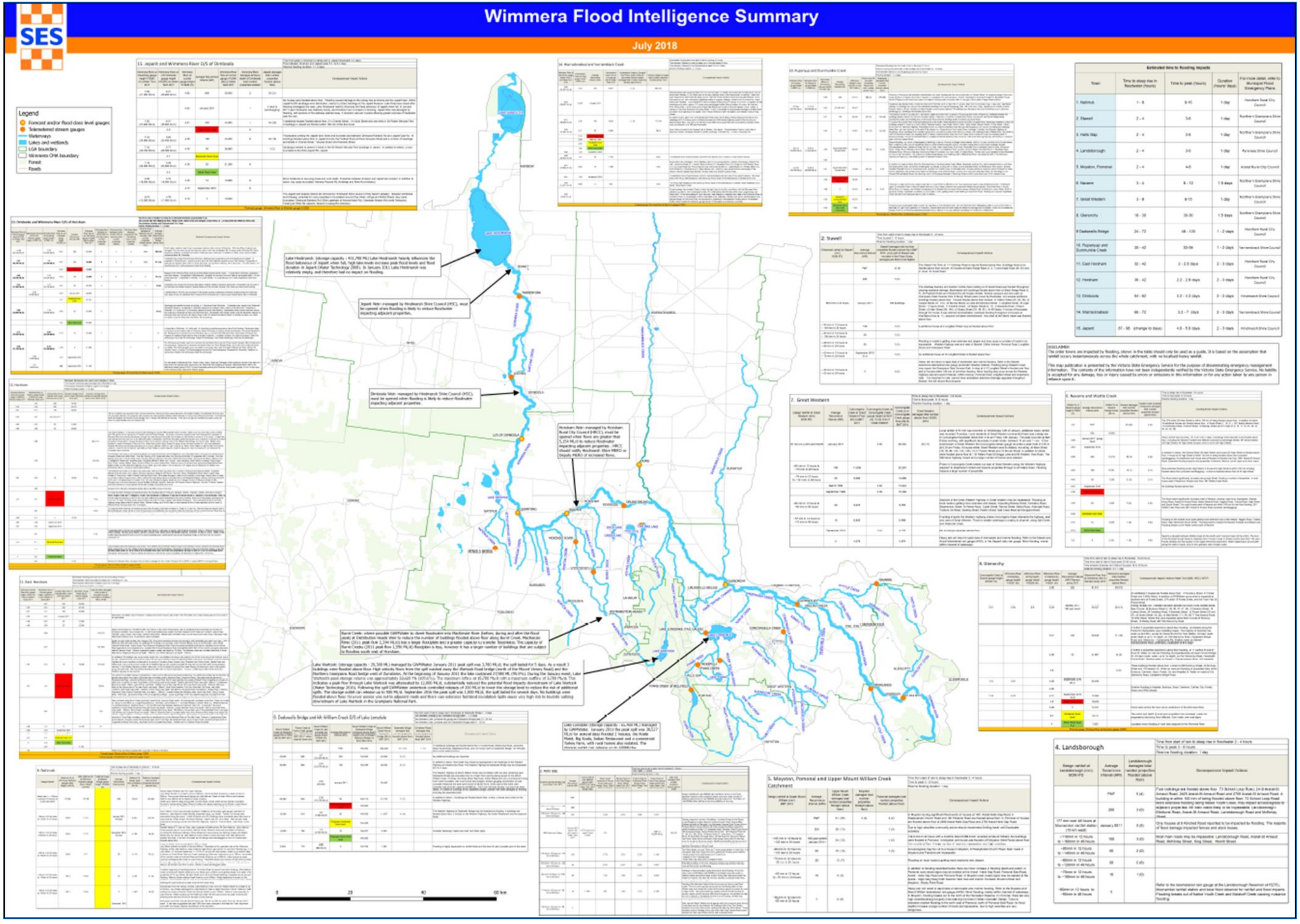
* Towns with low level of confidence in flood intelligence data. Will be updated when flood studies are completed.



Draft North Central Flood Intelligence Summary

Version 19 March 2018




Wimmera Flood Intelligence Summary
July 2018
SES
Legend
Forecast and/or flood class level gauges
Telemetered stream gauges
Waterways
Lakes and wetlands
LGA boundary
Wimmera CMA boundary
Forest
Roads
Lake Hindmarsh: (storage capacity - 410,700 ML) Lake Hindmarsh heavily influences the flood behaviour of Jeparit when full, high lake levels increase peak flood levels and flood duration in Jeparit (Water Technology 2005). In January 2011 Lake Hindmarsh was extremely empty, and therefore had no impact on flooding.
Jeparit Weir: managed by Hindmarsh Shore Council (HSC), must be opened when flooding is likely to reduce flooduation impacting adjacent properties.
Dimboola Weir: managed by Hindmarsh Shore Council (HSC), must be opened when flooding is likely to reduce flooduation impacting adjacent properties.
Rocklum Weir: managed by Rocklum Rural City Council (HRCC), must be opened when flows are greater than 5,154 ML/d to reduce flooduation impacting adjacent properties. (HRCC should notify Hindmarsh Shire MRFO or Deputy MERO of increased flows.
Burnt Creek: where possible CAPUlister to divert floodwaters into Mackenzie River (before, during and after the flood peak) at Distribution roads weir to reduce the number of buildings flooded above floor along Burnt Creek, Mackenzie River (2011 peak flow 2,194 ML/d) has a large floodplain and a greater capacity to accommodate floodwaters. The capacity of Burnt Creek (2011 peak flow 1,196 ML/d) floodplain is less, however it has a larger number of buildings that are subject to flooding south east of Horsham.
Lake Wartook: (storage capacity - 25,300 ML) managed by GWMWater January 2011 peak spill was 3,390 ML/d, the spill lasted for 5 days. As a result 3 buildings were flooded above floor. High velocity flows from the spill eroded away the Wartook Road bridge (north of the Mount Victory Road) and the Northern Grampians Road bridge west of Zumsteins. At the beginning of January 2011 the lake contained 27,980 ML (96.5%). During the January event, Lake Wartook's peak storage volume was approximately 32,620 ML (109.6%). The maximum inflow of 85,280 ML/d with a maximum outflow of 3,390 ML/d. This indicates a peak flow through Lake Wartook was attenuated to 12,890 ML/d, substantially reduced the potential flood impacts downstream of Lake Wartook (Water Technology 2011). Following the spill GWMWater undertook controlled releases of 300 ML/d to lower the storage level to reduce the risk of additional spills. The storage outlet can release up to 500 ML/d. September 2016 the peak spill was 1,800 ML/d, the spill lasted for several days. No buildings were flooded above floor however access was cut to adjacent roads and there was extensive farmland inundation. Spills cause very high risk to flooding, setting downstream of Lake Wartook in the Grampians National Park.
Lake Lonsdale: (storage capacity - xx,xxx ML) managed by GWMWater. January 2011 the peak spill was 38,527 ML/d for several days flooded 1 house, the Wattle Hotel, Big Koala, Indian Restaurant and a commercial Turkey Farm, with road homes also isolated. The channel outlet has release up to 12,000ML/day.
15. Jeparit and Wimmera River D/S of Dimboola
16. Wartook/Lake and Yarriambiack Creek
10. Rupanyup and Dunmunkle Creek
Estimated time to flooding impacts
2. Stawell
7. Great Western
8. Glenorchy
9 Dadswells Bridge
11. East Horsham
12. Horsham
13. Dimboola
14. Warracknabeal
15. Jeparit
DISCLAIMER
This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified to the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.
5. Dadswells Bridge and Mt William Creek D/S of Lake Lonsdale
5. Mayston, Pomonal and Upper Mount William Creek Catchment
4. Landsborough
6. Navarre and Wattle Creek
11. East Horsham
8. Natimuk
0
20
40
60 km

