C81 Panel Hearing

South Gippsland Planning Scheme Amendment

West Gippsland
Catchment Management Authority

CMA's role

- The West Gippsland Catchment Management Authority has waterway and floodplain management functions under the *Water Act 1989*. The CMA is the designated floodplain management authority for all of the South Gippsland catchments.
- As part of our floodplain management role, the CMA is required to assess and provide advice on inundation from any source; whether that be riverine, coastal or even local run-off.
- In undertaking that role, we frequently undertake flood studies, monitor actual inundation events and provide advice and estimates based on the best available information.

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Policy Basis

South Gippsland Planning Scheme

State Planning Policy Framework - Environmental risks

13.01 Climate Change Impacts

13.01.1 Coastal inundation and erosion

Objective - Plan for and manage the potential coastal impacts of climate change.

Strategy - Plan for possible sea level rise of 0.8 metres by 2100, and allow for the combined effects of tides, storm surges, coastal processes and local conditions such as topography and geology when assessing risks and coastal impacts associated with climate change.

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Policy Basis

State Planning Policy Framework - Environmental risks

13.02 Floodplains

13.02.1 Floodplain Management

Objective - To assist the protection of:

- Life, property and community infrastructure from flood hazard.
- The natural flood carrying capacity of rivers, streams and floodways.
- The flood storage function of floodplains and waterways.
- Floodplain areas of environmental significance or of importance to river health.

Strategy - Identify land affected by flooding, including floodway areas, as verified by the relevant floodplain management authority, in planning scheme maps.

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Policy Basis

Local Planning Policy Framework

21.03 Key Issues

21.03-3 Environmental risks

The anticipated impact of climate change on the local environment, and the need to monitor and continue to plan for these impacts in the context of broader climate change policy and new knowledge.

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Policy Basis

Ministerial Direction No. 13:

Managing coastal hazards & the impacts of climate change

Applies to planning scheme amendments related to rezonings for urban uses and requires:

- the current and future risks of sea level rise and storm surge to be addressed;
- that new development be located, designed and protected from potential coastal hazards and management arrangements put in place to ensure ongoing risk minimization; and
- that the floodplain management authority be consulted.

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Policy Basis

Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise

- Approved by the Minister for Water in 2012
- Further establish CMA's role in assessing coastal inundation.
- The guidelines specifically apply the policies set out in Clause 13.01-1 of the State Planning Policy Framework relating to coastal inundation

The objectives require:

- planning for sea level rise and storm surge to the Year 2100;
- that land subject to coastal inundation is identified and appropriately managed to ensure that future development is not at risk; and
- that the precautionary principle is applied when considering the risks associated with climate change.

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Policy Basis

Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise

The guidelines allow for the assessment of planning permit applications in established urban areas to a lesser standard of +0.2 m sea level rise; however, this lesser requirement applies only to the assessment stage and not to strategic planning and the application of overlays.

The CMA is firmly of the view that, when applying the inundation overlay to coastal areas, the guidelines and the provisions of the planning scheme require us to plan for '… at least 0.8 m sea level rise by 2100'.

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Rationale for inundation mapping

- Widely acknowledged that the existing inundation mapping is inaccurate. ESO6 was originally applied as an '… interim measure … pending the completion of extensive flood path mapping.' – 42.01 Environmental Significance Overlay Schedule 6

- The existing overlays are a poor representation of known areas of inundation.

- Given that background, C81 was essentially a 'start from scratch' exercise to remap areas of inundation.

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Rationale for inundation mapping

In remapping areas of inundation, we used a ‘hierarchy of available data’:

- Flood studies or inundation modelling;
- Records of actual inundation, noting that inundation extents and heights are time-variable and difficult to capture at their peak. By definition, it’s also rare to get an actual 1% AEP event;
- Ground-truthing by experienced officers, noting that access to all areas is limited;
- Anecdotal information from local residents and others, noting that recollections frequently differ and are also time variable; and
- Existing inundation mapping from sources such the Victorian Flood Database (VFD), the Planning Scheme and other agencies.

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Rationale for inundation mapping

Where available, 1% AEP mapping from **flood studies** was used. Flood studies are usually the most reliable information available.

Detailed inundation mapping is available for:

- Tarwin Lower and surrounds, from the Tarwin Lower Flood Study (Water Technology, 2006)
- Agnes River, from the Agnes River Flood Modelling Exercise (WGCMA, 2015)
- Franklin River, from the Franklin River Flood Modelling Exercise (WGCMA, 2015)
- Corner Inlet, from the Corner Inlet Dynamic Storm Tide Modelling Assessment (Water Technology, 2014); and
- Coastal areas other than Corner Inlet, from the Victorian Coastal Inundation Dataset (DSE, 2012)

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Rationale for inundation mapping

Records of actual inundation exist for:

- Powlett River, aerial photography from a major event in June 2012, noting that the available photography is limited and is a snapshot in time;

- Tarwin River, aerial photography from a number of events, but particularly from May 1968 and June 2012, and some flood levels from June 2012.

