## 12.2 MINUTES - TUMUT FLOODPLAIN RISK MANAGEMENT COMMITTEE - 8 APRIL 2025

Attachment Titles:

1. Minutes - Tumut Floodplain Risk Management Committee - 8 April 2025 & Presentation provided by WMA Water - Tumut Flood Study

**Attachment 1 - 20250408 - Minutes - Tumut Floodplain Risk Management Committee**

Snowy Valleys Council

# Notice of Meeting

# TUMUT FLOODPLAIN RISK MANAGEMENT COMMITTEE

Tuesday, 08 April 2025 at 1:00 PM
Gundagai Room / Via Video Link

## MINUTES

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**8. AGENDA ITEMS:** ..... **3**

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## 1. COMMENCING AT:

The Tumut Flood Risk Management Committee commenced at 1.17pm

The Acting Director Corporate Community & Development was appointed Chairperson of the Committee.

## 2. PRESENT:

Erin Askew - Director/Consultant - WMA Water

Kajah Melhan - Engineer - WMA Water

Steve Manwaring - Senior Natural Resource Officer (Floodplain Management) - Department of Climate Change, Energy, the Environment and Water

Jon Gregory - District Manager Rural Fire Service - Community Representation

Ben Lavender - Superintendent/Deputy Zone Commander - NSW SES - Southern Zone

Nicholas Wilton - Acting Director Community, Corporate & Development (SVC) - Project Sponsor

Mark Kirton - Co-ordinator Growth and Development (SVC) - Project Manager

Amruta Oak - Graduate Assessment Planner (SVC)

Andrew Vaz - Co-ordinator Road Survey and Design (SVC)

Sam Machell - Project Officer (SVC) - Minute Taker

Mayor Julia Ham - Nominated Councillor Delegate in the absence of Cr Packard and Cr Sheldon (Councillor Delegates) - joined the meeting at 1.30pm

## 3. ACKNOWLEDGEMENT OF COUNTRY:

*Snowy Valleys Council proudly acknowledges the traditional owners and custodians of this land and water and pay respects to their Elders past and present.*

An acknowledgement of the traditional custodians of the land was delivered by the Acting Director Corporate Community & Development.

## 4. APOLOGIES:

Clr Hugh Packard (Councillor Delegate)

Clr David Sheldon (Alternate Councillor Delegate)

Leanne Gregory - Unit Commander Tumut - NSW SES - Southern Zone

Joshua Stanbury - Inspector/Coordinator - NSW SES - Southern Zone

## 5. DECLARATION OF PECUNIARY INTEREST:

Nil

## 6. MINUTES OF PREVIOUS MEETING:

### 6.1. MINUTES - TUMUT FLOODPLAIN RISK MANAGEMENT COMMITTEE - 25 JANUARY 2023

**TFRMC 01/25 RESOLVED:**

**THAT THE COMMITTEE**

1. Received the Minutes of the Tumut Floodplain Risk Management Committee meeting held on 25 January 2023.

CARRIED UNANIMOUSLY

## 7. BUSINESS ARISING:

Nil

## 8. AGENDA ITEMS:

### 8.1. TUMUT FLOODPLAIN RISK MANAGEMENT COMMITTEE - MATTERS - APRIL 2025

**TFRMC 02/23 RESOLVED:**

**THAT THE COMMITTEE:**

1. Received the report on Tumut Floodplain Risk Management Committee matters on 8 April 2025;
2. Agreed to change the Committee name to the Tumut Flood Risk Management Committee, to be consistent with the Flood Risk Management Manual (2023)

CARRIED UNANIMOUSLY

**RECOMMENDATION TO COUNCIL:**

**1. Change the name of Committee to the Tumut Flood Risk Management Committee, to be consistent with the Flood Risk Management Manual (2023)**

CARRIED UNAMINOUSLY

## 9. GENERAL BUSINESS:

The Tumut Flood Study Model Build and Calibration presentation was presented at the meeting. Steve Manwaring will be providing commentary on this presentation at a later date.

During the presentation, the representative from SES/WMA/Department of Climate Change, Energy, the Environment and Water discussed obtaining information from Water NSW regarding Probable Maximum Flood from Blowering Dam.

## 10. NEXT MEETING:

There being no further business to discuss, the meeting was closed at 2.40pm.

The next meeting will be held to synchronize with WMA timelines, data and findings.

# TUMUT FLOOD STUDY

## MODEL BUILD AND CALIBRATION

Floodplain Management Committee Meeting #2

8th January 2025

www.wmawater.com.au

# Meeting Overview

- Flood Study Process Recap
- Work to date
  - Community Consultation
  - Data Collection
  - Model Build
  - Calibration
- What's next?

**Elm Drive Stables and Racecourse, Tumut– March 2012**

*Source* : *Tumut Shire Council*

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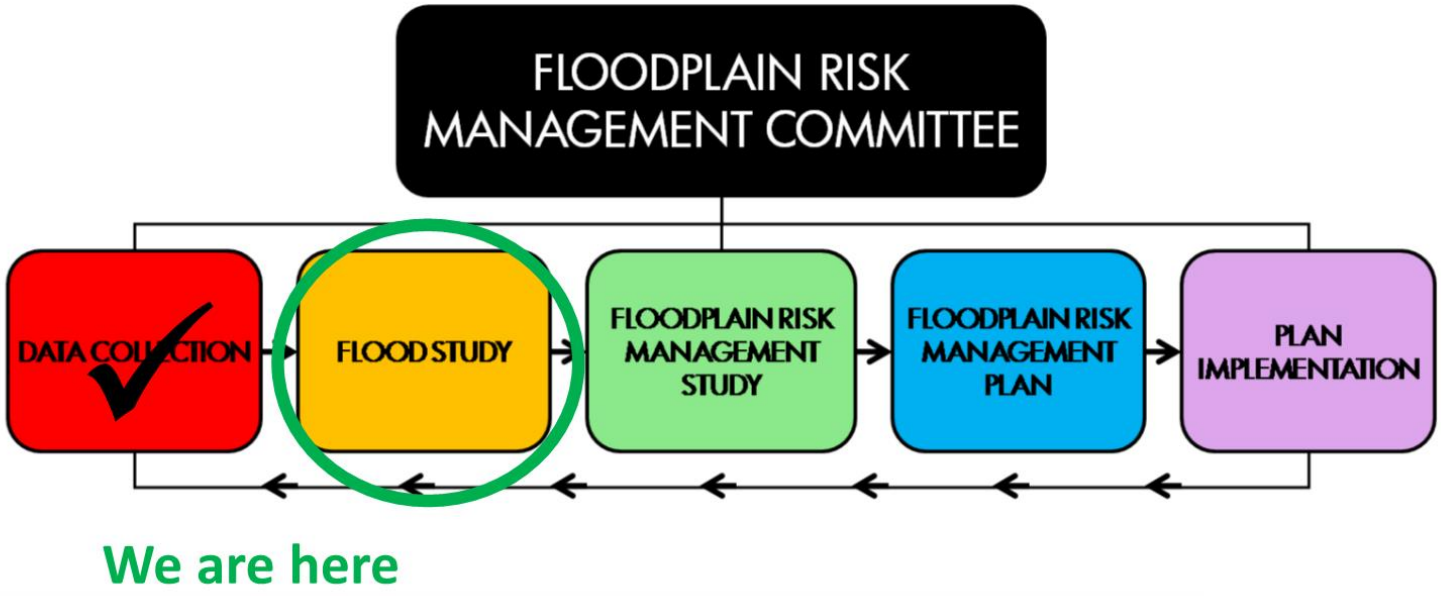
# Floodplain Risk Management Process





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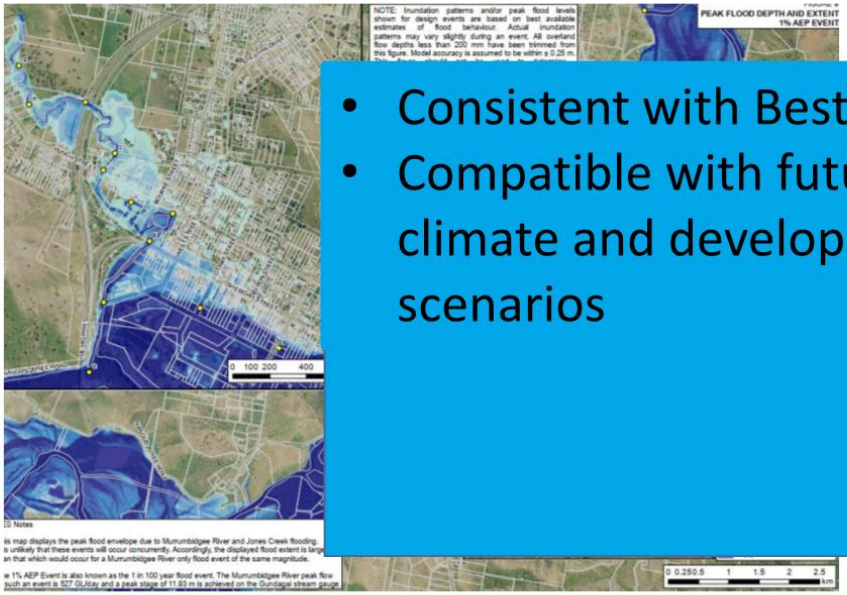
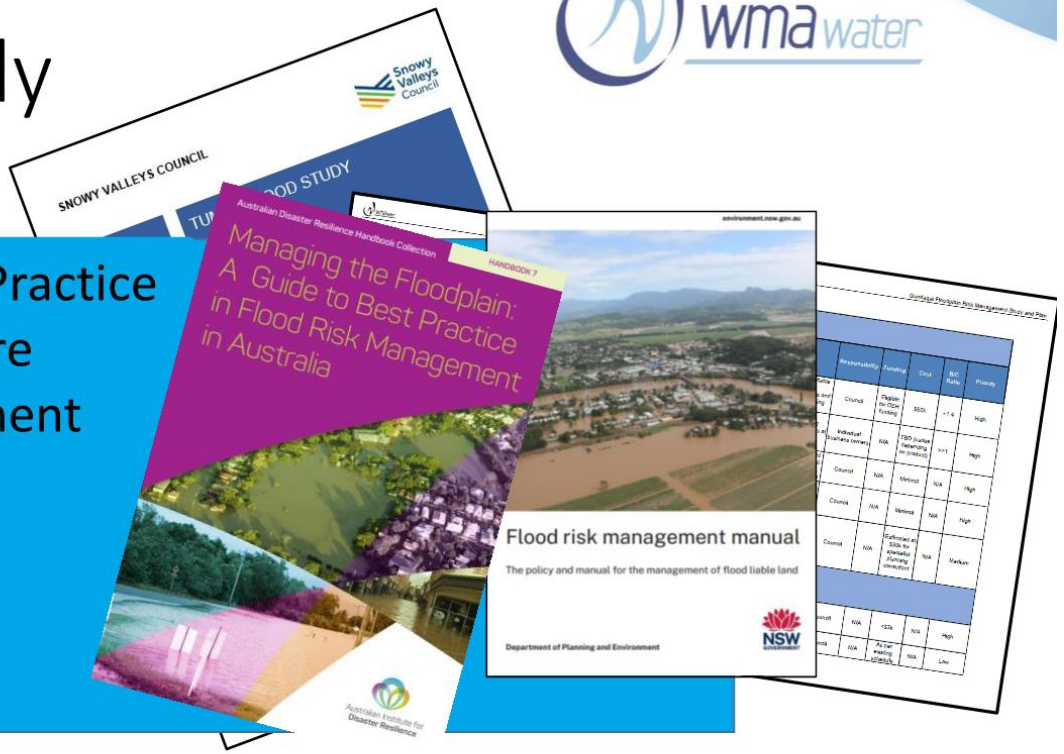
# Objectives of the Study




- Consistent with Best Practice
- Compatible with future climate and development scenarios




**Define Design Flood Behaviour in Tumut**

**Basis for Floodplain Risk Management Study + Plan**

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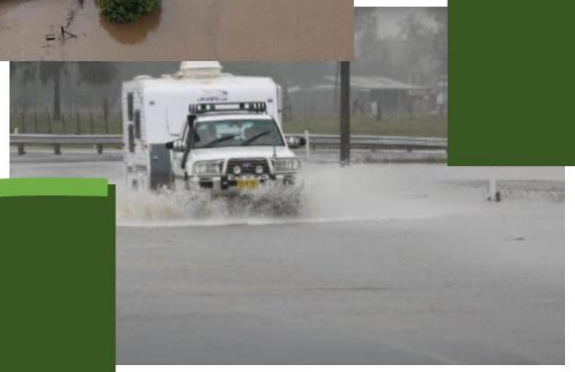
# Flood Risk in Tumut

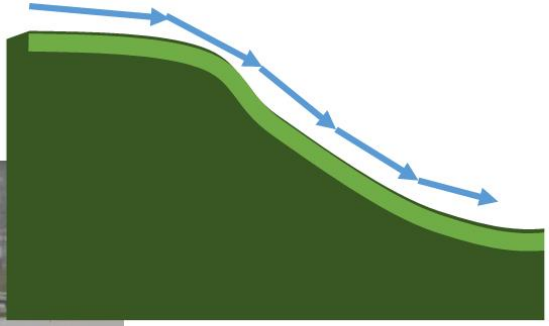
**Mainstream Flooding:**

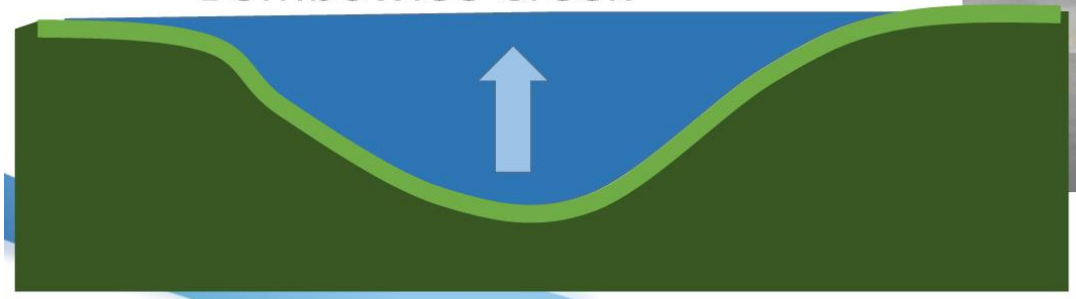
- Tumut River
- Goobarragandra River
- Gilmore Creek
- Stoney Creek
- Bombowlee Creek



**Overland Flow:**

- Catchment runoff





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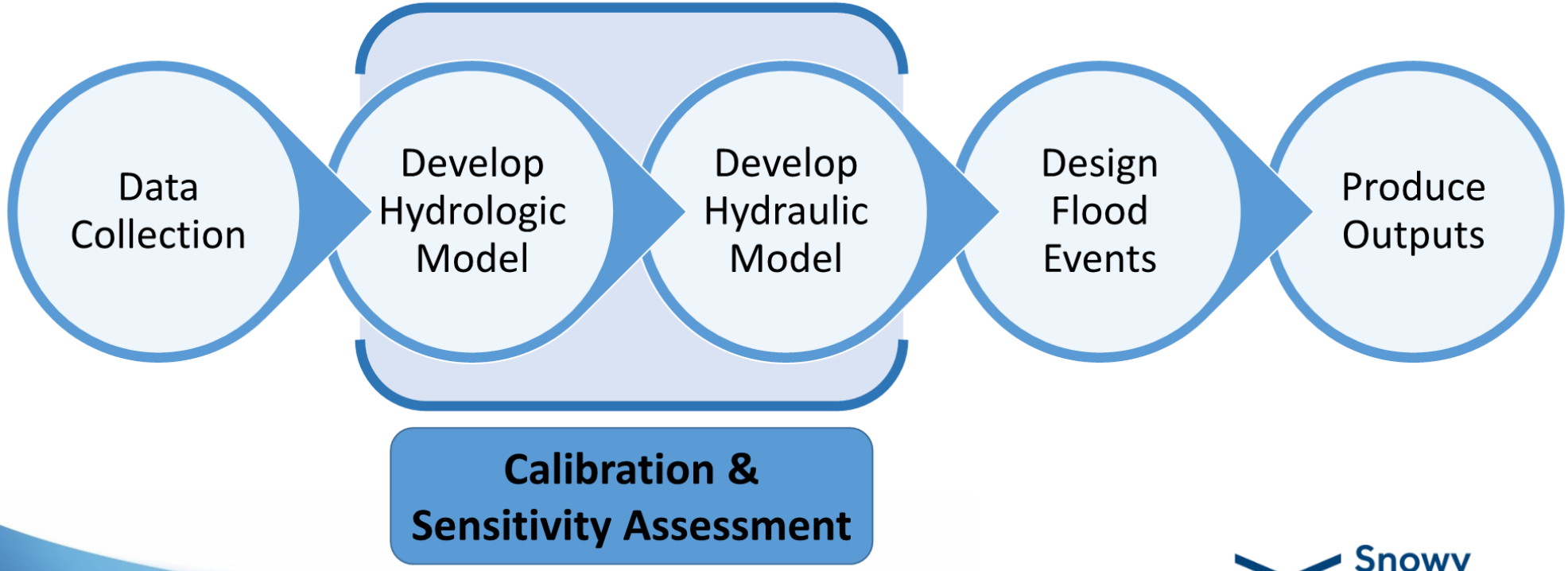
# Study Approach

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Data Collection

# Community Consultation

The consultation period ran from 19th September – 22nd October 2023.