Attachment 4 – MFEP and LFG List

Local Flood Guides are published at: www.ses.vic.gov.au/get-ready/your-local-flood-information

List of available Municipal Flood Emergency Plans		
Hindmarsh Shire Council		
Yarriambiack Shire Council		
West Wimmera Shire Council **(MFEP not completed)**		
Horsham Rural City Council		
Northern Grampians Shire Council		
Pyrenees Shire Council		
Ararat Shire Council		
Hepburn Shire Council		
Golden Plains Shire Council **(MFEP not completed)**		
Moorabool Shire Council		
City of Ballarat Shire Council		
List of available Local Flood Guides		
Wickliffe	Warracknabeal	
Creswick	Clunes	
Dimboola	Shelford	
Jeparit	Inverleigh	
Horsham	Ballarat - Miner's Rest	
Natimuk	Ballarat - East	
Bacchus Marsh	Ballarat - CBD	
Glenorchy	Halls Gap	
Great Western	Beaufort	

Attachment 5 – Regional resources

Resources

The Mid West (Grampians) Region has a range of equipment and resources available for flood response. This equipment is deployed according to situation, unit roles and strategic location.

VICSES Unit resources

Resources and equipment available at 14 VICSES Units within the Grampians Region.

VICSES bulk sandbag locations

Ballarat, Stawell and Dimboola have 15,000 to 20,000 sandbags in storage. Other VICSES Units have between 2,000 to 4,000 sandbags available. Refer to the table below for quantites at each unit:

Unit Name	Primary Contact Person	Quantities (refers to individual sandbags)
Ararat	Unit Controller	2600
Bacchus Marsh	Unit Controller	2500
Ballarat	Unit Controller	18500
Dimboola	Unit Controller	13000
Dunmunkle	Unit Controller	
Edenhope	Unit Controller	2000
Goroke	Unit Controller	1000
Hepburn	Unit Controller	1000
Horsham	Unit Controller	4000
Kaniva	Unit Controller	1500
Nhill	Unit Controller	2000
St Arnaud	Unit Controller	1250
Stawell	Unit Controller	24000
Warracknabeal	Unit Controller	750
MW RHQ	MW Regional Duty Officer	5500

Sandbags can be sourced rapidly through the ICC from the VICSES Logistics Centre.

Planned Sandbag Pick Up locations:

Area	Distribution management	Council	Sandbag pick up location
Apsley		West Wimmera	Apsley Football Oval
Harrow		West Wimmera	None
Horsham		Horsham	Horsham council depot, Selkirk Drive, Horsham
Natimuk	Council	Horsham	Council sandbag point at two Natimuk locations. 1st Depot: 123 Main street. 2nd Depot: Median strip, Main street and Lake Road.
Dadswells Bridge		Horsham	None
Halls Gap		Northern Grampians	None
Great Western	Council	Northern Grampians	None
Glenorchy		Northern Grampians	Glenorchy Golf Club
Beaufort	Council	Pyrenees	Beaufort – Goldfields Reserve
Waubra			Sandbags available at the Waubra CFA shed. Sand available from Waubra Rec Reserve behind the preschool.
Avoca			Avoca – CFA shed sand and sandbags
Lexton		Pyrenees	Lexton – CFA Shed Sand and Sandbags available
Bacchus Marsh	Council	Moorabool	17 Kennedy Place Bacchus Marsh Ballan – Council Depot in Edols Street
Natte Yallock			Natte Yallock – Sandbags Avoca CFA shed Sand at Cross Roads Natte Yallock
Ballarat	Council & VICSES	Ballarat City	Miners Rest VICSES Unit Gillies Street Ballarat
Creswick	Council	Hepburn	Creswick Council Depot
Clunes		Hepburn	None

Rescue Boats:

A number of VICSES rescue boats are available for flood response across the region and can be quickly deployed to the required location. Consideration should be given to the type of flood and the expected conditions and uses for boats when deploying this resource.