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Rationale for inundation mapping

Ground truthing was undertaken for:

- the Powlett River, using mapping from the Victorian Flood Database as the basis;
- the upper and middle reaches of the Tarwin River, using the existing ESO6 as the basis;
- the Agnes River, which was subsequently refined by flood modelling;
- the Franklin River, subsequently refined by flood modelling.

Ground-truthing is useful but can be limited by a lack of access in rural areas and difficulty in defining flood extent boundaries on flat land, such as the floodplain of the Powlett River above Outtrim.

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Rationale for inundation mapping

Existing flood mapping within the planning scheme is known to be inaccurate, as recognized in 42.01 Environmental Significance Overlay Schedule 6 of the planning scheme.

Similarly, the mapping in the Victorian Flood Database, which in some areas is based only on soil type, is also known to be inaccurate.

However, as a starting point, both sources were used as the basis for more detailed assessment.

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Rationale for inundation mapping

Following exhibition, and in response to submissions, a number of **anecdotal sources** were used, along with LiDAR data, to refine flood mapping:

- Tim Macrae, Tarwin Lower;
- David Whiteside, Outtrim;
- Ian Nicholas, Outtrim;
- Des, Len and Jason Macrae, Middle Tarwin;
- Paul Murrihy, Leongatha;
- Ian Cash, Outtrim;
- Tony and Rita Lamers, Outtrim;
- Robert McDowell, Outtrim

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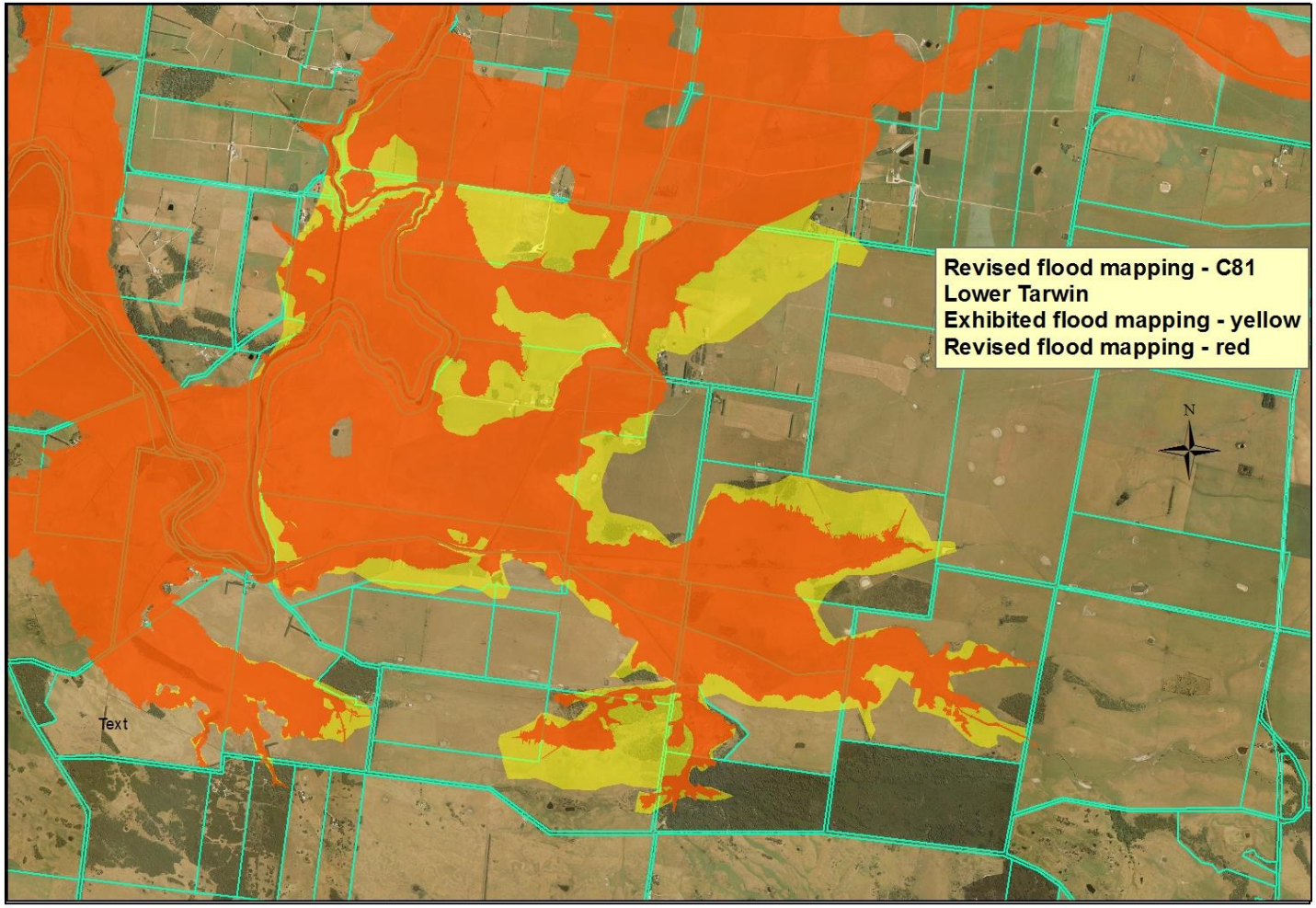
Mapping refinements