- Newsletter and Questionnaire available online and hardcopies at the council office. 6 responses were received.
- Drop- session was conducted on the 26th September 2023.


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Snowy Valleys Council


# Community Consultation Outcomes

The following concerns we raised by the community:

- Frequent Road Inundation;
- Capacity of Stormwater Network;
- In-bank vegetation;
- Influence of new development;
- Information on past flood events;
- Change in the channels of Tumut River, Goobarragandra River, Gilmore Creek.

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Data Collection

# Hydraulic Structures


**Buildings**
(Validated against the Aerial Imagery)

**Bridges**
(9 structures, surveyed by Council)

**Culverts**
33 Structures, 10 surveyed by Council and 23 measured by WMAwater on a field trip

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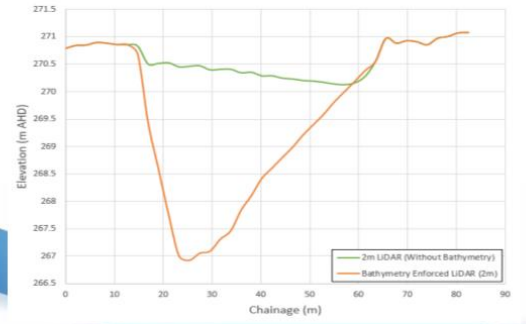
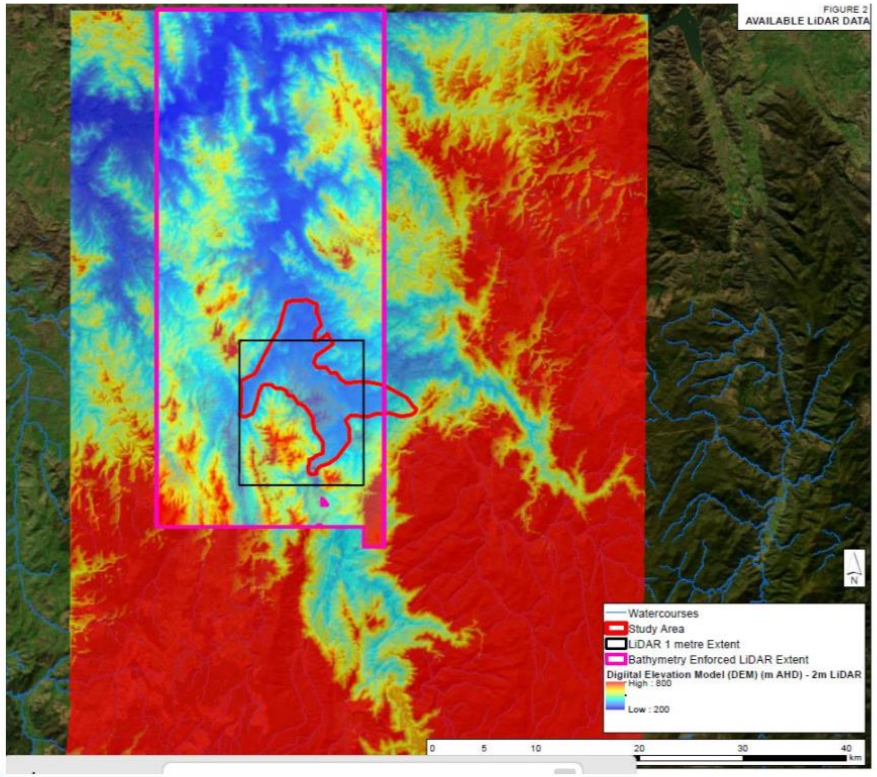
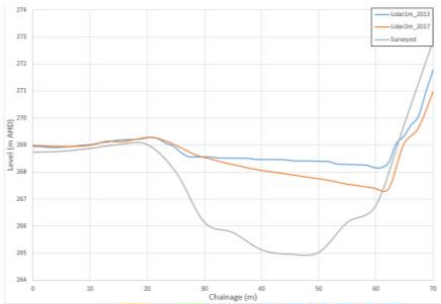
Data Collection

# Topography





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# Flood Modelling

Hydrologic Model

Hydraulic Model

Rainfall → Runoff (Flow) → Flood Levels

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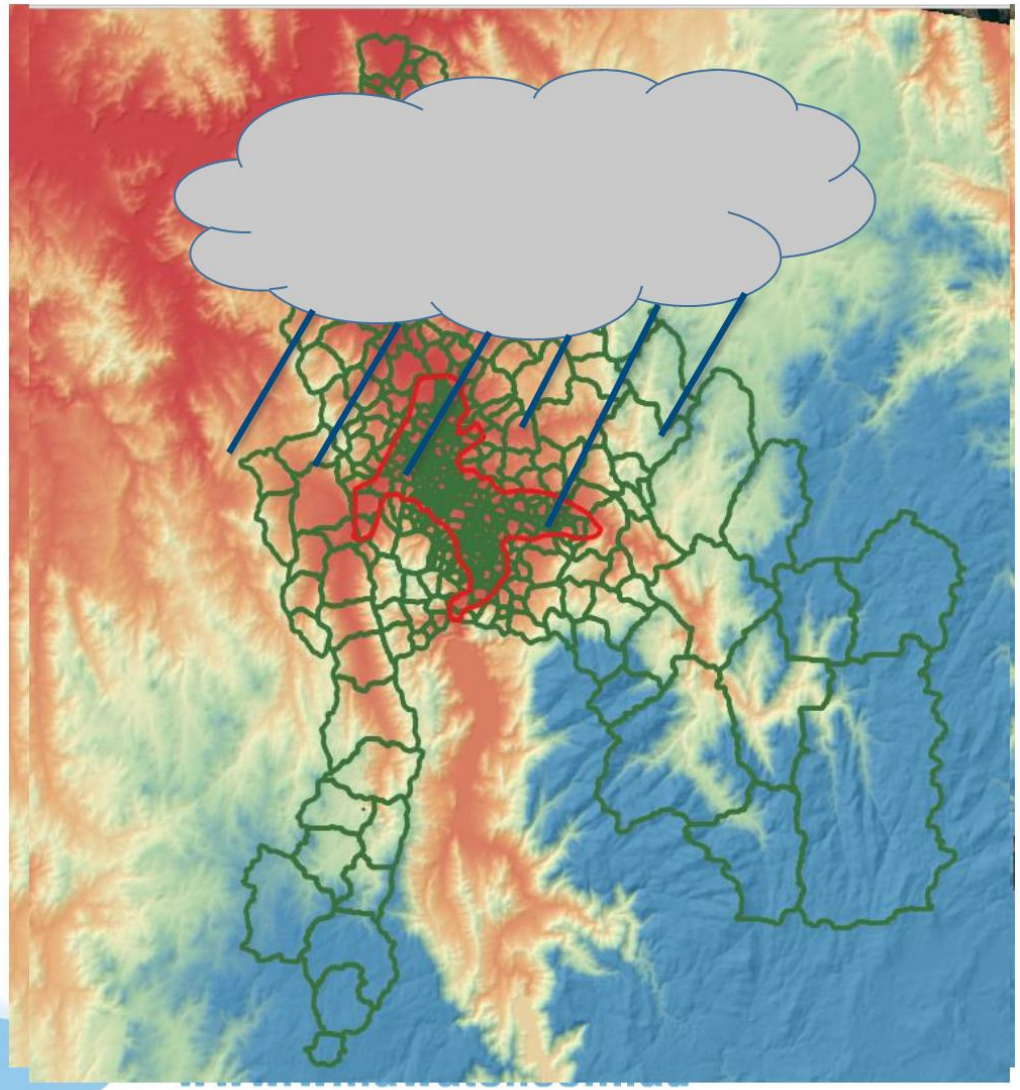
Hydrological Model Build



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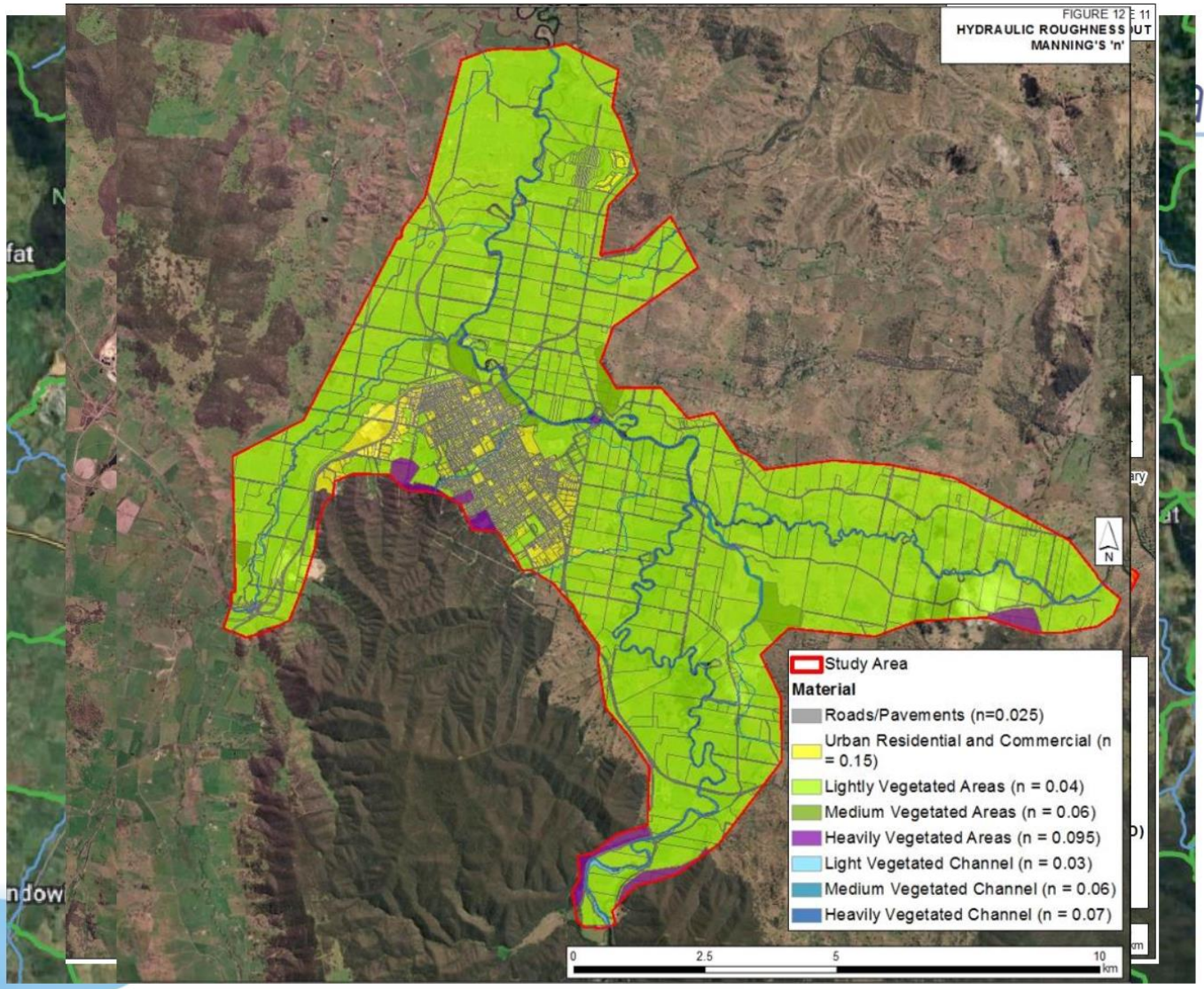
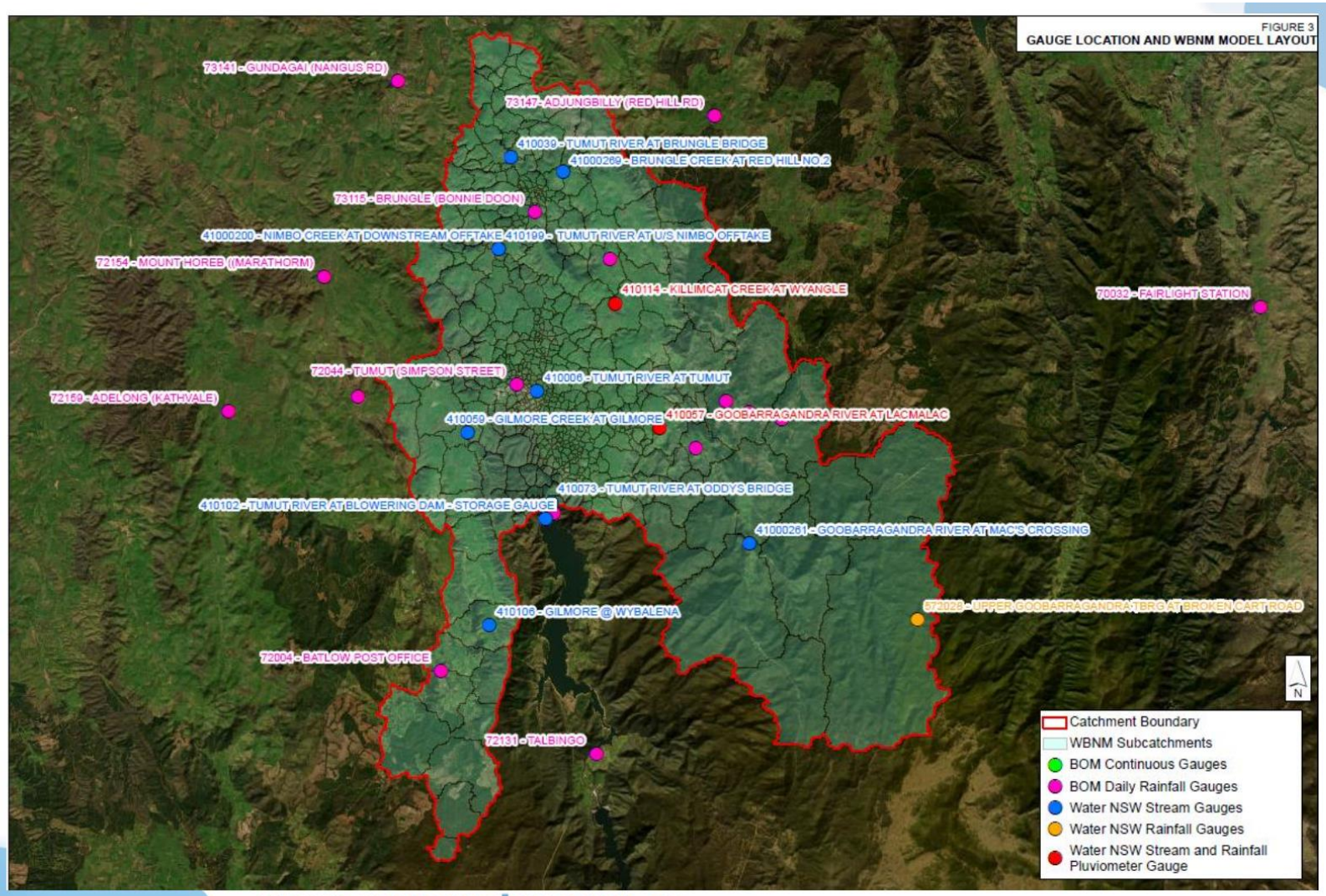
Snowy Valleys Council