Regional Rescue Boat Locations:

Unit Location	Rescue Boat Type	Rescue Boat Length
Hepburn	Inflatable	4.2m
Nhill	V hull aluminium	5.5m
Wendouree	Inflatable	4.2m
Ballarat	V hull aluminium	5.5m
Ballarat	Inflatable	4.2m
Bacchus Marsh	Inflatable	4.2m
Horsham	V hull aluminium	4.2m
Ararat	Semi Rigid Inflatable	4.6m
Stawell	V hull aluminium	5.0m

Detailed lists of VICSES lighting plants, trailers, satellite phones and EMLO laptops and equipment available within the Grampians region:

VICSES all-terrain specialist vehicles	
Resource Type	**Location**
Motorbikes x 2	Ballarat
Motorbikes x 4	Bacchus Marsh

VICSES community education trailers	
Resource Type	**Location**
Public Relations Trailer 1 - rego	Wendouree
Public Relations Trailer 2	Horsham
Public Relations Trailer 3	Stawell

VICSES logistics vehicles and trailers	
Resource Type	**Location**
Sandbag filling machine (dual)	Stawell Unit
Logistics Truck – MCB886	Wendouree
Forklift (OPS 6-01) – UCN174	Wendouree

VICSES lighting plants	
Resource Type	**Location**
Lighting Plant – W34344	Ballarat Unit
Lighting Plant – Y42788	Bacchus Marsh
Lighting Plant – R41411	Ararat
Lighting Plant – V86146	Dimboola
Lighting Plant – X54764	Stawell
Lighting Plant – Y11406	Hepburn Shire
Lighting Plant – Y11410	Edenhope

Resource	Number	Located	Comment
Mobile Command Vehicle	1	Ballarat	ICC for level 1 and 2 incidents, Divisional Command for level 3 incidents
Sandbag Filling Machine	1	Stawell	
Lighting Trailers	7	Ballarat, Stawell, Ararat, Daylesford, Bacchus Marsh, Dimboola, Edenhope	

Other VICSES operational equipment	
Resource Type	**Location**
State Rescue 2	Wendouree
Staging Area Cache	Wendouree
USAR Trailer – L19611	Ballarat Unit
Mass Casualty Cache	Wendouree
Catering Trailer	Ballarat Unit

VICSES communications	
Resource Type	**Location**
EMLO Kit #1	Wendouree
EMLO Kit #2	Wendouree
EMLO Kit #3	Wendouree
EMLO Kit #4	Horsham
Satellite phone - 0147 186 004	Wendouree
Satellite phone - 0417 184 274	Stawell
Satellite phone - 0147 186 005	Horsham

All requests for such resources should be made via the relevant Regional Agency Commander.

In addition to the unit resources listed above, the following VICSES regional strategic resources and composite teams are available:

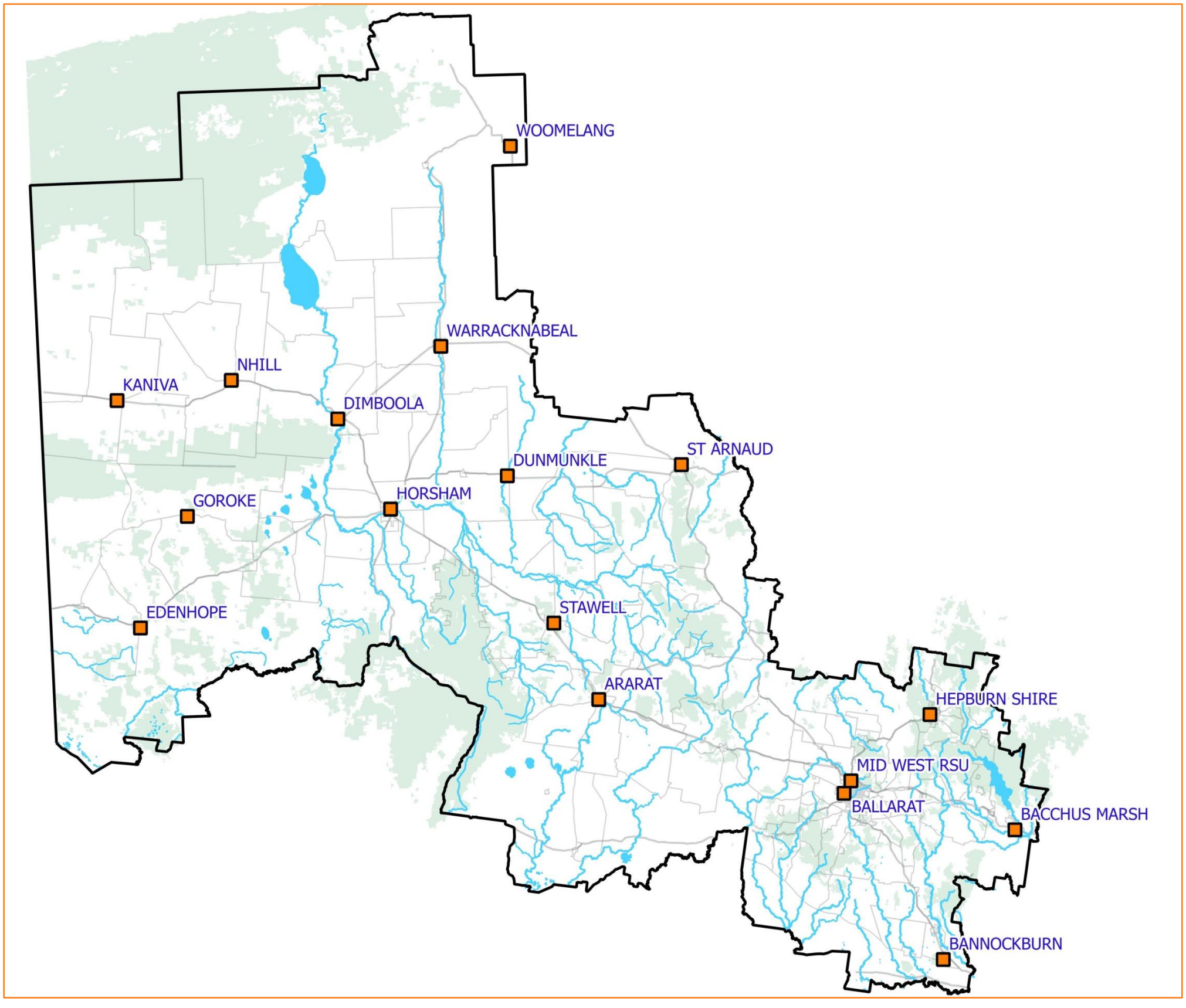
- 1 x Mobile Command Vehicle.
- 1 x Logistics Truck (with staging area or base camp equipment).
- 5 x Lighting Towers.
- 1 x Sandbag Filling Trailer.
- Land Based Swift Water Rescue Team.
- Health monitoring units – air quality (EPA).