Tim McRae,
Tarwin Lower

- LiDAR
- VCID
- Anecdotal
- Aerial photos

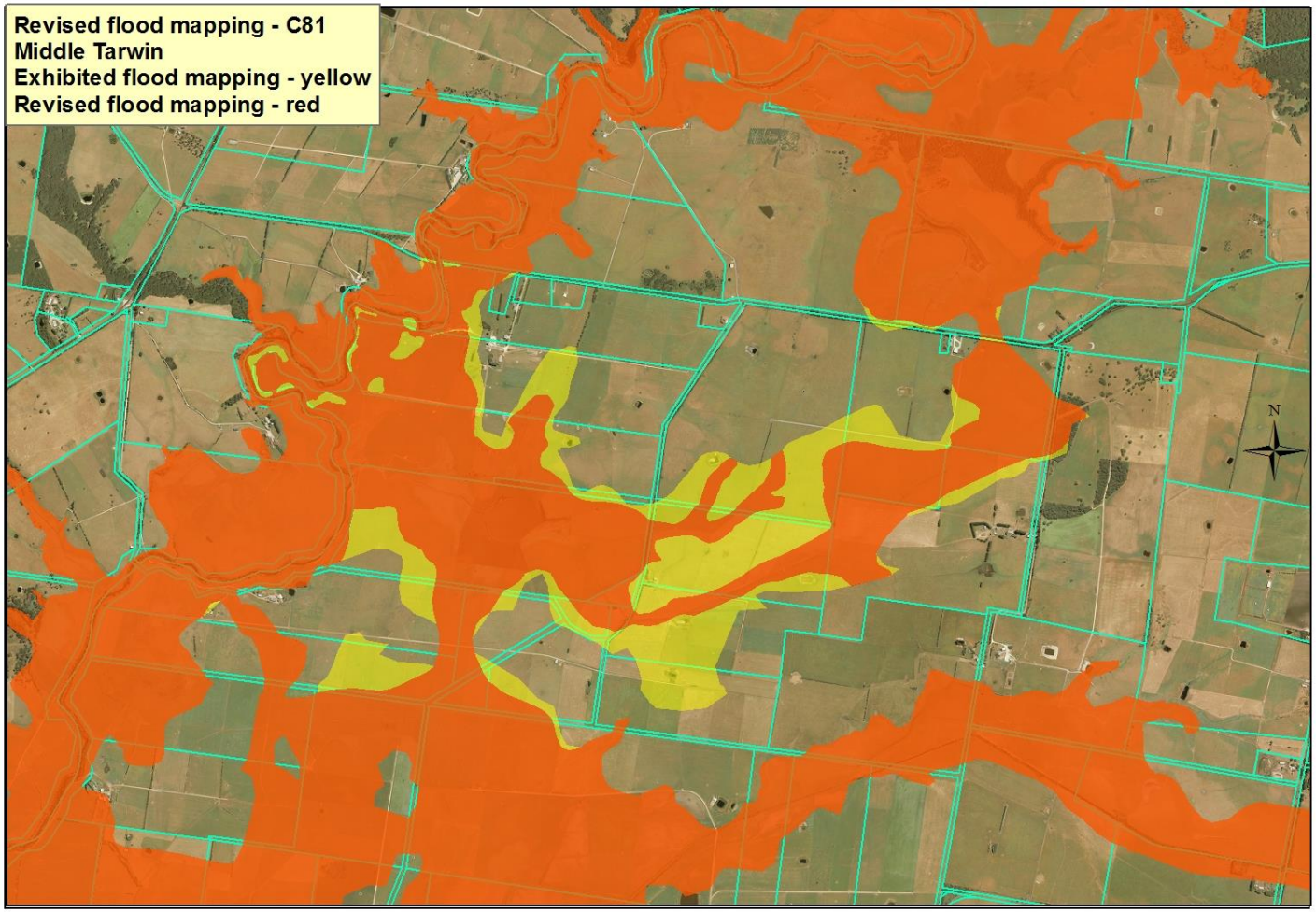


Mapping refinements

Jason McRae,

Middle Tarwin

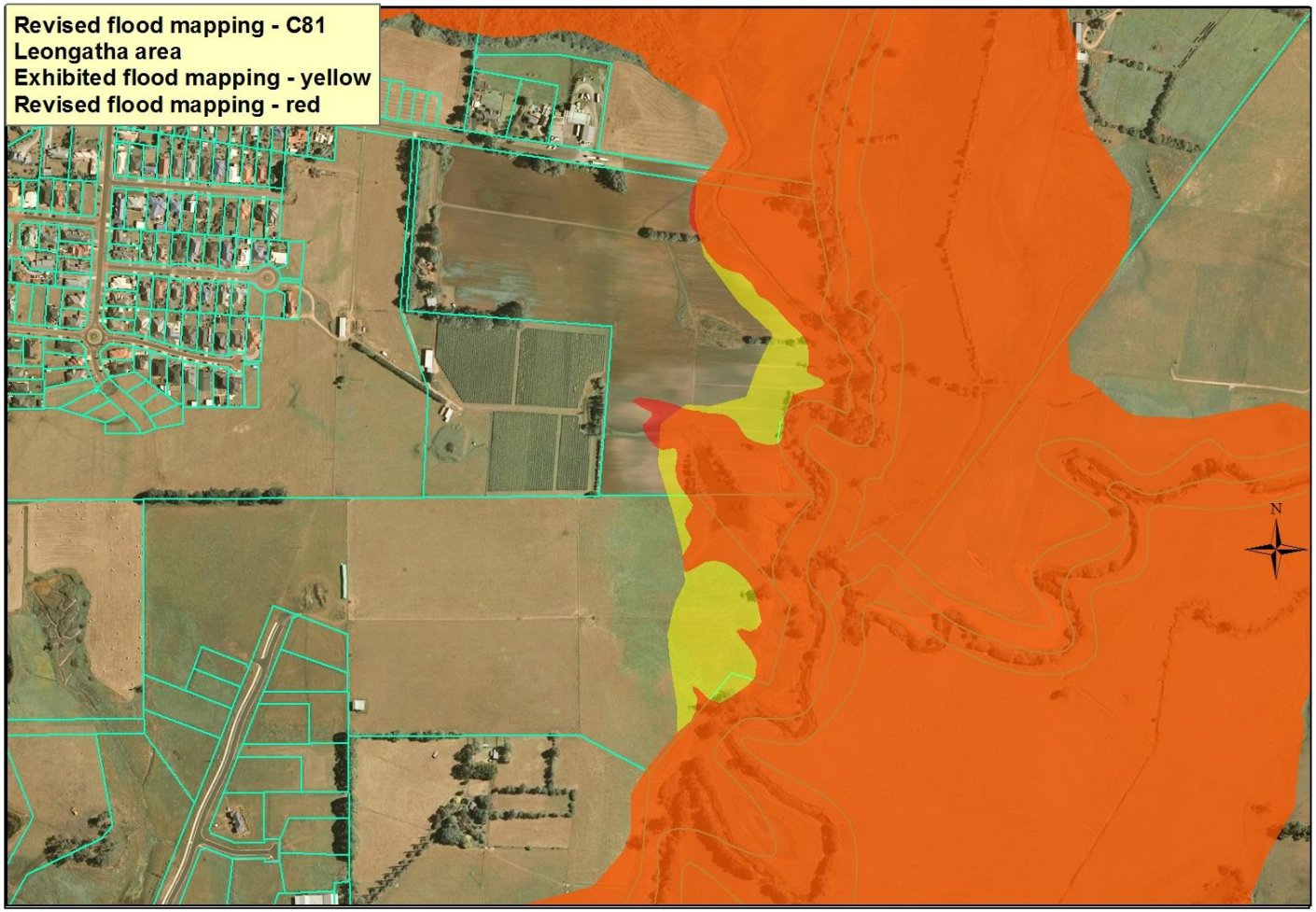
- LiDAR
- Anecdotal
- Aerial photos



Mapping refinements

Paul Murrihy, Leongatha

- LiDAR
- Anecdotal
- Ground survey
- Aerial photos



Mapping refinements

Powlett River at Outtrim

Submitters:	David Whiteside
	Ian Nicholas
Further Consultation:	Ian Cash
	Tony and Rita Lamers
	Robert McDowell
Data sources:	VFD
	Ground-truthing
	Anecdotal
	LiDAR
	Aerial photos