Hydraulic Model Build



Model Calibration

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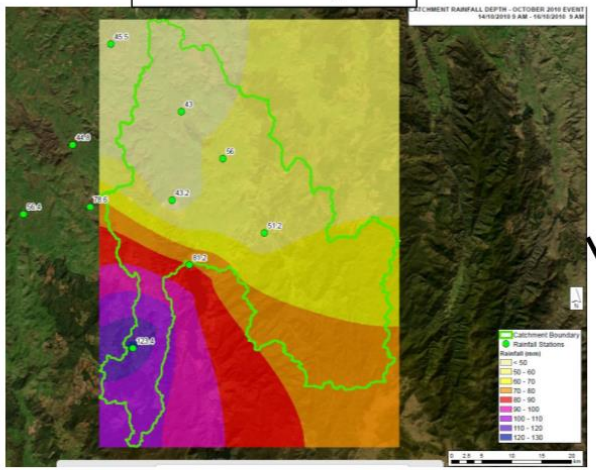
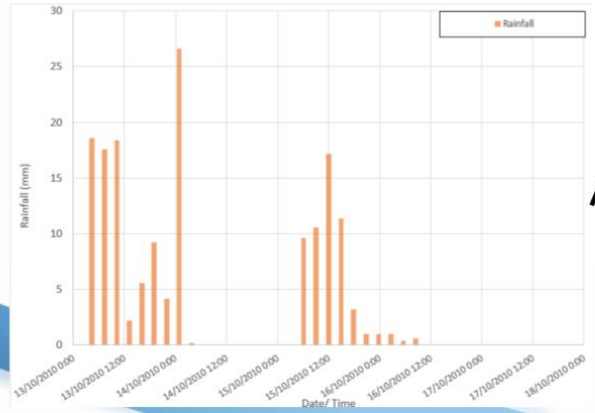
Rainfall Isohyets



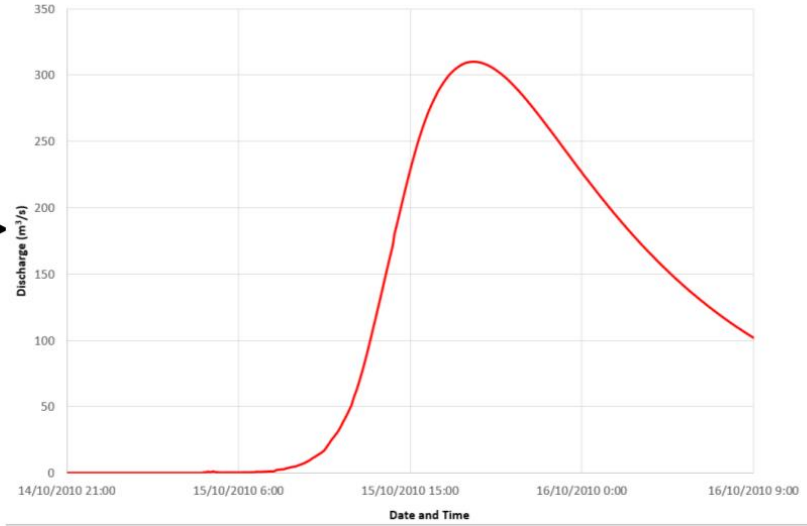
Rainfall Temporal Pattern




Recorded Hydrograph at Oddy's Bridge Gauge (410073)

WBNM (Hydrological Model)

Rainfall Losses




Flow Hydrograph
(For each sub catchment)

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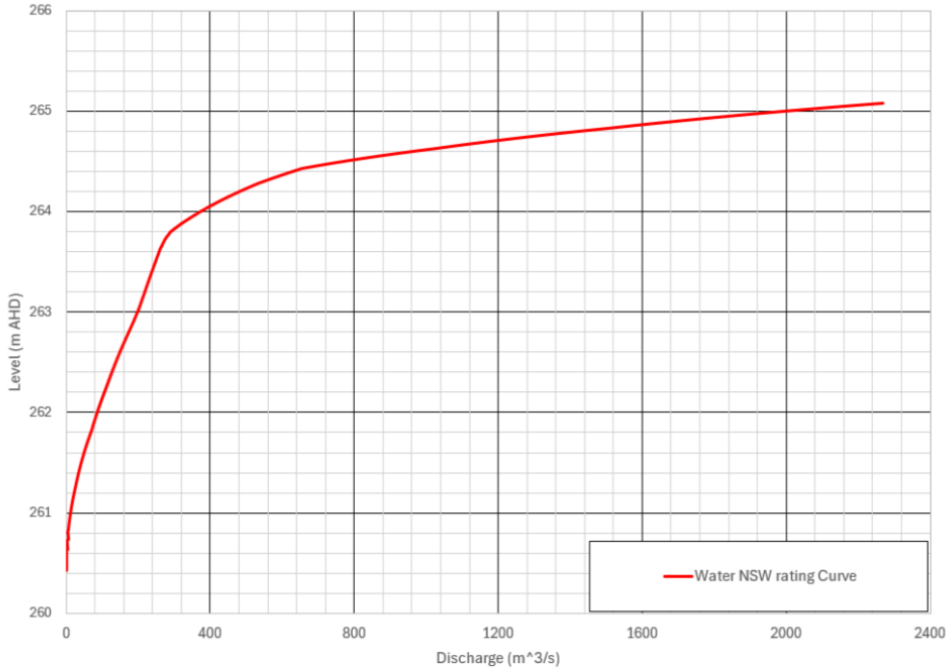
# Rating Curves

- Rating curves define a relationship of height to flow at a gauge location. These are used to convert the recorded water level data at the stream gauges to flow which can be used to compare to the hydrological and hydraulic model.
- Rating curves are developed from velocity measurements (gaugings) during flood events which are converted to flows using the area of cross-section and the water level.

**Limitations:**

- Change in cross-section of river/creek over a period of time can significantly impact the rating curve relationship.
- Gaugings are available only up to a certain recorded level and beyond that, the rating curves are extrapolated.

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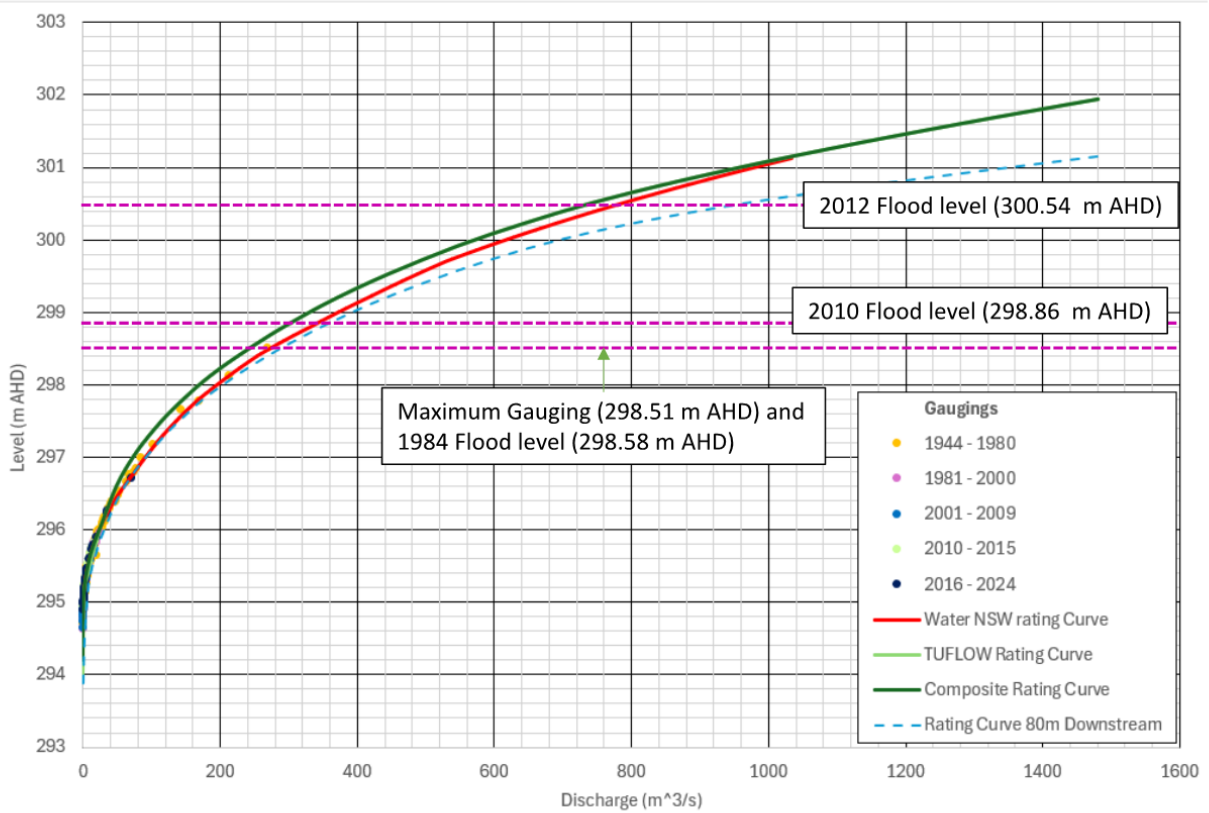
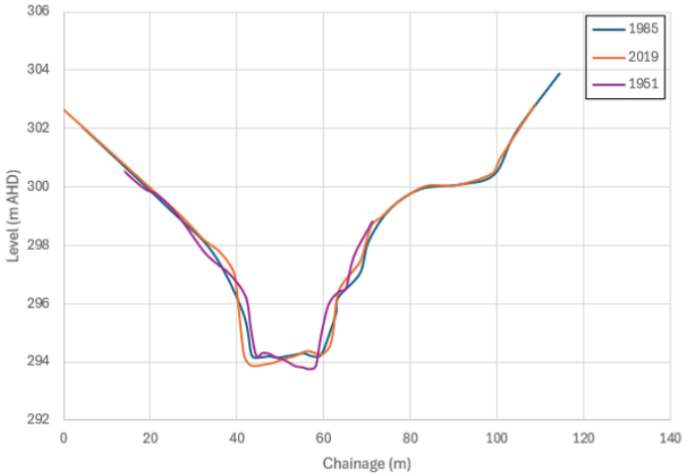
## Goobarragandra River at Lacmalac Gauge (410057)

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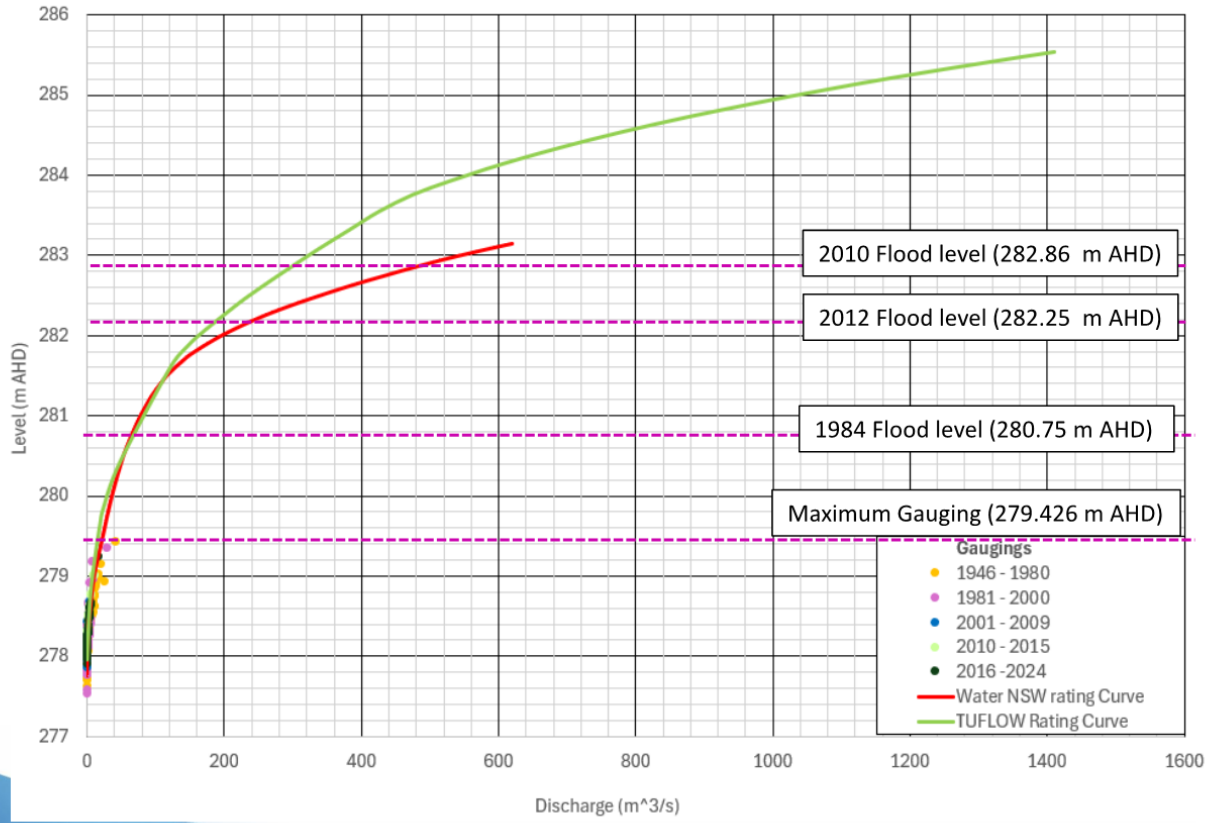
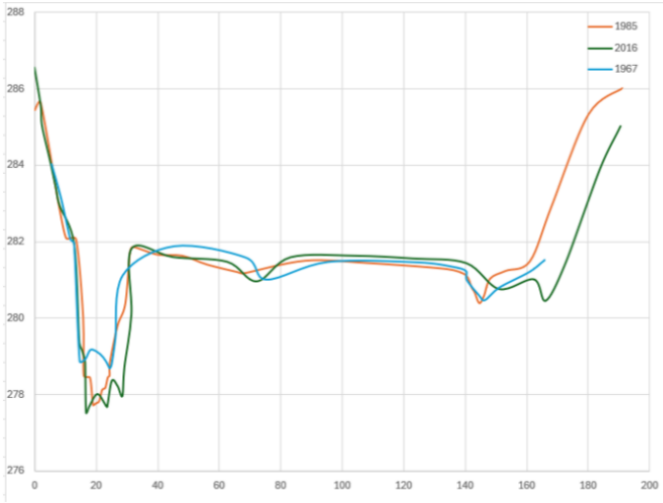
## Gilmore Creek at Gilmore Gauge (410059)