The Country Fire Authority (CFA) and DELWP maintain specialist resources that can be utilised by VICSES during flooding, including:

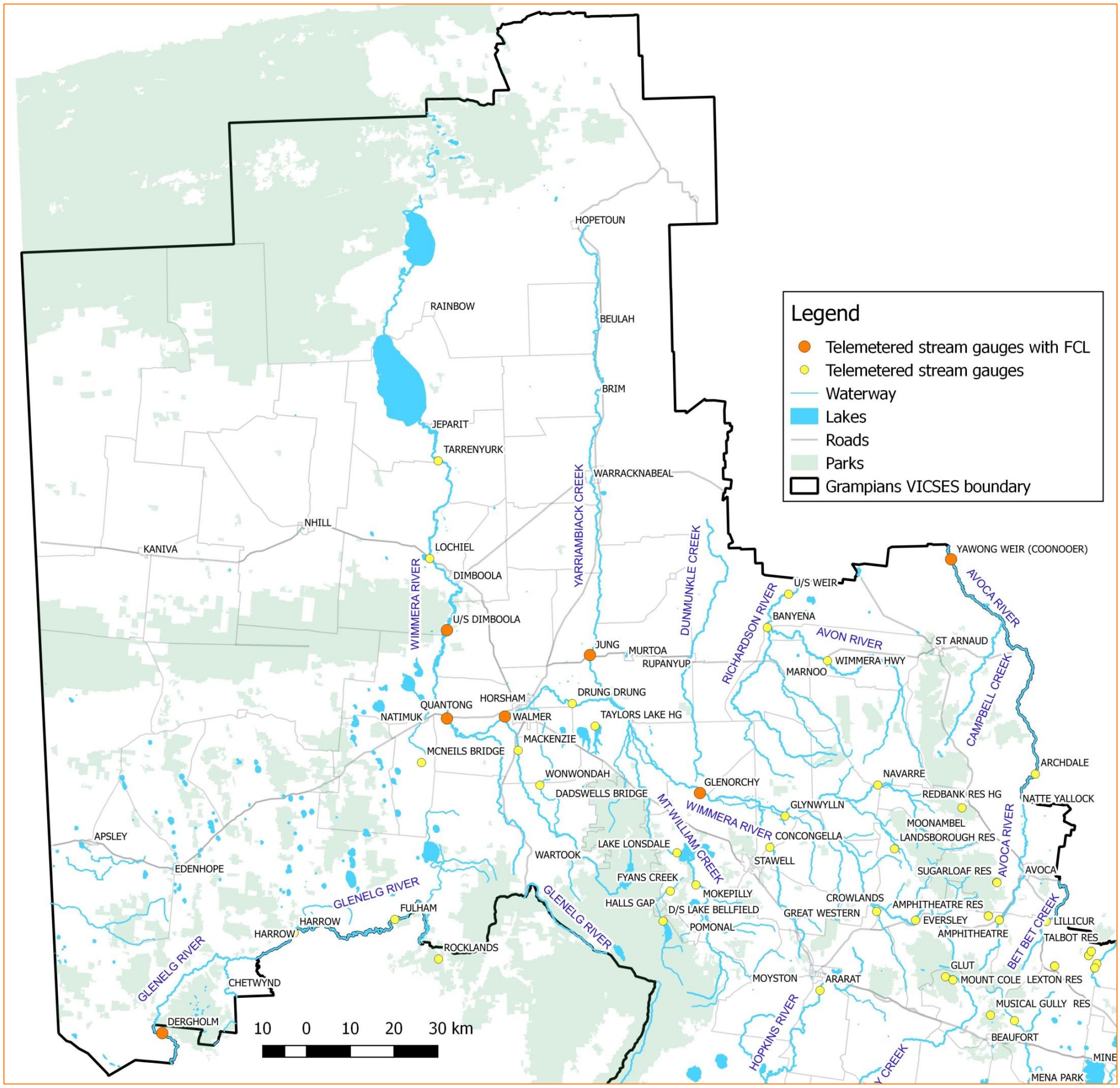
- IMT personnel.
- Chainsaw Crews.