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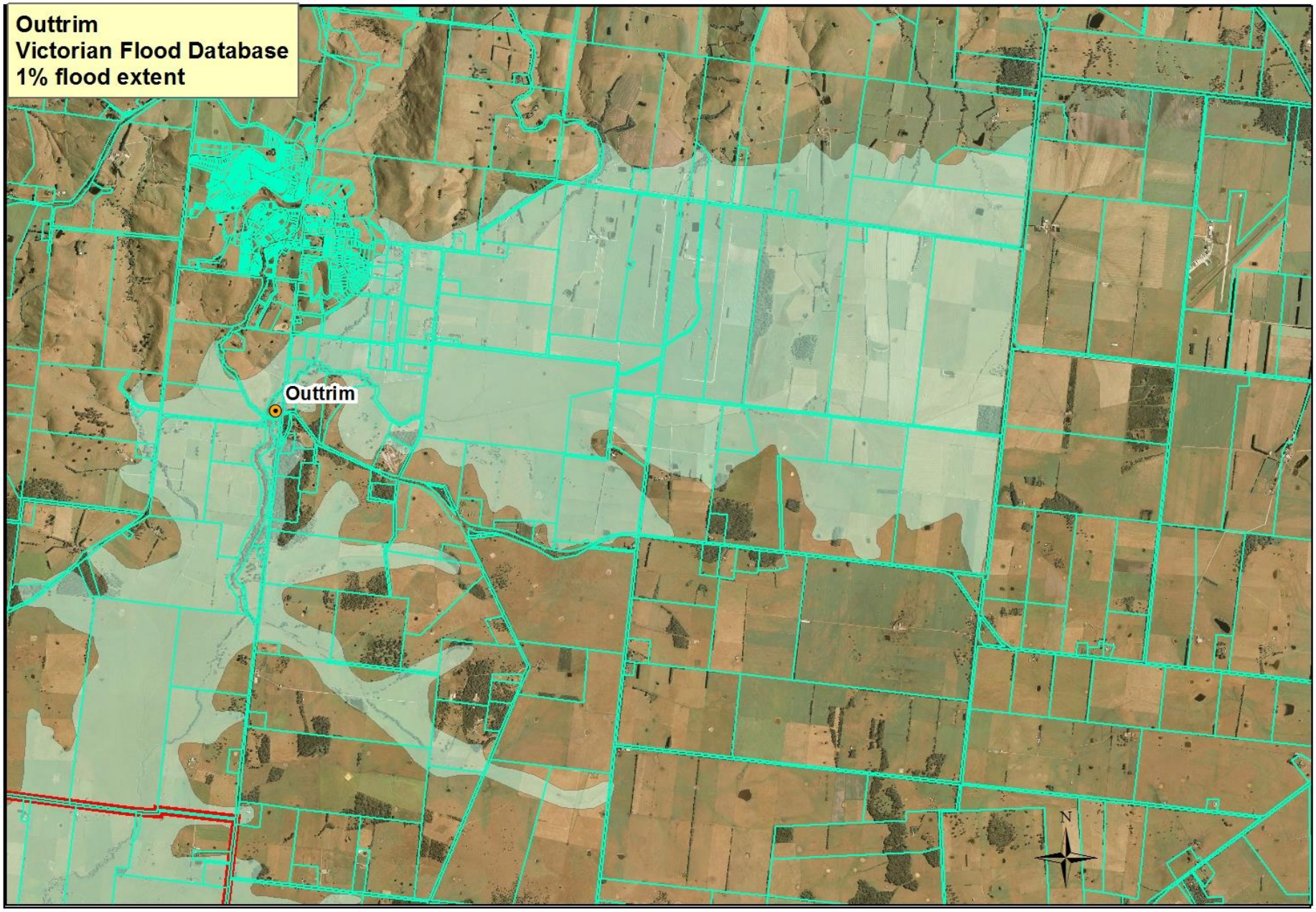
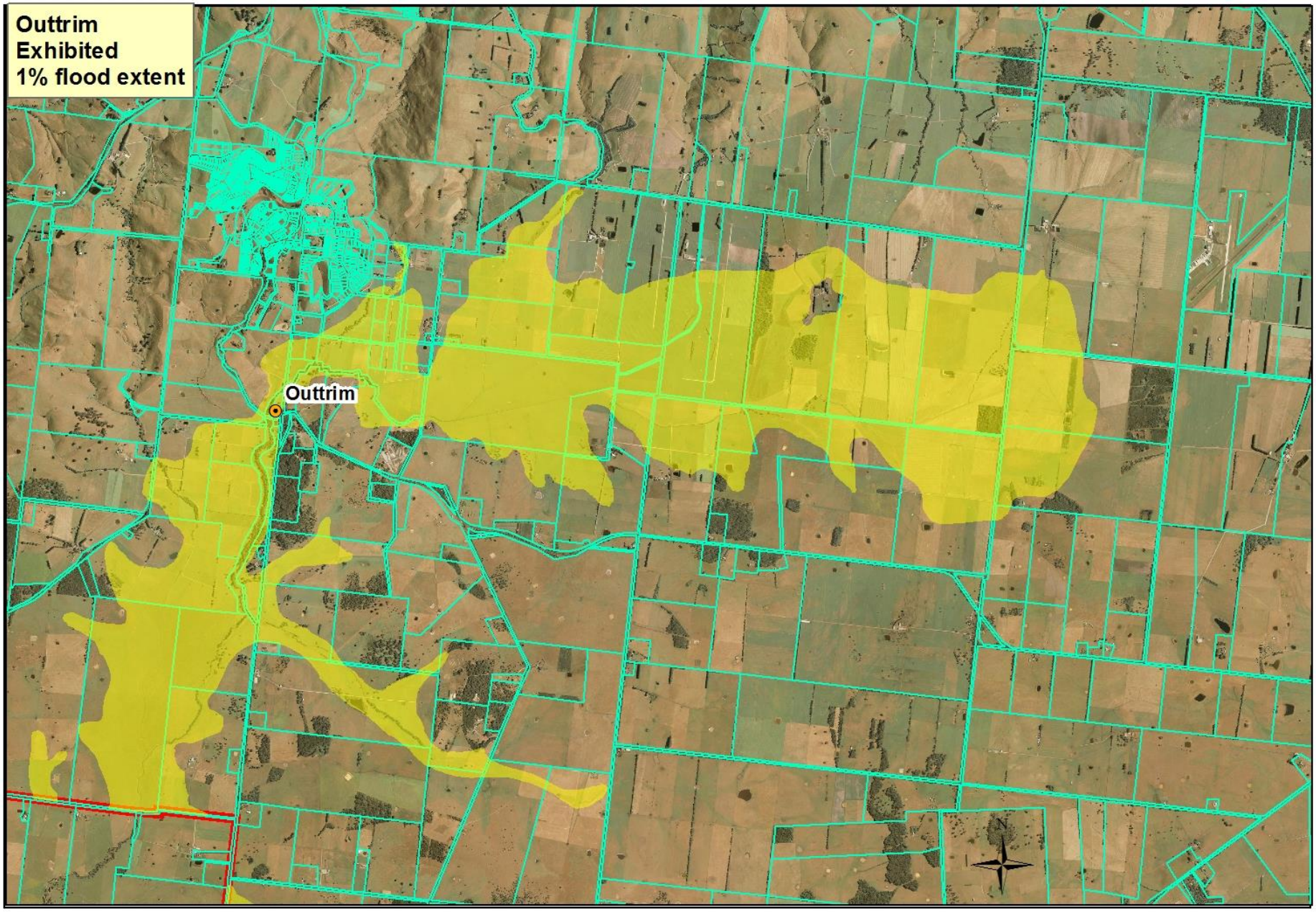