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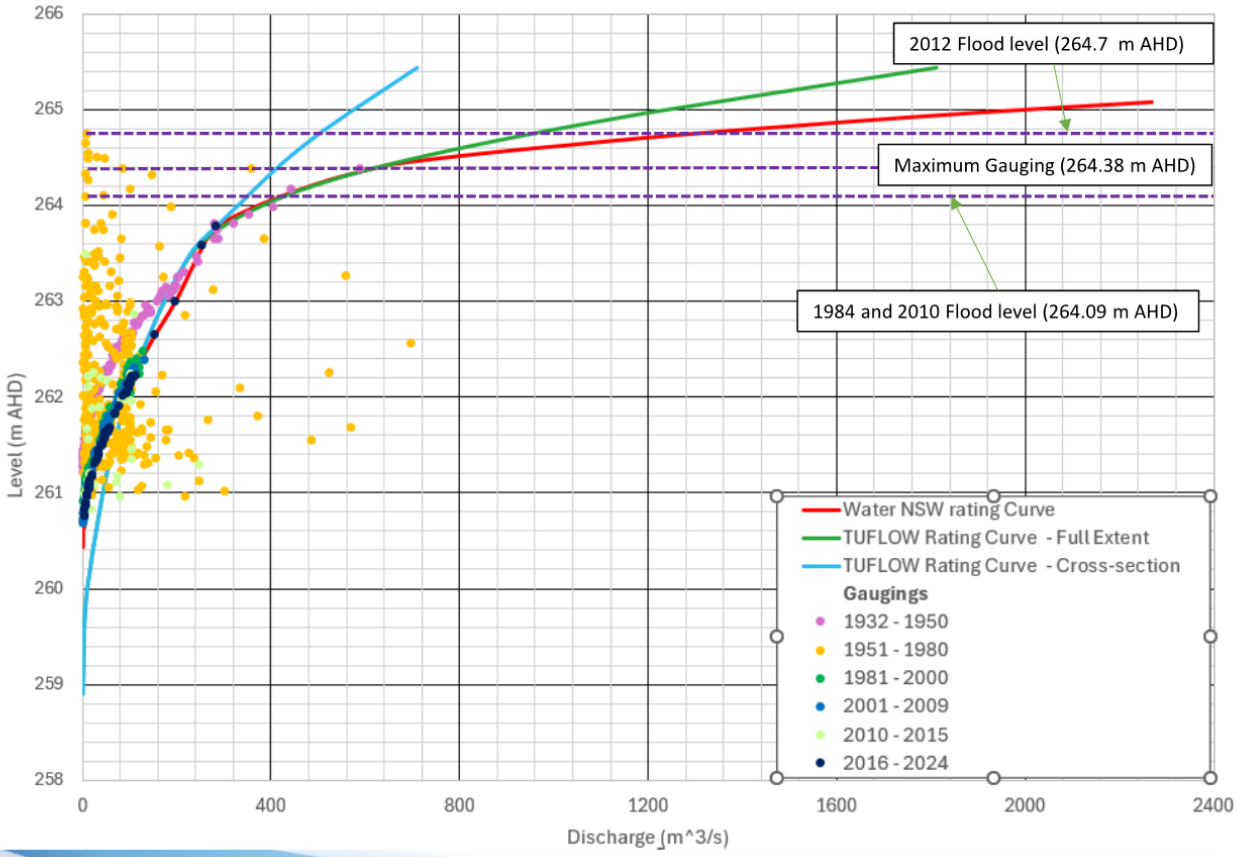
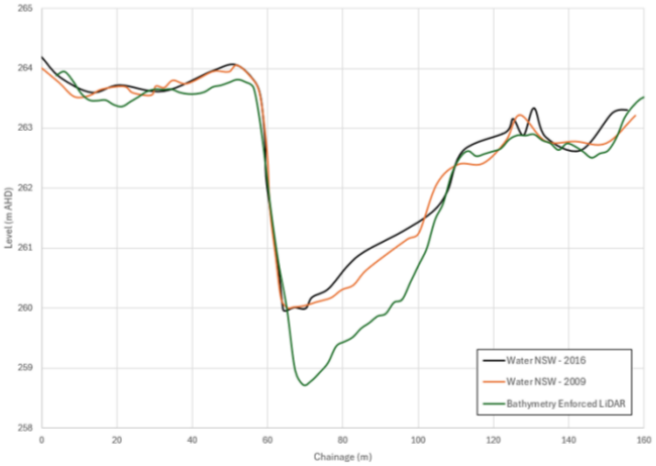
## Tumut River at Tumut (410006)

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# Hydrological Model Calibration

- The hydrologic model was initially calibrated using the Goobarragandra River at Lacmalac Gauge (410057) and Gilmore Creek Gauge (410059). This was then coupled with the results of the hydraulic model and compared to Tumut River at Tumut (410006)
- The modelled events include January 1984, October 2010 and March 2012.
- A higher set of losses were found to be suitable for the Gilmore Creek catchment. This is consistent with the data available from the ARR Data Hub.
- Standard WBNM parameters were used.

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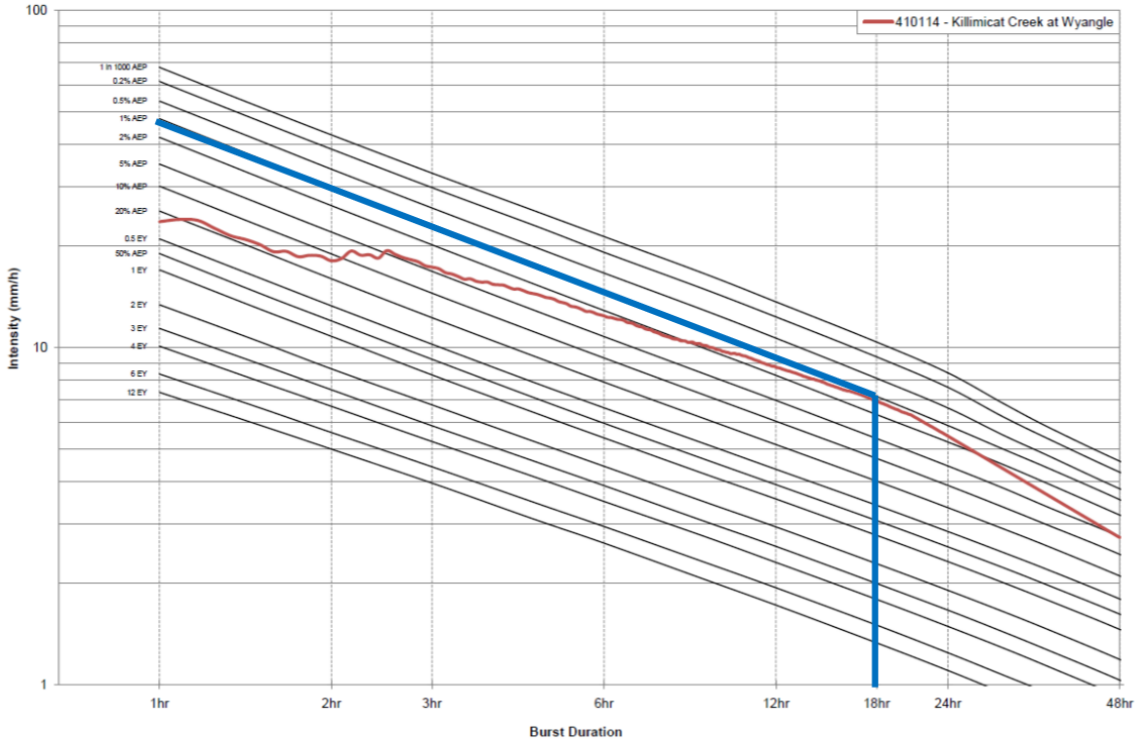
# January 1984




| Gauge Number | Station Name | Operating Authority | Rainfall Depth (mm) (Equivalent Design Rainfall Event) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 3 hrs | 6 hrs | 12 hrs | 18 hrs | 24 hrs |
| 410114 | Killimcat Creek at Wyangle | WaterNSW | 50.5 (5% AEP) | 77.3 (2% AEP) | 99.3 (2% AEP) | 129 (1% AEP) | 126 (2% AEP) |

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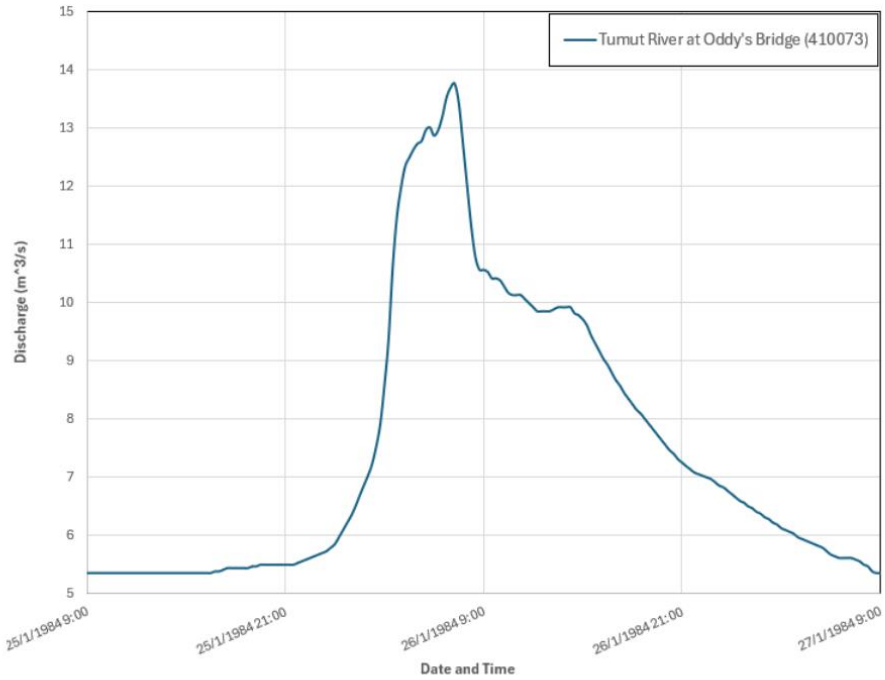
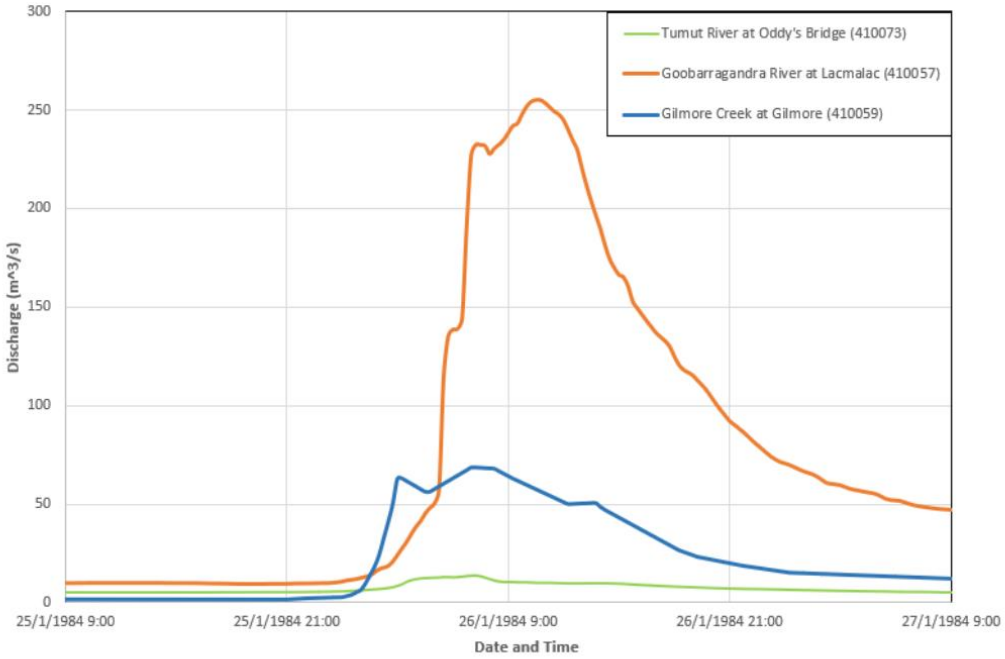
# January 1984

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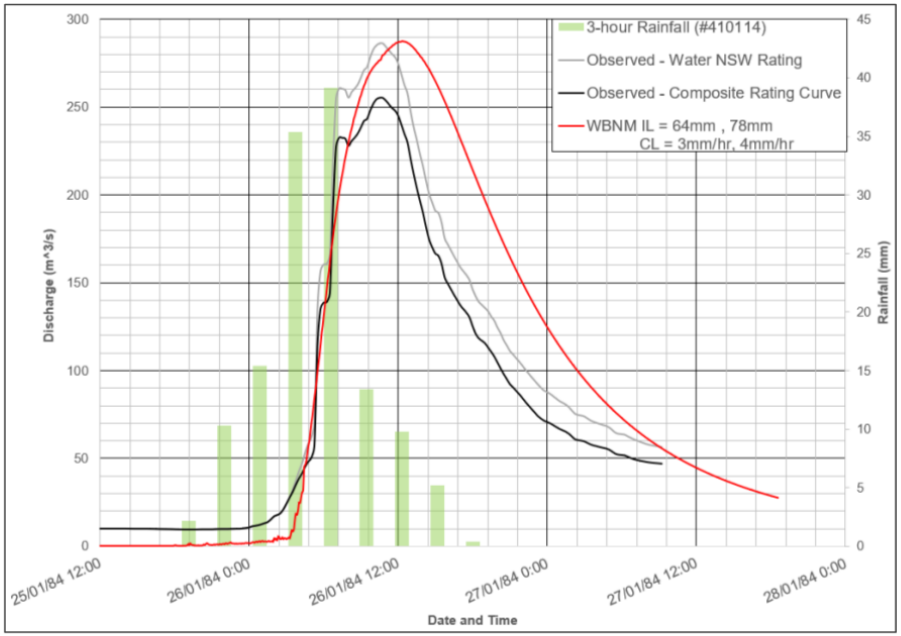
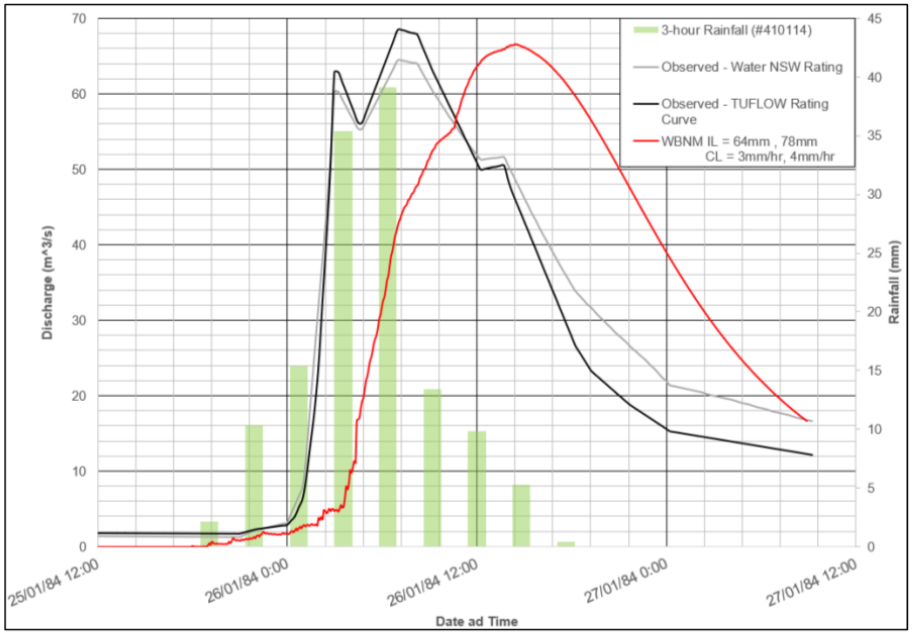
# January 1984




**Goobarragandra River at Lacmalac Gauge (#410057)**
IL = 64mm, CL = 3mm/hr
Estimated Flow (Water NSW Rating Curve) = 286.3 $m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 255.1 $m^3/s$
Modelled Flow = 287.8 $m^3/s$




**Gilmore Creek at Gilmore Gauge (#410059)**
IL = 78mm, CL = 4mm/hr
Estimated Flow (Water NSW Rating Curve) = 64.5$m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 68.5 $m^3/s$
Modelled Flow = 66.5 $m^3/s$