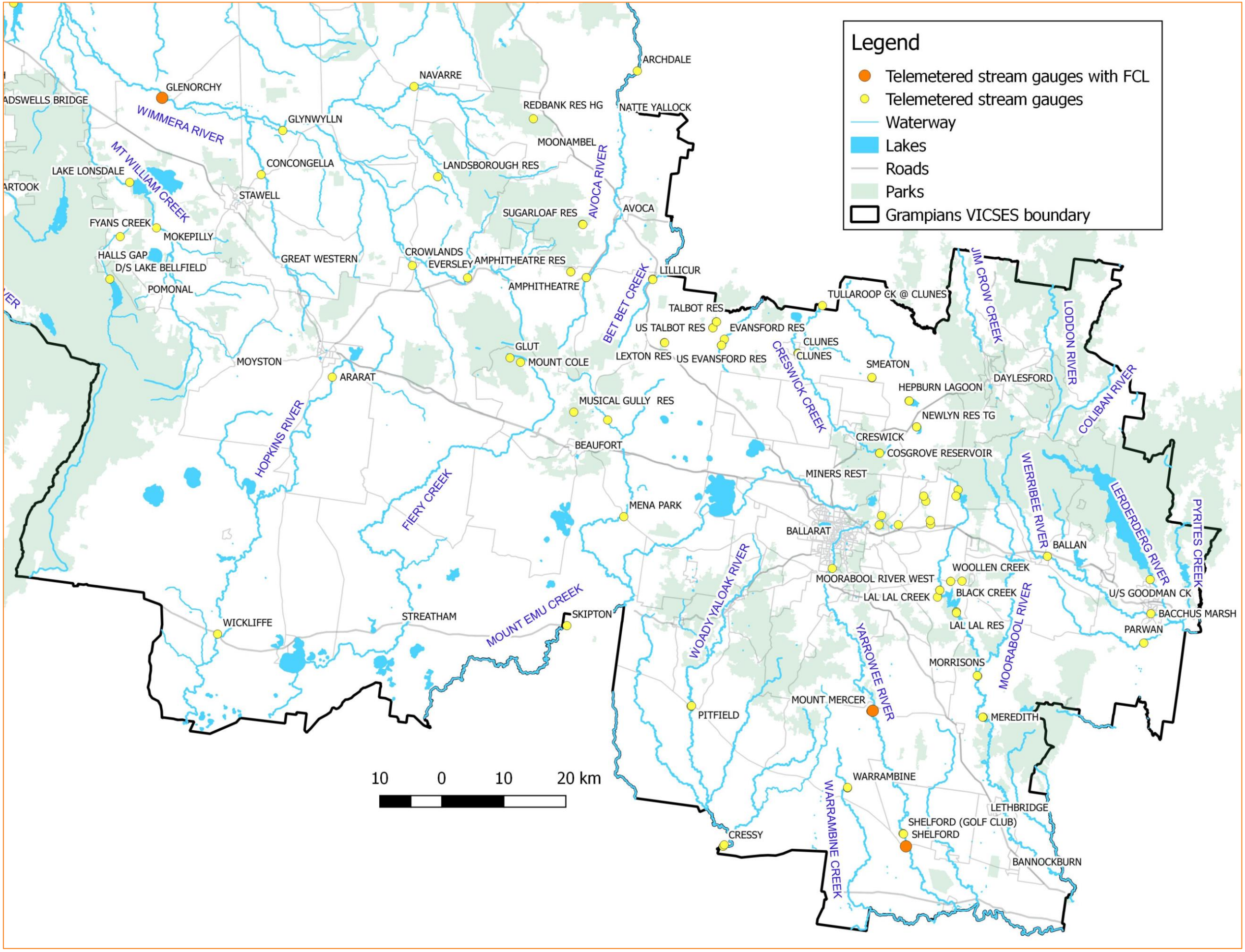
- Arborists.
- Initial Impact Assessment Teams.
- Base Camp Teams.
- Staging Area Team at Ballarat.
- Mobile communication vehicles at Wendouree and Horsham.

Attachment 6 – VICSES Unit map



Attachment 7 – Map of regional flood gauges




Legend
Telemetered stream gauges with FCL
Telemetered stream gauges
Waterway
Lakes
Roads
Parks
Grampians VICSES boundary
GLENORCHY
ADSWELLS BRIDGE
WIMMERA RIVER
GLYNWYLLN
NAVARRE
REDBANK RES HG
ARCHDALE
NATTE YALLOCK
MOONAMBEL
MT WILLIAM CREEK
LAKE LONSDALE
ARTOOK
CONCONGELLA
LANDSBOROUGH RES
AVOCA RIVER
STAWELL
SUGARLOAF RES
AVOCA
FYANS CREEK
MOKEPILLY
HALLS GAP
D/S LAKE BELLFIELD
POMONAL
GREAT WESTERN
CROWLANDS
EVERSLEY
AMPHITHEATRE RES
AMPHITHEATRE
LILLICUR
BET BET CREEK
TULLAROOP CK @ CLUNES
JIM CROW CREEK
LODDON RIVER
TALBOT RES
US TALBOT RES
EVANSFORD RES
CLUNES
CLUNES
GLUT
MOUNT COLE
LEXTON RES
US EVANSFORD RES
CRESWICK CREEK
SMEATON
DAYLESFORD
HEPBURN LAGOON
MOYSTON
ARARAT
MUSICAL GULLY RES
NEWLYN RES TG
COLIBAN RIVER
CRESWICK
HOPKINS RIVER
BEAUFORT
COSGROVE RESERVOIR
MINERS REST
WERRIBEE RIVER
LERDERDERG RIVER
PYRITES CREEK
FIERY CREEK
MENA PARK
BALLARAT
BALLAN
WOOLLEN CREEK
MOORABOOL RIVER WEST
BLACK CREEK
U/S GOODMAN CK
LAL LAL CREEK
BACCHUS MARSH
LAL LAL RES
PARWAN
WOADY YALOAK RIVER
YARROWEE RIVER
MOORABOOL RIVER
MORRISONS
WICKLIFFE
STREATHAM
MOUNT EMU CREEK
SKIPTON
MOUNT MERCER
PITFIELD
MEREDITH
WARRAMBINE
LETHBRIDGE
SHELFORD (GOLF CLUB)
SHELFORD
CRESSY
WARRAMBINE CREEK
BANNOCKBURN
10 0 10 20 km

Attachment 8 – IMT readiness levels (flood)

JSOP 2.03 – Incident Management Team (IMT) Readiness Arrangements

Schedule 6

IMT Readiness Levels – Flood

To determine the readiness level required, all three riverine flood conditions (FCL) described in the table below are needed to be predicted for 50% or more of an ICC footprint. Each river catchment, the upper and lower reaches of a river system have been allocated to an ICC footprint.

The RC may vary the actual number, distribution and level of an IMT from this schedule in order to manage local risks, as per section 15 of this JSOP.

IMTs should be in place as advised by the Regional Controller (RC) based on the risk, indicatively 2 hours before the community impact is expected to occur in the ICC footprint.

Where an IMT manages more than one ICC footprint, the RC in consultation with the SRC will determine the location of the IMT based on risk and consistent with the Regional Flood Response Plan and the SES Readiness and Activation considerations. Operational IMTs can be used for readiness, if they have the capacity to manage new emergencies in the initial stages

In addition to this schedule, the SRC may request a RC to form a Reserve IMT for deployment within a region or to support another region

In consultation with the SRC, a RC will advise when an IMT can deactivate or stand down the preparedness level.