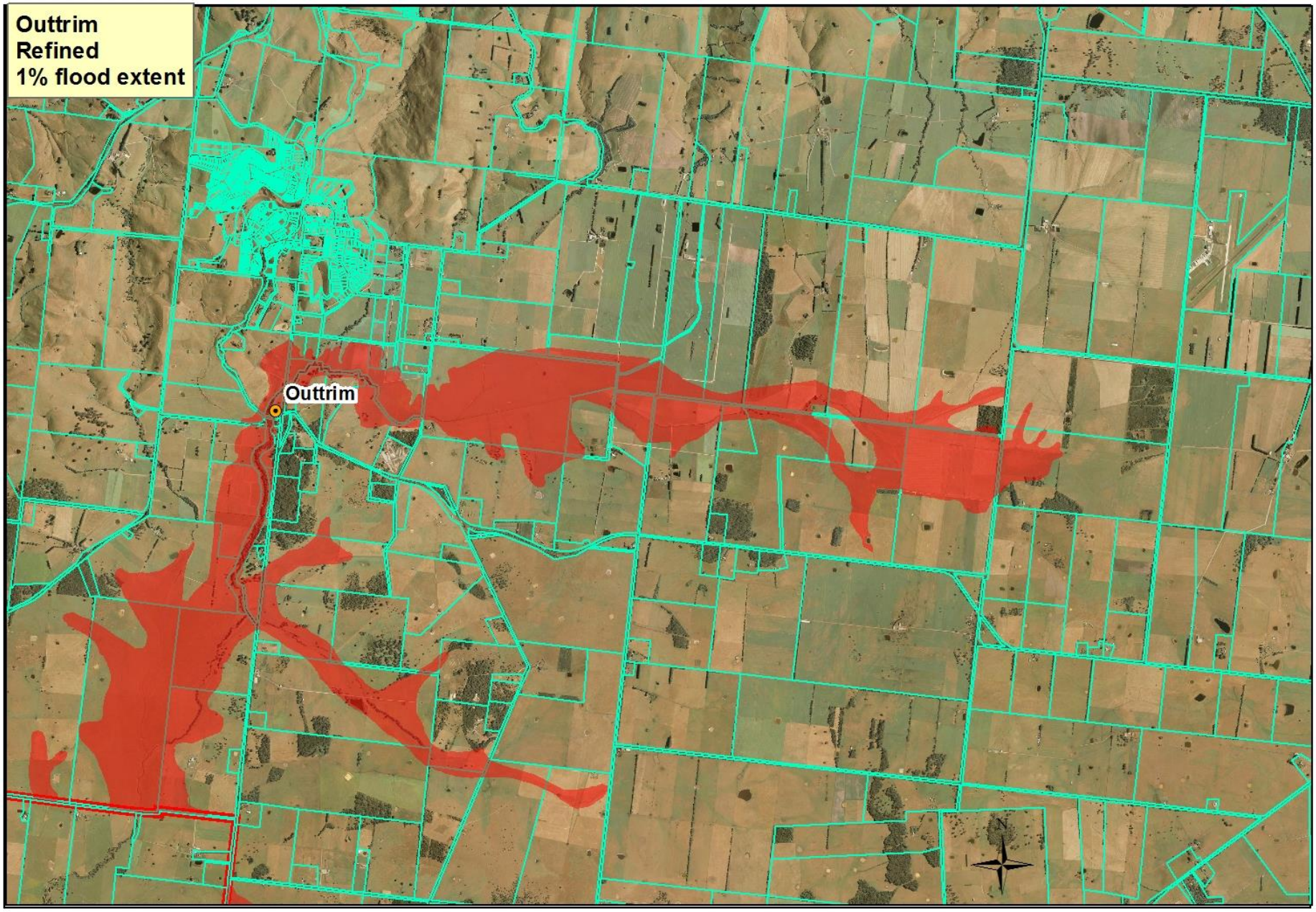