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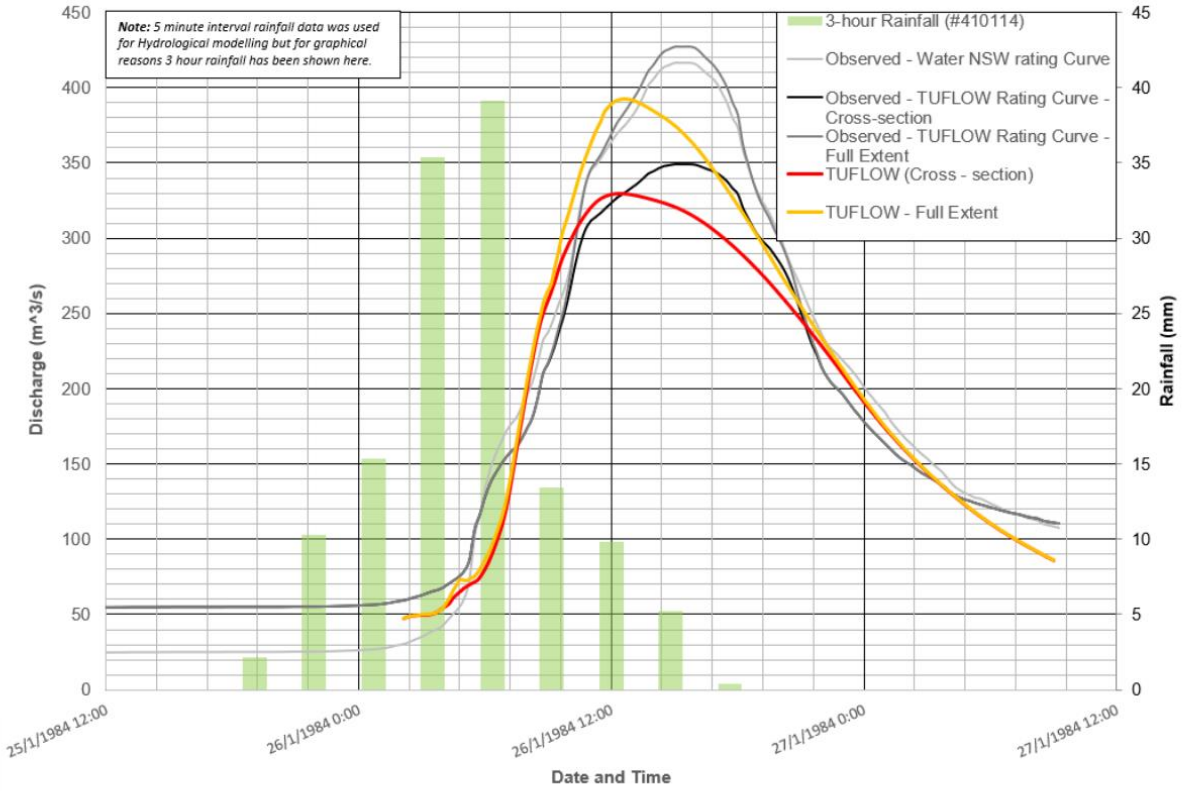
# January 1984




**Tumut River at Tumut (#410006)**

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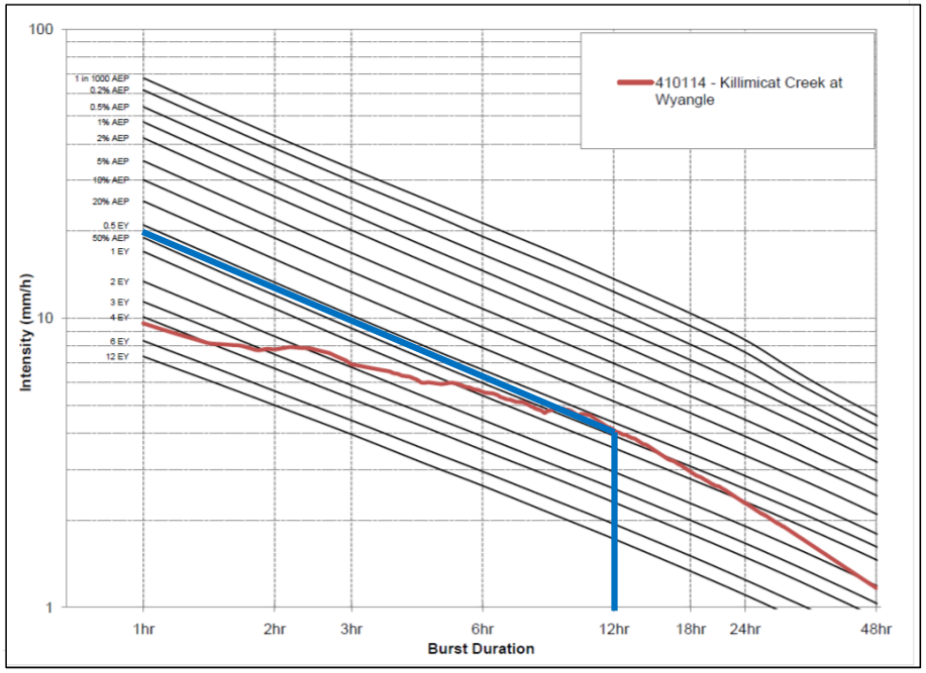
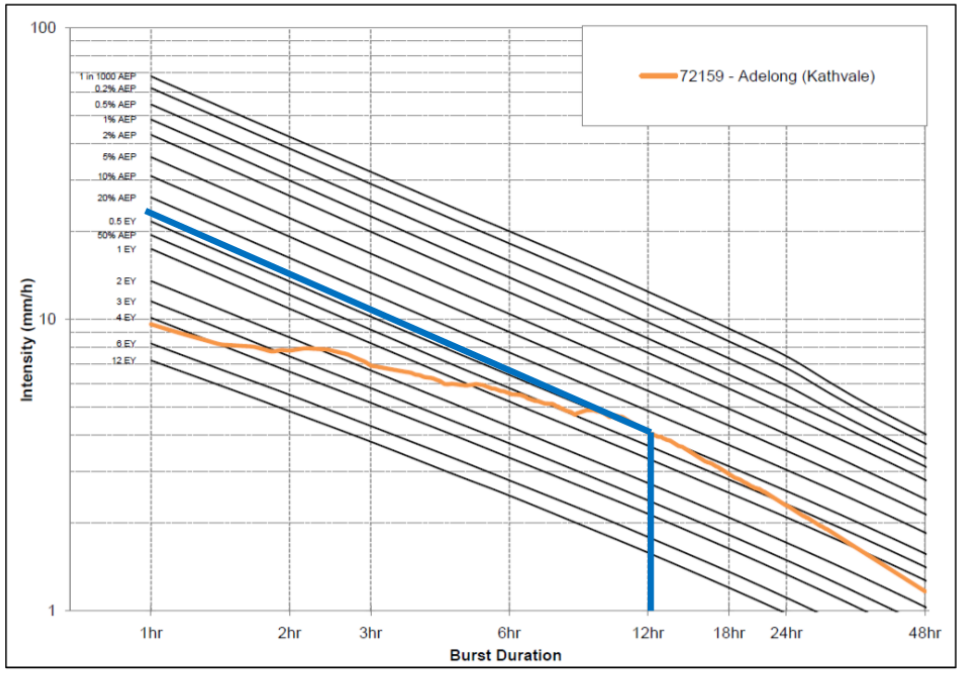
# October 2010




| Gauge Number | Station Name | Operating Authority | Rainfall Depth (mm) (Equivalent Design Rainfall Event) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 3 hrs | 6 hrs | 12 hrs | 18 hrs | 24 hrs |
| 410114 | Killimcat Creek at Wyangle | WaterNSW | 20.3 (2 EY) | 26.7 (2 EY) | 47.1 (50% AEP) | 55.2 (50% AEP) | 55.7 (1 EY) |
| 72159 | Adelong (Kathvale) | BOM | 20 (2 EY) | 34.8 (50% AEP) | 49.1 (0.5 EY) | 50.7(50% AEP) | 55.7 (50% AEP) |

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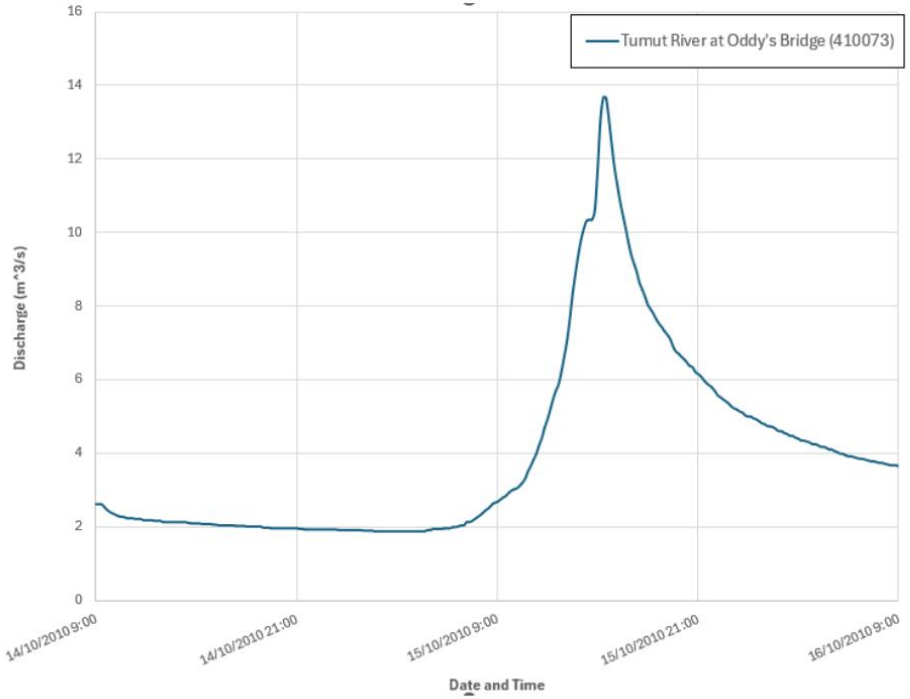
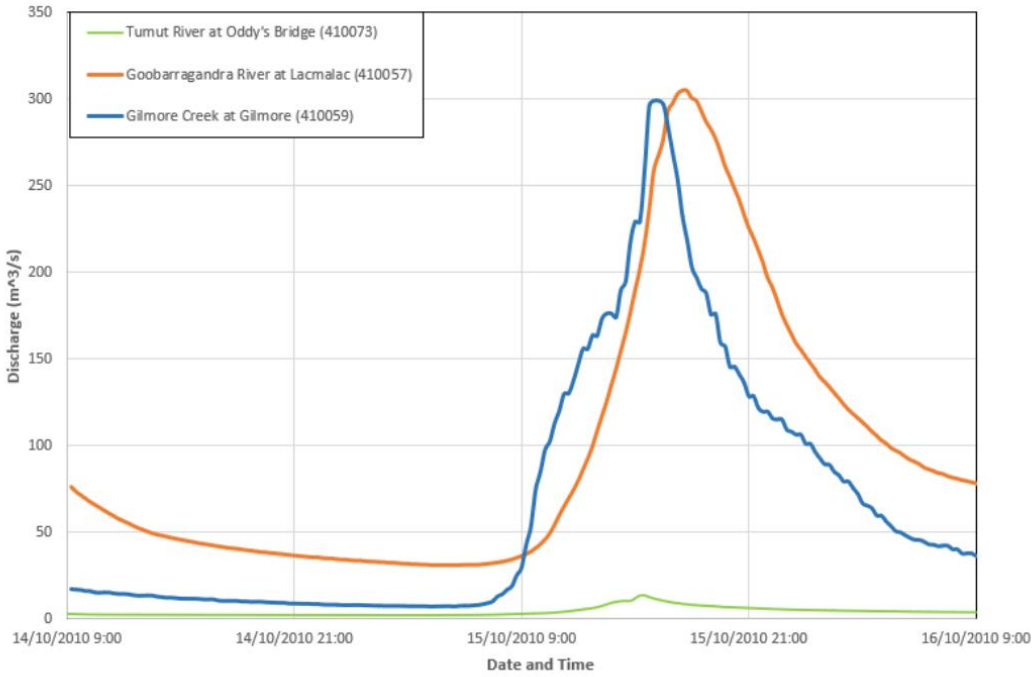
# October 2010

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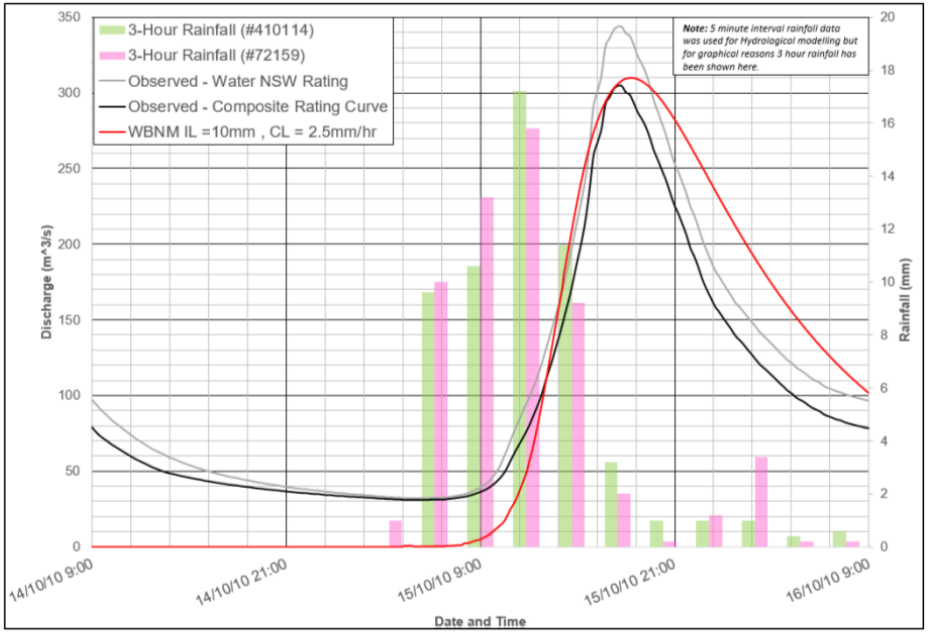
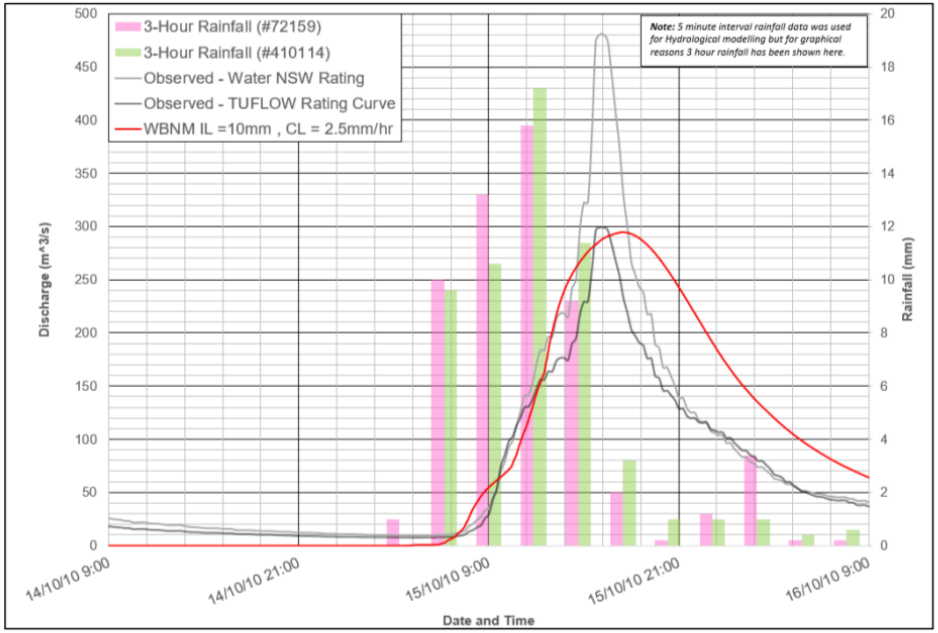
# October 2010




**Goobarragandra River at Lacmalac Gauge (#410057)**
IL = 10mm, CL = 2.5mm/hr
Estimated Flow (Water NSW Rating Curve) = 343.5 $m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 304.8 $m^3/s$
Modelled Flow = 310 $m^3/s$