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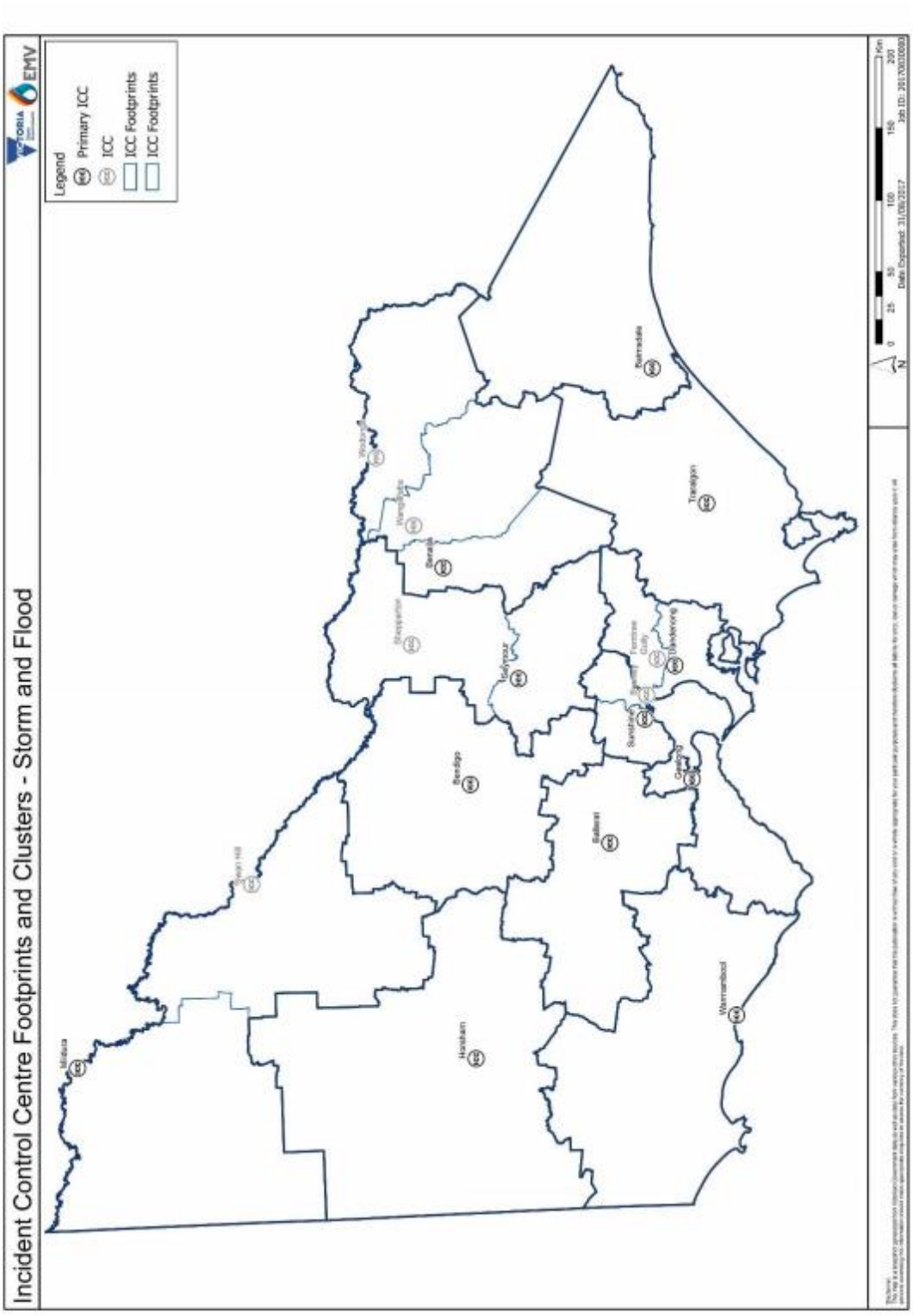
Region	Primary ICC	ICC Cluster		Flood Class Level (FCL) [4]		
			Minor	Multiple	Multiple	Multiple
			Mod	> 2	>2	Multiple
			Major	0	≥1	≥2
				Very High (high end)	Severe	Extreme
Loddon Mallee	Bendigo	Bendigo		Base (I)	Base (I)	Full (I)
	Mildura	Mildura		Base (C)	Base (I)	Core (I) Full (C)
		Swan Hill			Base (I)	Core (I) Full (C)
Grampians	Ballarat	Ballarat		Base (C)	Base (I)	Core (I) Full (C)
	Horsham	Horsham		Base (I)	Base (I)	Core (I) Full (C)
Barwon South West	Geelong	Geelong		Base (I)	Base (I) Core (C)	Core (I) Full (C)
	Warrnambool	Warrnambool		Base (C)	Base (I) Core (C)	Core (I) Full (C)
North West Metro	Sunshine	Sunshine		Base (I)	Core (I)	Core (I) Full (C)
		Burnley				Full (I)
Eastern Metro	Dandenong	Ferntree Gully		Base (I)	Core (I)	Core (I) Full (C)
Southern Metro		Dandenong				Full (I)
Hume	Benalla *(NE CMA area)*	Benalla		Base (I)	Base (I) Core (C)	Full (I)
		Wodonga			Base (I) Core (C)	Base (I) Full (C)
		Wangaratta			Base (I) Core (C)	Base (I) Full (C)
	Seymour *(Goulburn Broken - CMA area)*	Seymour		Base (C)	Base (I) Core (C)	Core (I) Full (C)
		Shepparton			Base (I) Core (C)	Full (C)
Gippsland	Traralgon	Traralgon		Base (C)	Base (I) Core (C)	Full (I)
	Bairnsdale	Bairnsdale			Base (I) Core (C)	Full (I)

[4] *Where no FCL provided for a river system, The RC is to consult the SES Agency Commander for the alignment of the warning issued to a FCL.*