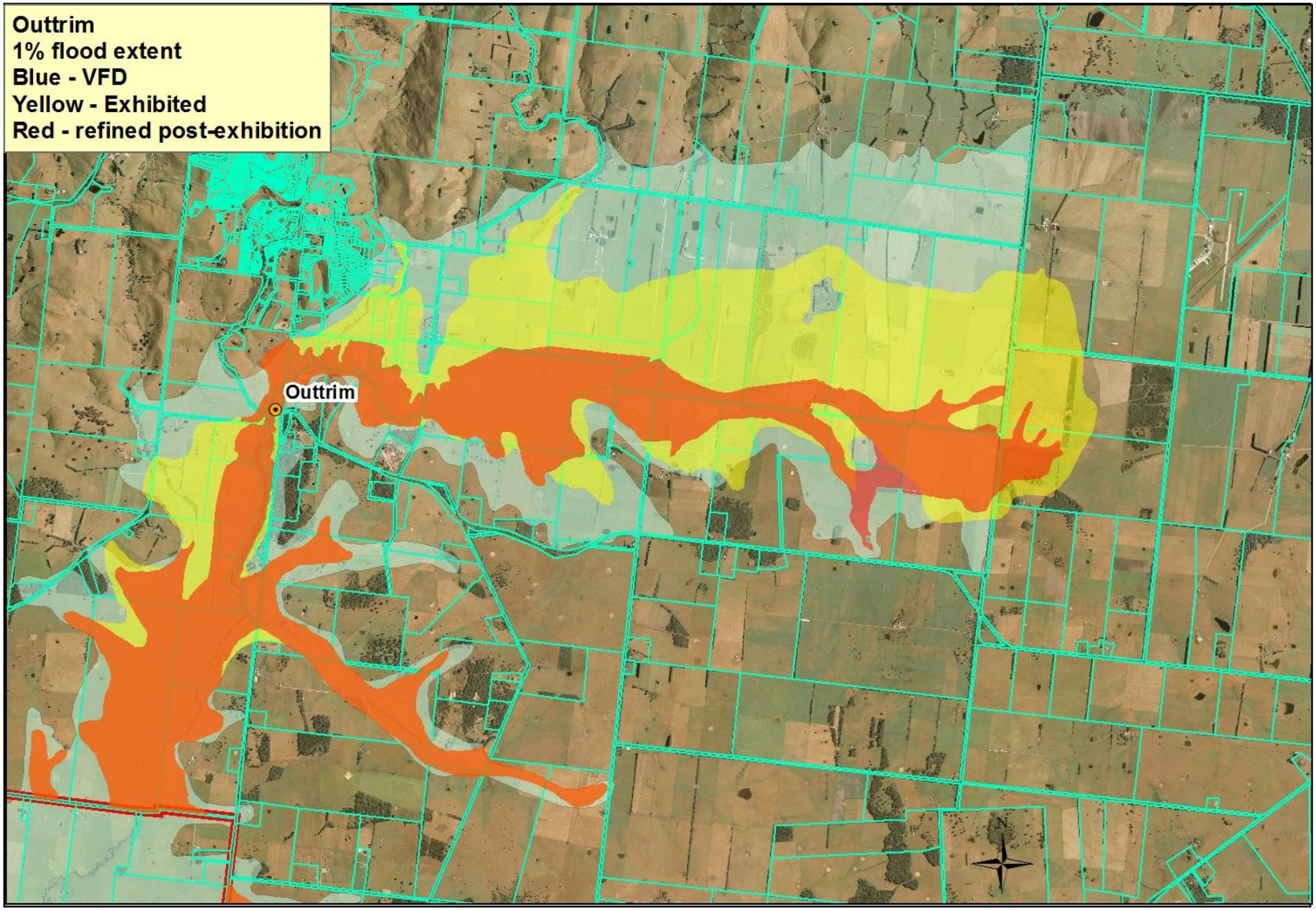
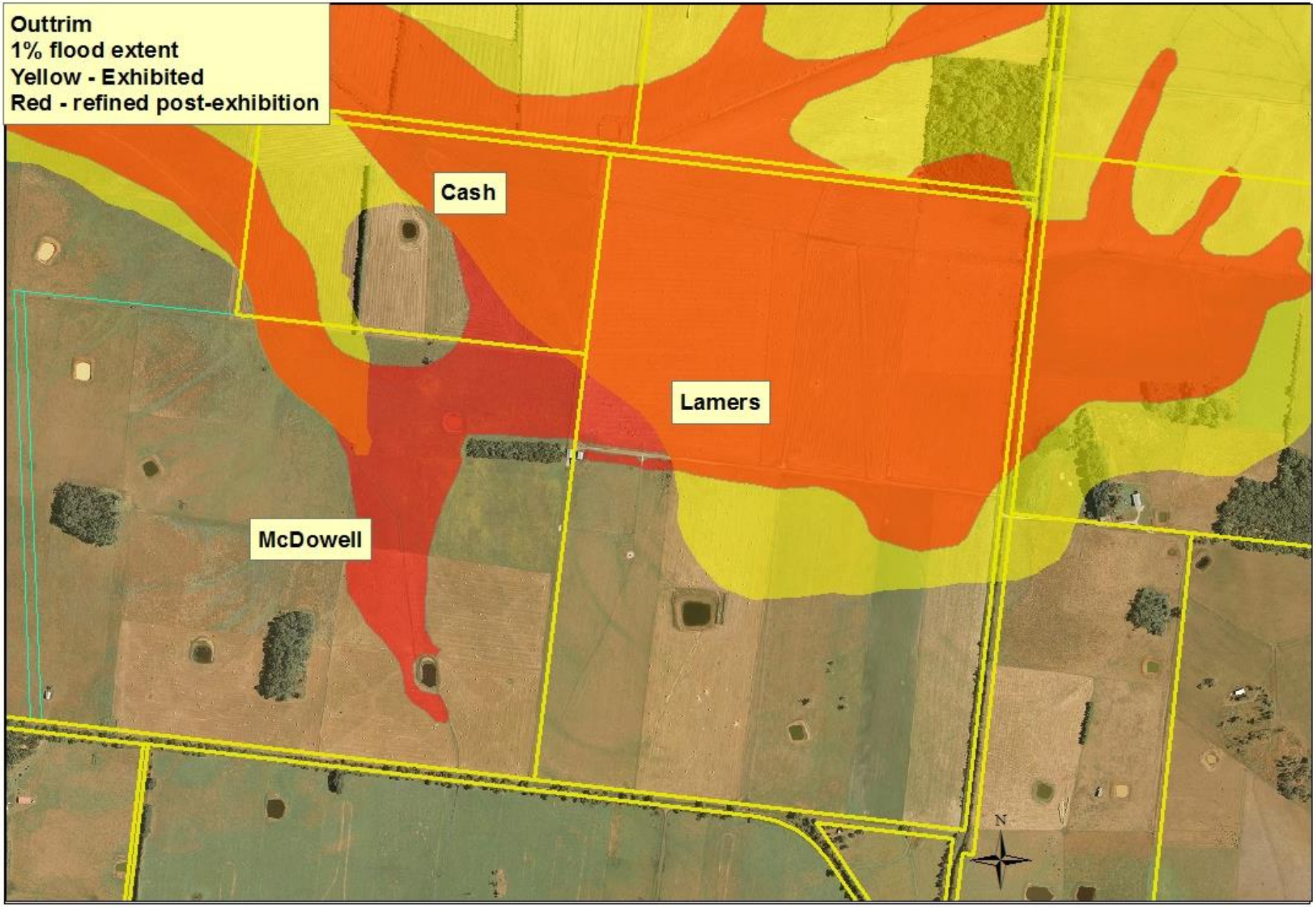