**Gilmore Creek at Gilmore Gauge (#410059)**
IL = 10mm, CL = 2.5mm/hr
Estimated Flow (Water NSW Rating Curve) = 480.2$m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 298.8 $m^3/s$
Modelled Flow = 294.2 $m^3/s$

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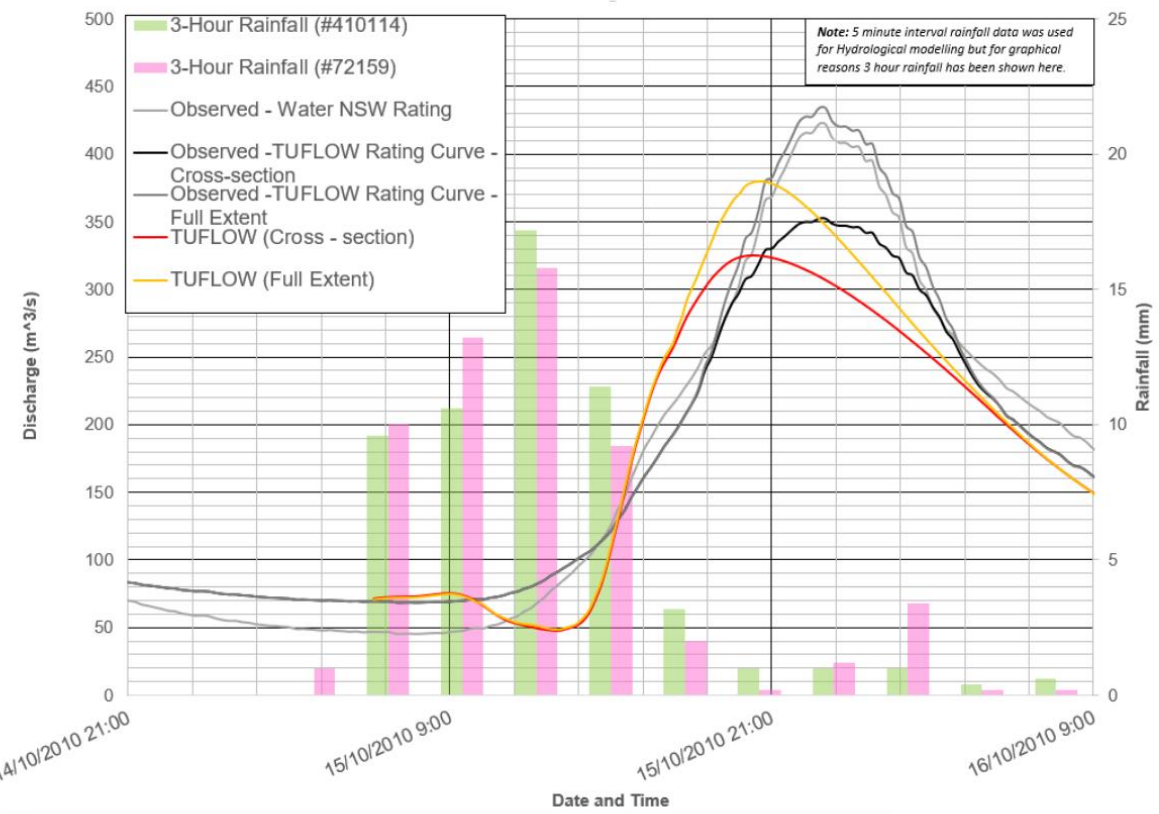
# October 2010




**Tumut River at Tumut (#410006)**

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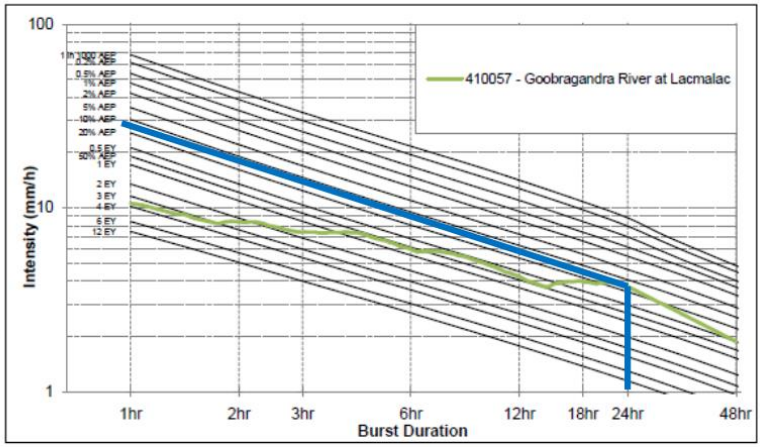
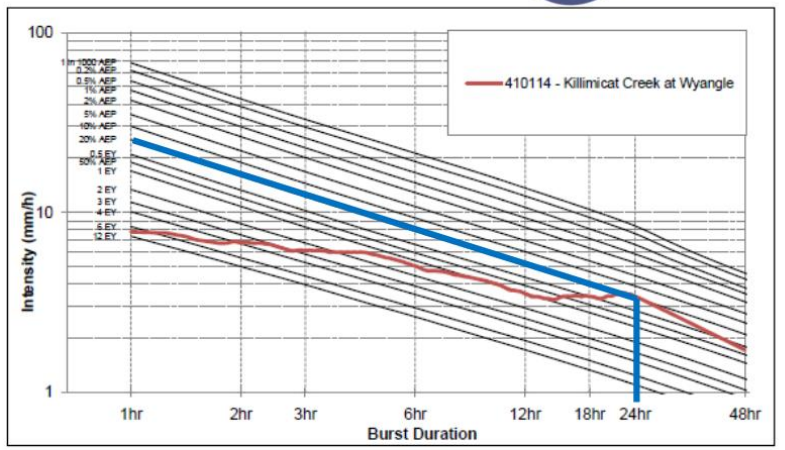
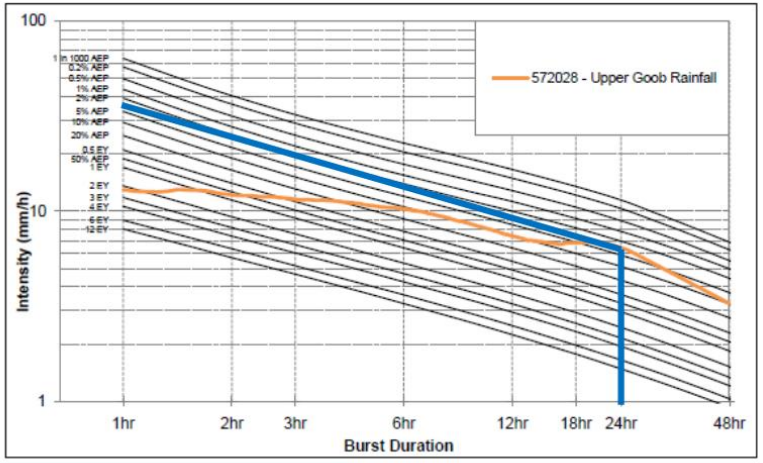
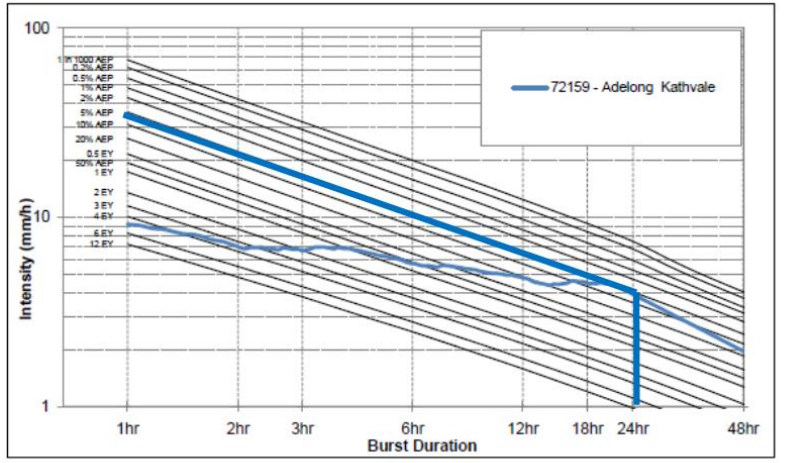
# March 2012


410057 - Goobragandra River at Lacmalac
Intensity (mm/h)
100
10
1
1hr
2hr
3hr
6hr
12hr
18hr
24hr
48hr
Burst Duration


410114 - Killimicat Creek at Wyangle
Intensity (mm/h)
100
10
1
1hr
2hr
3hr
6hr
12hr
18hr
24hr
48hr
Burst Duration


572028 - Upper Goob Rainfall
Intensity (mm/h)
100
10
1
1hr
2hr
3hr
6hr
12hr
18hr
24hr
48hr
Burst Duration


72159 - Adelong Kathvale
Intensity (mm/h)
100
10
1
1hr
2hr
3hr
6hr
12hr
18hr
24hr
48hr
Burst Duration

# March 2012

| Gauge Number | Station Name | Operating Authority | Rainfall Depth (mm) (Equivalent Design Rainfall Event) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 3 hrs | 6 hrs | 12 hrs | 18 hrs | 24 hrs |
| 410114 | Killimcat Creek at Wyangle | WaterNSW | 17.9 (3 EY) | 27.3 (2 EY) | 44.1 (1 EY) | 63.7 (0.5 EY) | 83.9 (20% AEP) |
| 410057 | Goobarragandra River at Lacmalac | WaterNSW | 20.6 (2 EY) | 36.7 (50% AEP) | 48.7 (50% AEP) | 75.2(20% AEP) | 83.9 (20% AEP) |
| 572028 | Upper Goobarragandra TBRG at Broken Cart Road | WaterNSW | 33.7 (0.5 EY) | 63.3 (10% AEP) | 89.5 (10% AEP) | 124 (5% AEP) | 83.9 (2% AEP) |
| 72159 | Adelong (Kathvale) | BOM | 20 (2 EY) | 34.8 (50% AEP) | 58.2 (20% AEP) | 77.7(10% AEP) | 167 (5% AEP) |

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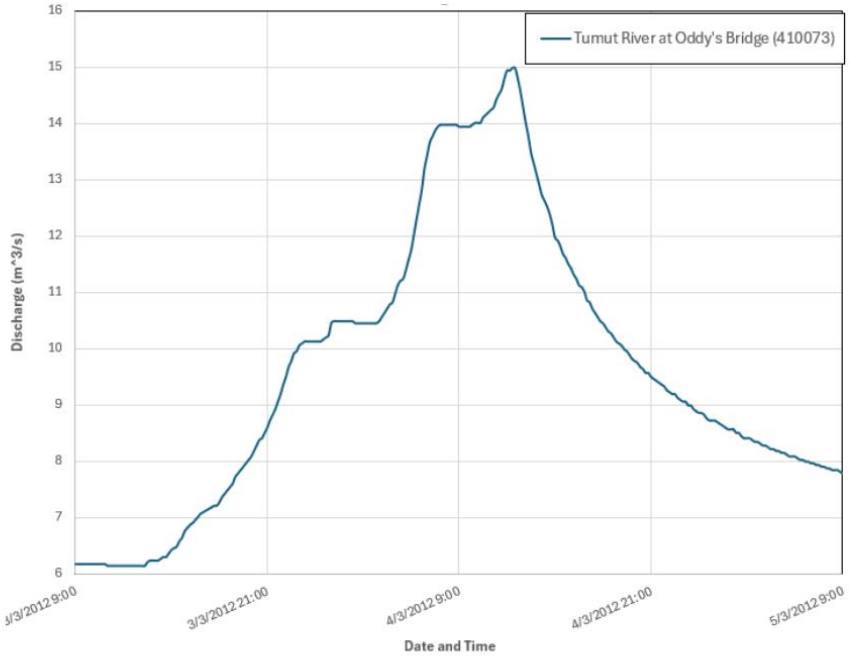
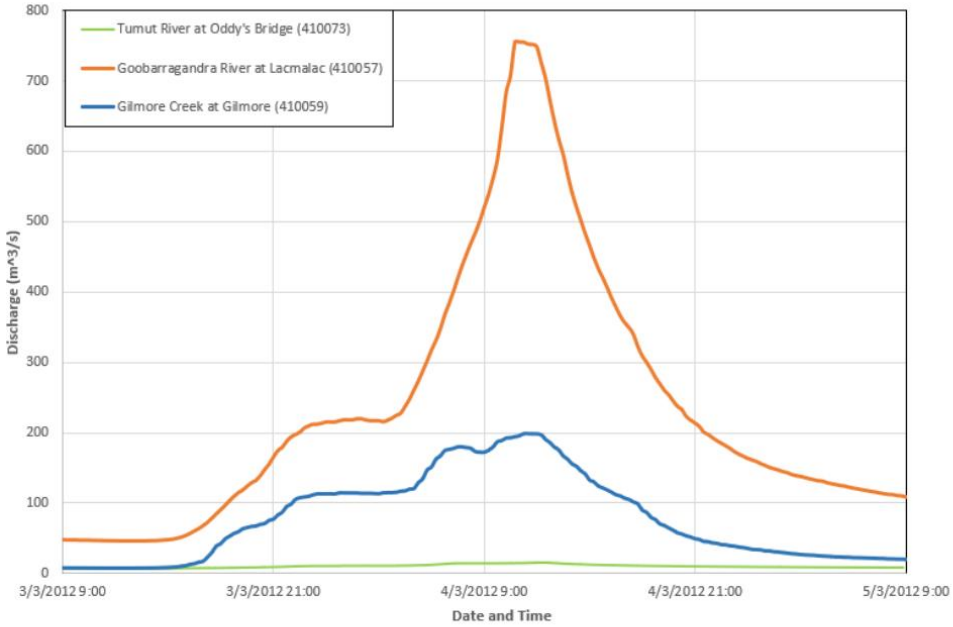
# March 2012

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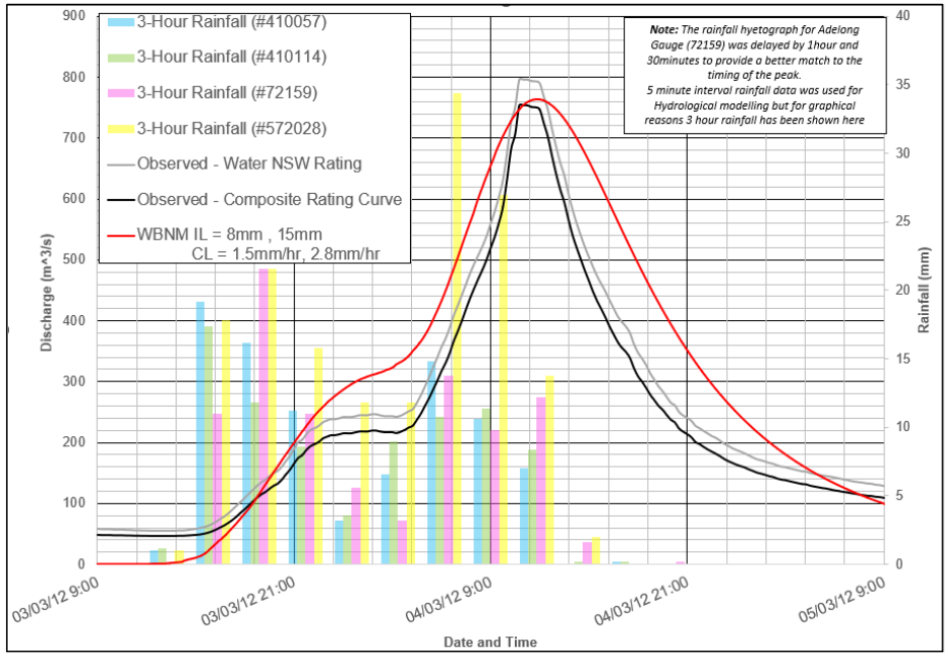
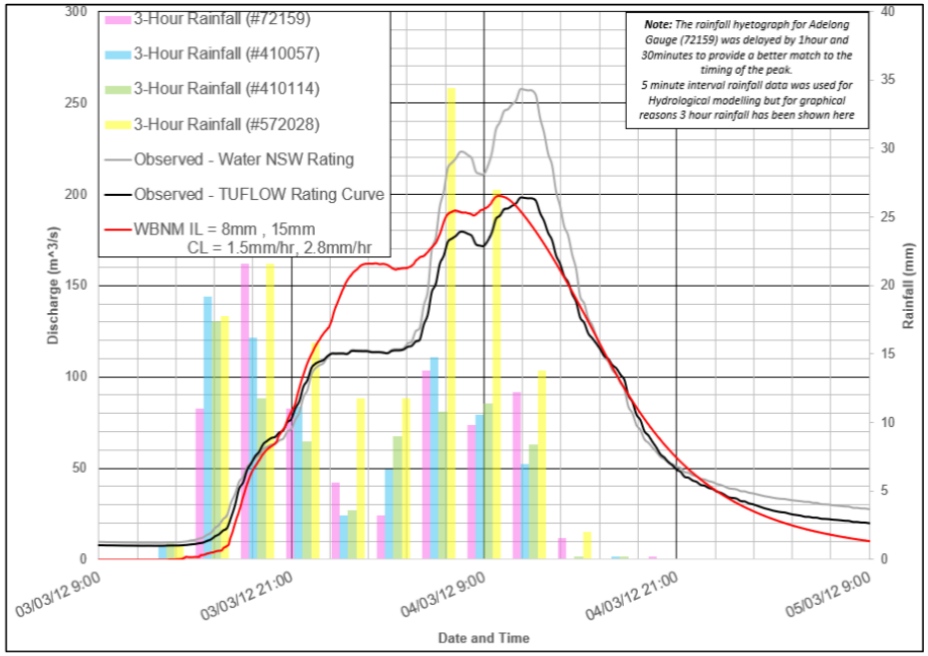
# March 2012