Schedule 4

ICC Footprint and Clusters – Flood and Storm



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VICSES Flood Readiness and Activation Trigger Considerations (v3.0 – September 2017)

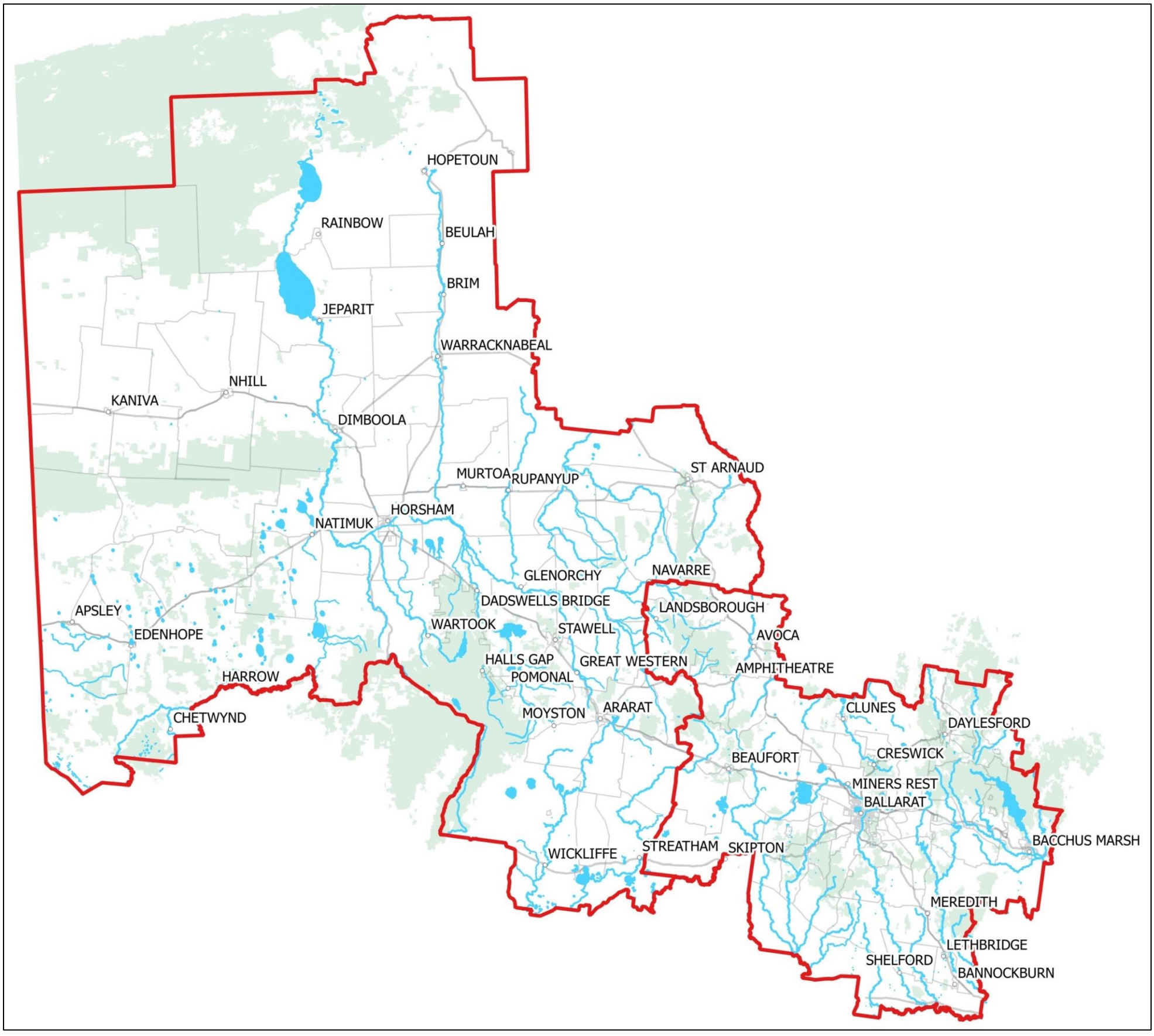
For the most up to date readiness and activation trigger considerations document always check the latest version on the VICSES Hub at: https://hub.ses.vic.gov.au/library/operational-doctrine.