Outtrim
Victorian Flood Database
1% flood extent
Outtrim
N


Outtrim
Exhibited
1% flood extent
Outtrim
N


Outtrim
Refined
1% flood extent
Outtrim


Outtrim
1% flood extent
Blue - VFD
Yellow - Exhibited
Red - refined post-exhibition
Outtrim
N



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Coastal Inundation

For most of the South Gippsland coastline, the exhibited coastal inundation mapping was based on DELWP's Victorian Coastal Inundation Dataset (VCID) for Year 2100 storm surge inundation which, as required by government policy, includes at least 0.8 m for sea level rise.

VCID uses CSIRO estimates of future inundation levels, combined with coastal LiDAR, to determine future 1% AEP inundation extents. Where the coastline is simple, this 'bathtub' modelling is adequate.

However, concerned that the complexities of landform within Corner Inlet might attenuate storm surge, the WGCMA commissioned further detailed modelling within the Inlet and this was used in preference to VCID in this area. Even within Corner Inlet, the differences in extent weren't great.

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Corner Inlet Dynamic Storm Tide Modelling Assessment

- Study commissioned by CMA, undertaken by Water Technology, in 2014
- Found that there was very little attenuation of storm surge through Corner Inlet and very little change to the 1% AEP Year 2100 inundation extent.
- Animation for Port Welshpool.

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Animation – Port Welshpool

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Coastal Inundation

Finally, in mapping coastal inundation, and using the Victorian Coastal Inundation Dataset as the basis, we removed:

- any low-lying areas that don't have a physical connection with tidal areas;
- small areas of urban inundation with only a narrow or shallow connection with tidal areas, the logic being that these areas could be easily and inexpensively protected; and
- the whole of urban properties where only a small proportion of the property will be inundated by a 1% AEP event in the Year 2100.

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