**Goobarragandra River at Lacmalac Gauge (#410057)**
IL = 8mm, CL = 1.5mm/hr
Estimated Flow (Water NSW Rating Curve) = 796.8 $m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 754.4 $m^3/s$
Modelled Flow = 763.2 $m^3/s$




**Gilmore Creek at Gilmore Gauge (#410059)**
IL = 15mm, CL = 2.8mm/hr
Estimated Flow (Water NSW Rating Curve) = 257.4$m^3/s$
Estimated Flow (TUFLOW Rating Curve) = 198.2 $m^3/s$
Modelled Flow =198.3 $m^3/s$

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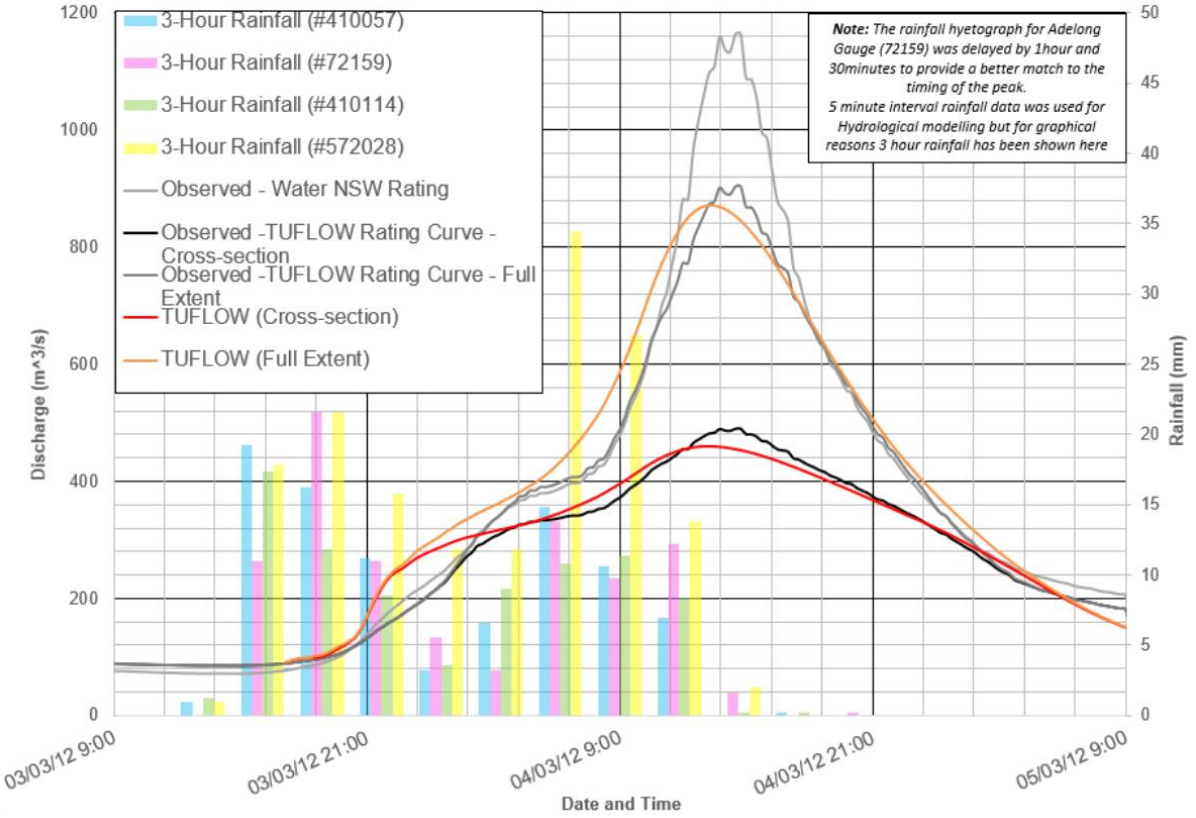
# March 2012




**Tumut River at Tumut (#410006)**

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# Flood Modelling

Hydrologic Model

Hydraulic Model

Rainfall

Can we reasonably reproduce observed flood behaviour?

Flood Levels

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# Hydraulic Model Calibration

- The hydraulic model was calibrated using the recorded levels and flows at Goobarragandra River at Lacmalac Gauge (410057), Gilmore Creek Gauge (410059) and Tumut River at Tumut (410006) gauge.
- Recorded flood levels from the January 1984 event were available.
- Anecdotal information from some reports and web articles.
- Estimated flood extent (available for the March 2012 Event).
- Flood Photos

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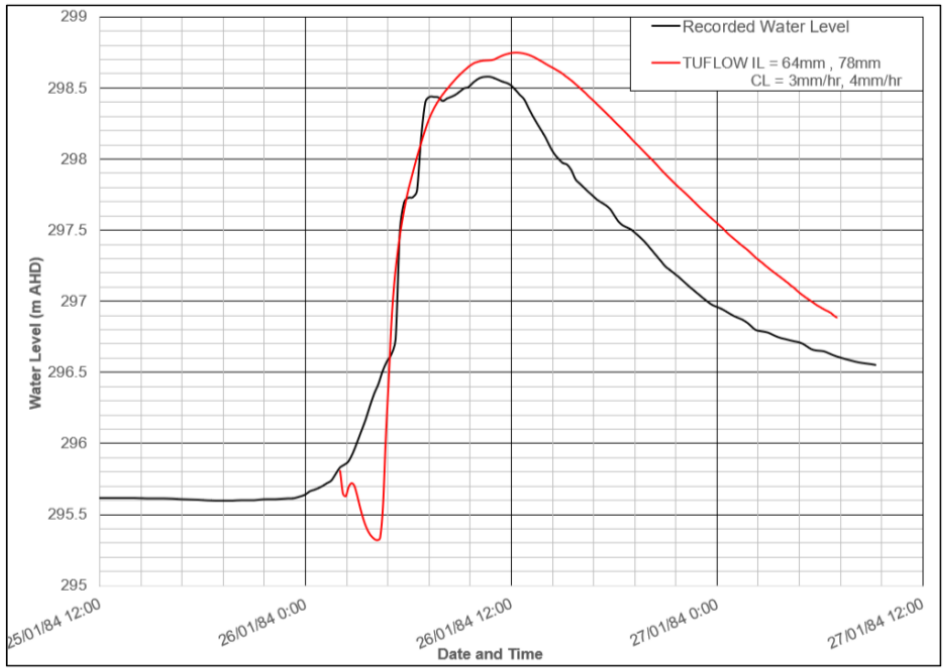
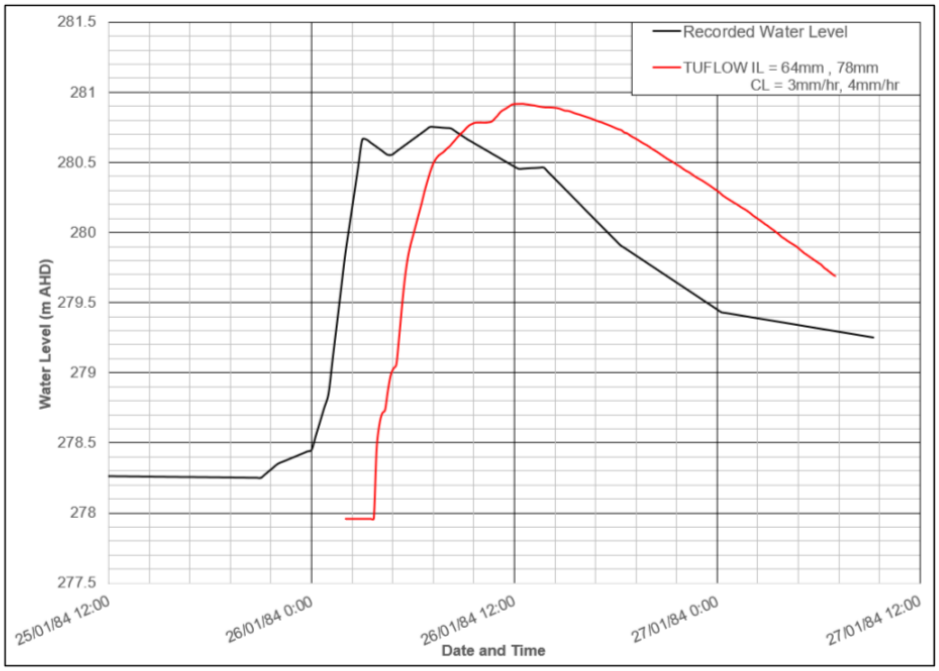
# January 1984




**Goobarragandra River at Lacmalac Gauge (#410057)**
Recorded Level = 298.58m AHD
Modelled Level = 298.76m AHD
Difference = +0.18m




**Gilmore Creek at Gilmore Gauge (#410059)**
Recorded Level = 280.75m AHD
Modelled Level =280.94 m AHD
Difference = +0.19m

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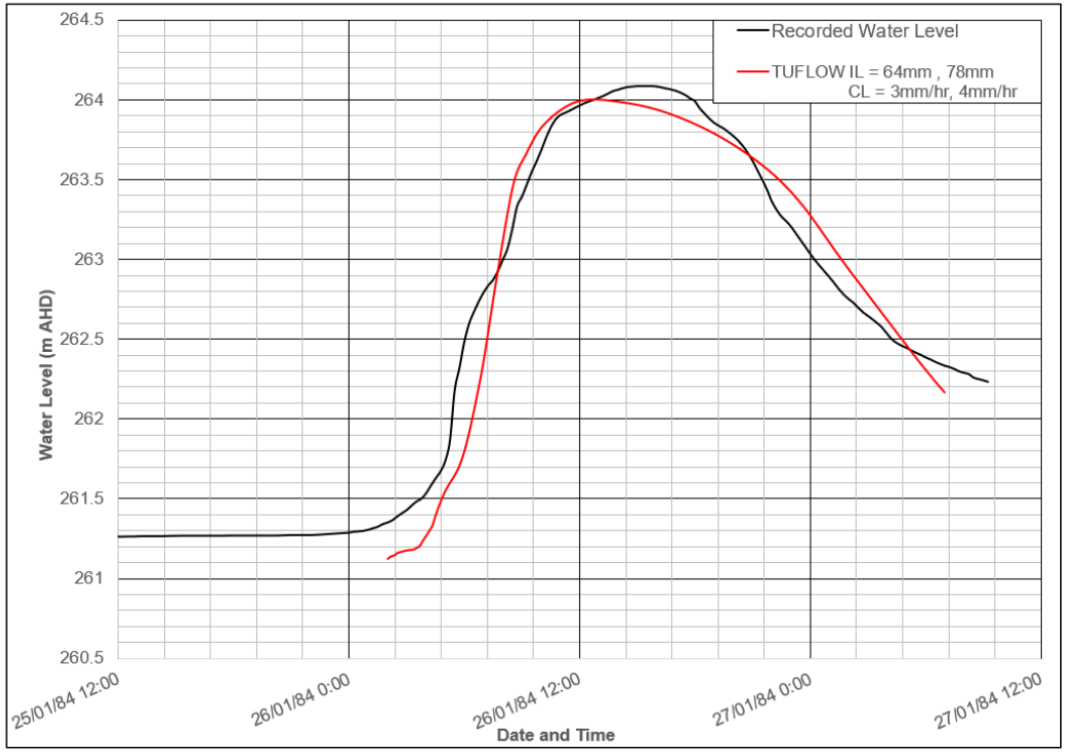
# January 1984




**Tumut River at Tumut (#410006)**
Recorded Level = 264.09m AHD
Modelled Level = 264m AHD
Difference = -0.09m

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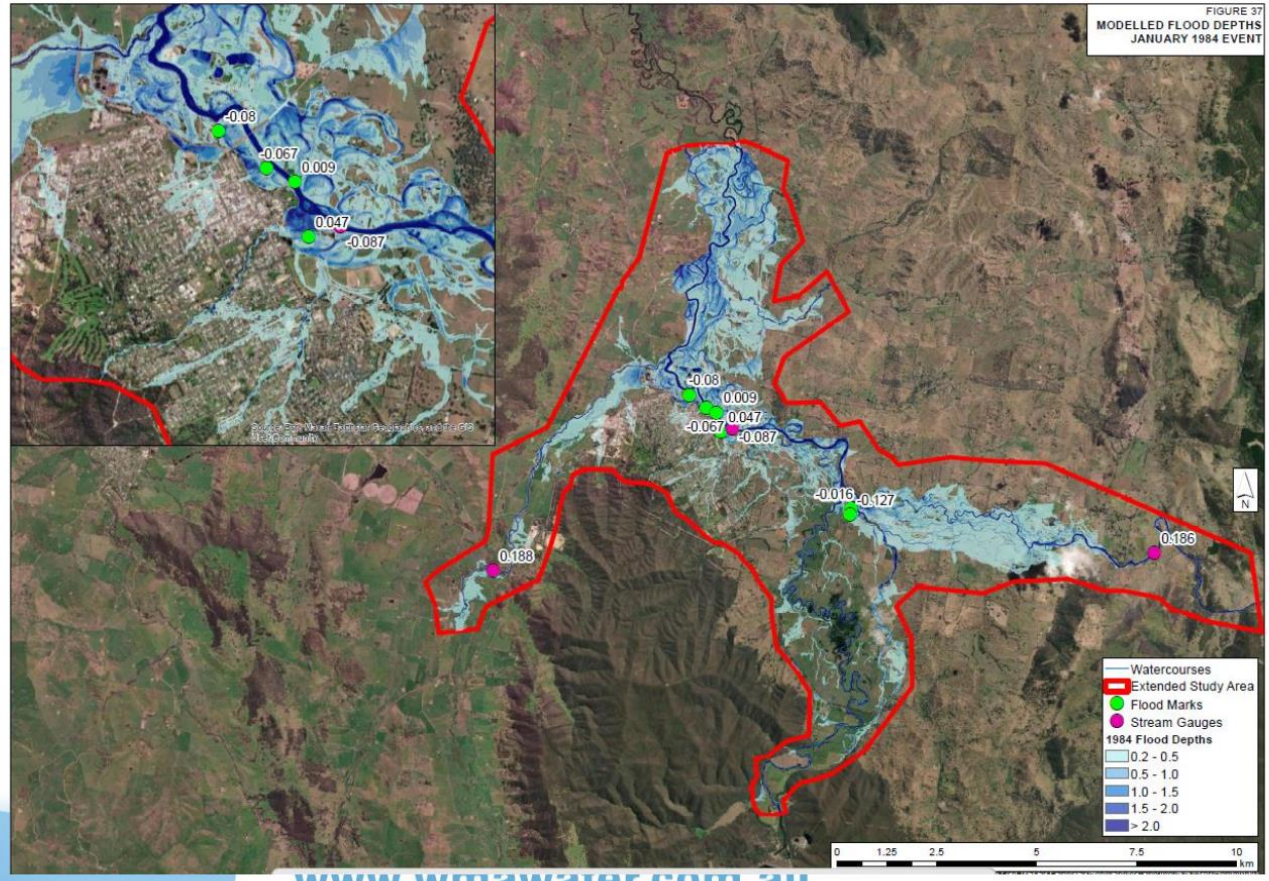
# January 1984