FLOOD READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017

Readiness Level	RL 1- LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	Minor		Moderate		High End Moderate to Major	
Flood Prediction	Flood Watch issued and /or Minor Flood warning issued	Minor Flood Warning issued	Low to mid range Moderate Flood warning issued with low consequences for built environment based on risk	Moderate to high end MODERATE Flood Warning with moderate consequences for built environment based on risk Multiple other Rivers in MINOR	MAJOR Flood Warning predicted and/or >2 high end MODERATE Flood warnings with risks and consequences for built environment & economic	Two or more MAJOR Flood warning(s) or One with significant consequences / widespread evacuations for built environment, exceeding 1 in 100 year riverine event. Multiple MODERATE Flood Warnings. Large Dam failure considered very likely.
Flood Behaviour	Anticipated continued light rain. Catchments able to absorb predicted rain for consecutive days but may lead to flooding. Nil impacts or consequences predicted unless identified.	Anticipated continued rain. Catchments able to absorb predicted rain for consecutive days with minor flooding occurring. Low-lying areas next to water courses are inundated. Minor roads may be closed and low-level bridges submerged. In urban areas inundation may affect some backyards and buildings below the floor level as well as bicycle and pedestrian paths. In rural areas removal of stock and equipment may be required	Anticipated continued rain. Catchments likely to be saturated and unable to absorb continued rain. Areas of inundation are more substantial in size but consequence low . Main traffic routes may be affected. Unlikely for buildings to be affected above the floor level. Evacuation of flood affected areas may start to be considered. In rural areas removal of stock is required.	Anticipated continued rain. Catchments are saturated and unable to absorb continued rain. Areas of inundation are more substantial. Main traffic routes may be affected. Some buildings may be affected above the floor level. Evacuation of flood affected areas may be planned for. In rural areas removal of stock is required. Impact assessment may be required.	Anticipated continued high rain. Catchments are saturated and unable to absorb continued rain and runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas likely. Utility services likely to be impacted.	Anticipated significant extreme weather event that will lead to rapidly rising river conditions. Catchments are saturated and unable to absorb current or additional runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas are likely. Utility services will be impacted.
	VICSES - Business As Usual Operations			JSOP 2.03 LINE OF CONTROL		
Readiness Level (State)	Preparedness WHITE	Preparedness WHITE	Preparedness WHITE	SCC Level BLUE or When ICC activated	SCC Level ORANGE Multiple ICCs activated or multi region	SCC Level RED Multiple ICCs activated or multi region
	SDO and SAC (monitor)	SDO and SAC (monitor)	SDO and SAC (monitor)	SDO and SAC In Place	SDO and SAC In Place Consider Day/Night	SDO and SAC In Place Day and Night
Readiness levels (Regional)	Preparedness WHITE	Preparedness WHITE	Regional Command (on CALL/STBY)	RURAL: Regional Cmd In Place, RC notified METRO - RCC OPEN: Base RCT in place	RCC OPEN: RCT in place, some agencies available on immediate recall	RCC OPEN: Full RCT/most REMT In Place
	RAC (Monitoring)	RAC (Monitoring)	RAC (Monitoring)	RAC and RDO at the RCC	RAC and RDO at the RCC	RAC and RDO at the RCC
	RDO (monitor and issuing public information)	RDO (monitor and issuing warnings)	RDO (issuing warnings - oversighting basic response (eg: evac caravan park)	FULL RCT on Standby REMT briefed by RAC	REMT briefed by RAC and on standby to come in (as required)	FULL RCT and REMT In Place
Readiness levels (Incident)			Base IMT (Rostered STBY)	Base IMT (In Place - Primary ICC)	RURAL - BASE IMT (In Place), CORE (On Call / Stand-by) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (On Call / Stand-by) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)
People	Some minor inconvenience around local roads.		Increased number of roads being impacted traffic management plan should be considered.		Significant number of roads impacted traffic management plan is required some major roads closed with isolation or evacuation possible.	
Power	Possible power disruptions		Likely short term power disruptions		Power disruptions likely with some substations impacted and potential long term outages.	
Health	Little impact expected some local issues might be encountered but managed locally within own facility Plan		Consideration for review and familiarisation with facility Plan - VICPOL and DHHS to review Vulnerable persons list		Highly likely some hospitals isolated and vulnerable people isolation and require evacuation.	
Education	Unlikely impact		Some impact expected traffic management plan for school buses should be considered.		Some school and preschools may be inundated and school bus routes closures	
Road Network	Unlikely to impact		Some minor roads may be impacted with possible disruption to critical needs supplies such as milk		Highly likely for roads to be cut and egress and access impacted. Major roads potentially cut in some locations traffic diversions in place. Potential rescue of trapped persons in vehicles. Expected impact on rail routes. Economic impact likely with loss of commercial transport routes.	
Public Transport	Limited impact on public transport routes		Impact to public transport routes may occur but likely to be minimal with diversions possible		Public transport impacts will occur with roads and rail lines cut and no alterative route available - significant disruption to people movement likely	
Relief and Recovery	Relief and recovery activity unlikely may be some local issues.		Increased potential for relief and recovery activity but likely to be managed locally by LGA with support of DHHS		Formal arrangements put in place for relief and recovery activity Regional Recovery Commander appointed. Health Commander in Place and demands on relief and recovery to be substantial and potentially long term.	
Water utilities	Little impact expected some local issues might be encountered but managed locally.		Increased potential but still managed locally. May be minor sewerage overflow issues in isolated areas		Highly likely that some infrastructure will be impacted water authorities should develop or initiate their plans to address issues. Significant potential for pollutants including sewerage in water	
Telecommunications	Nil impact		Minimal impact to individual premises only		Significant impact with loss of landlines and mobile powers which will affect peoples capacity to receive warnings and information.	
Public Events	Maybe cancelled due to weather conditions only		Some public events may need to be cancelled or rescheduled due to safety of patrons either whilst at event or travelling to or from.		Public events impacted likely cancellation of major events due to flooding impact on venue or ability to attend or leave event.	
Tourism	Unlikely that event will be impacted but consideration must be given to any event occurring to ensure it is safe to continue.		Potential impact on tourist locations if area not safe to visit or isolated due to road closures.		May impact on high value tourist locations and facilities with long term impacts in the social and economic environment of communities.	
Agriculture/Animal welfare	No impact likely with landowners managing any localised issues.		Potential impact with losses to live stock, fencing and crops including high intensive farming of produce		Substantial impact to live stock, fencing (widespread), farm machinery and crops, including high intensive produce farming short and long term impacts due to loss of soil and erosion. Highly likely need for stock movement support and fodder resupply for isolated stock	
Remote communities	Inconvenience only		Some minor isolation of individual properties or remote communities is likely		Community isolation likely with resupply requirements as well as evacuation considerations needed	
Environmental	Minimal impact - some minor watercourse erosion		Stream erosion and loss of vegetation around watercourses		Significant disturbance to soil and vegetation	
Cultural Heritage	Minimal impact likely		Some disturbance along watercourses may occur but likely to be minimal		Potential for significant disturbance especially of flood of significance in area and flood of record	
Public Infrastructure /Essential Community Infrastructure	limited impact		Some disruption to access-Parks and low lying community areas and infrastructure - Some minor damage of community infrastructure build on floodplains		Significant damage to road infrastructure and community facilities. Long term closure of key community facilities likely	
Critical infrastructure	Nil impact		May require some preparatory work and discussion with owner of infrastructure		Significant work likely to be required to protect critical infrastructure - Contingency plans put in place if lose of the infrastructure occurs	

Regional Agency Commander (VICSES) provides advice to the Regional Controller re: forecast and consideration for varying the actual number, distribution and level of IMT required.

Attachment 9 – Regional Control Centre footprint map



Attachment 10 – Division Command location map