# January 1984

Observed (left) vs Modelled (right) Flood behaviour at Wynyard Street, Tumut


Photo looking in this direction

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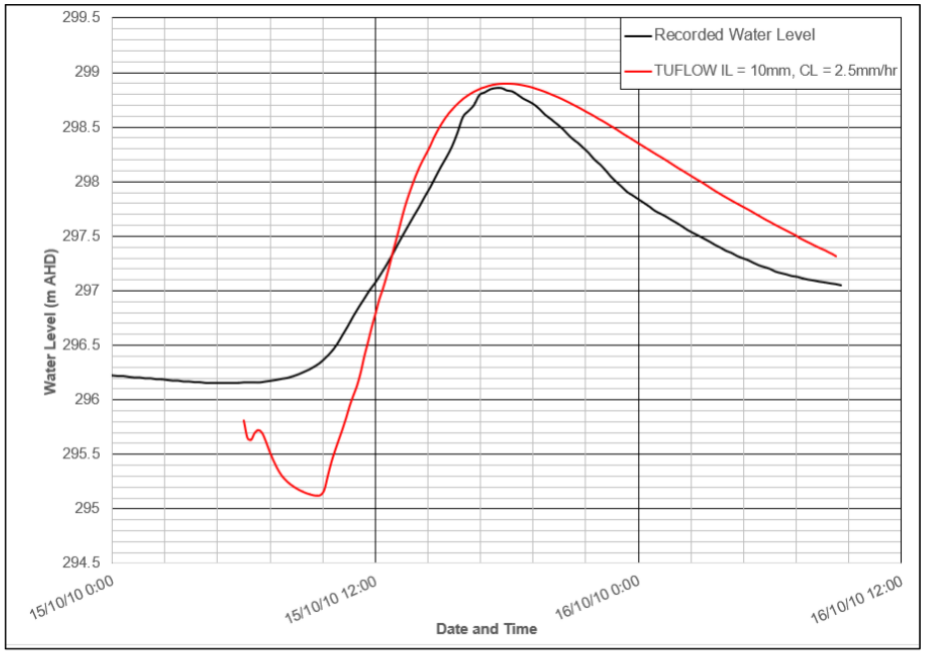
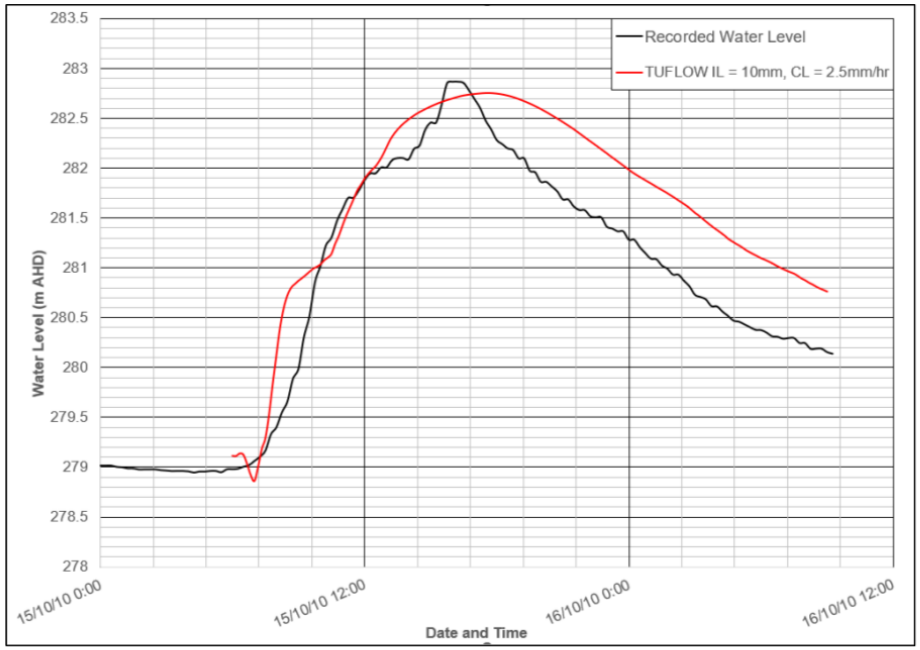
# October 2010




**Goobarragandra River at Lacmalac Gauge (#410057)**
Recorded Level = 298.86m AHD
Modelled Level = 298.9 m AHD
Difference = +0.04m




**Gilmore Creek at Gilmore Gauge (#410059)**
Recorded Level = 282.86m AHD
Modelled Level = 282.76m AHD
Difference = -0.1m

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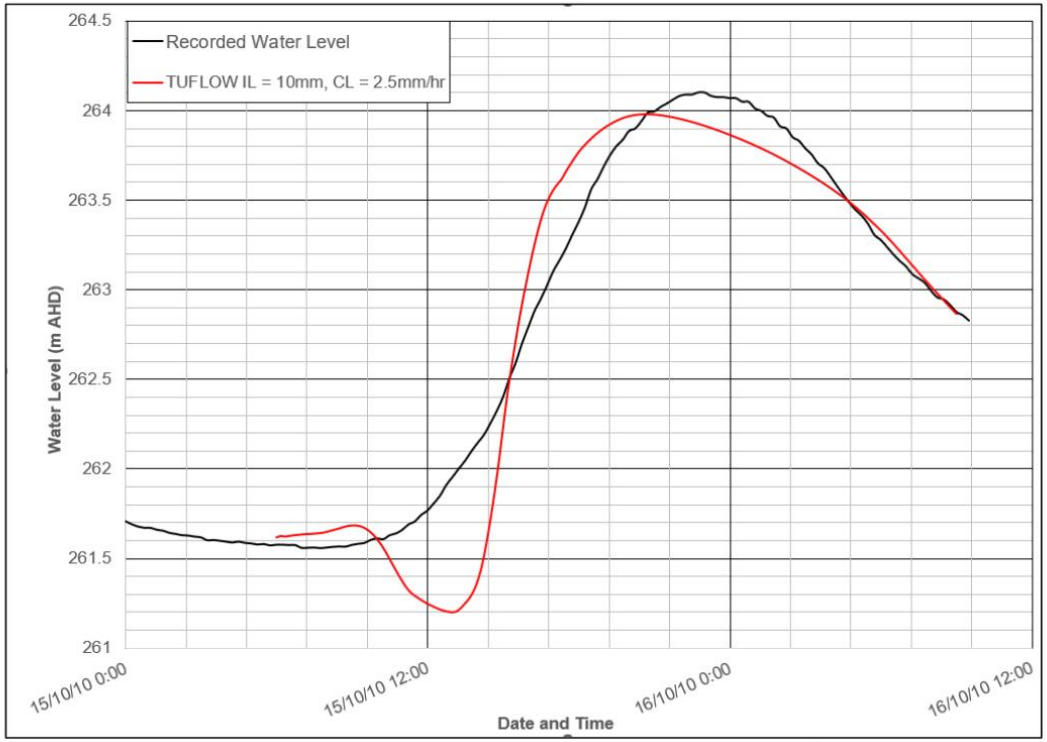
# October 2010




**Tumut River at Tumut (#410006)**
Recorded Level = 264.1m AHD
Modelled Level = 263.98m AHD
Difference = -0.12m

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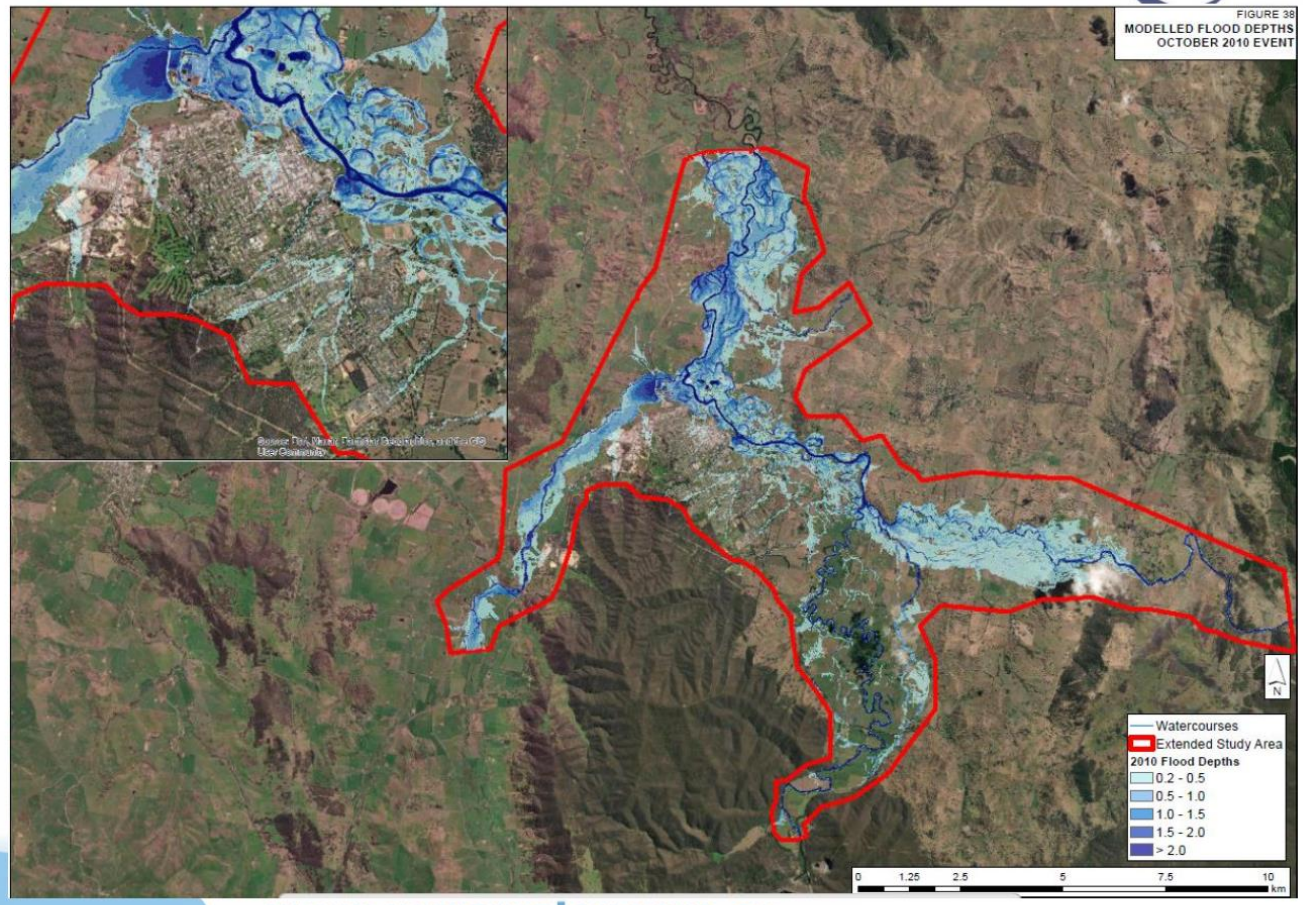
# October 2010

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# October 2010

Observed (left) vs Modelled (right) Flood behaviour at Willow Bend

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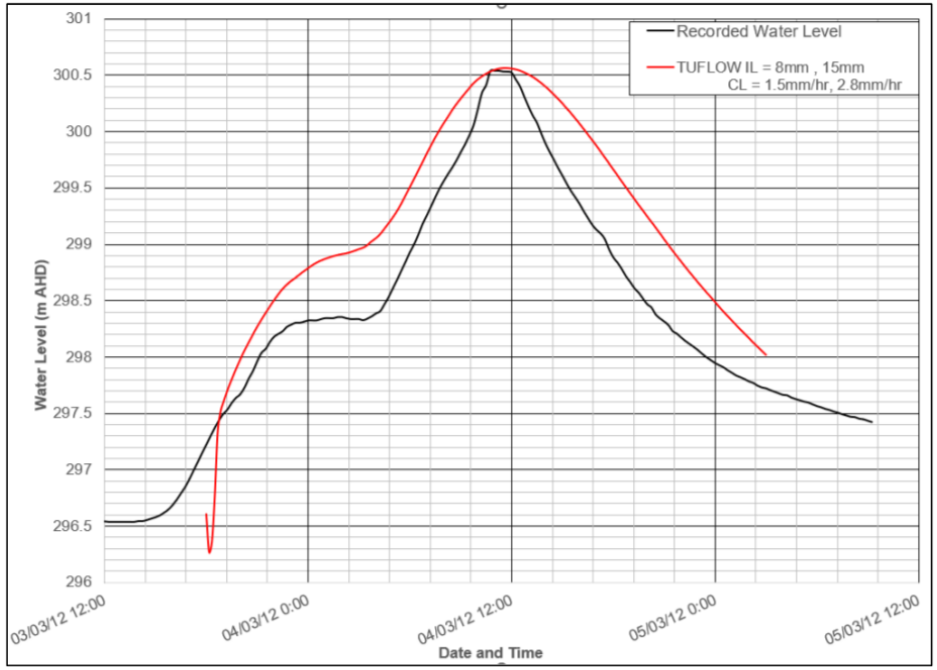
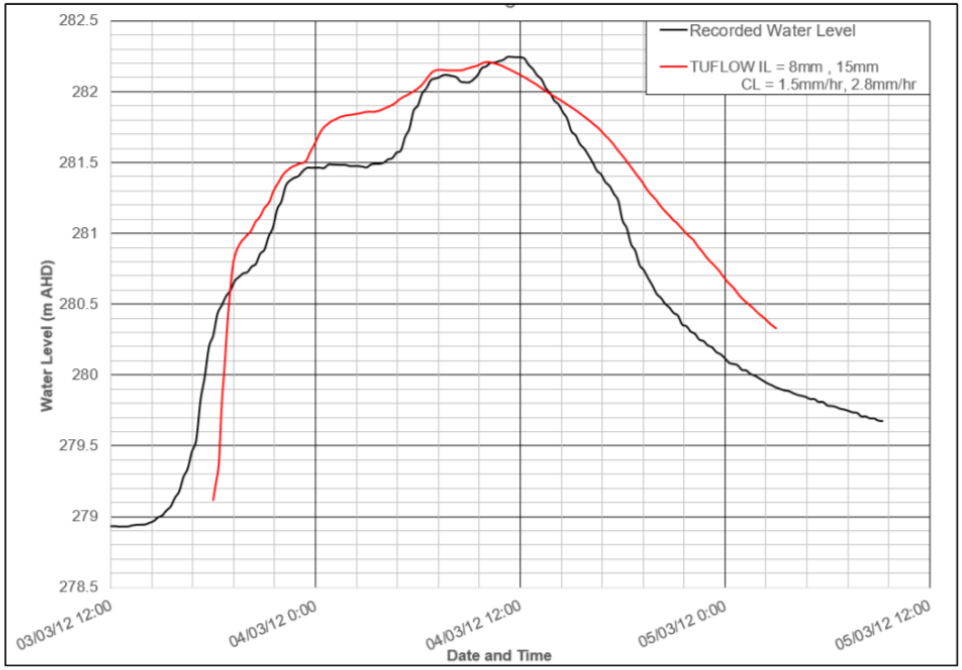
# March 2012




**Goobarragandra River at Lacmalac Gauge (#410057)**
Recorded Level = 300.54 m AHD
Modelled Level = 300.56m AHD
Difference = +0.02m




**Gilmore Creek at Gilmore Gauge (#410059)**
Recorded Level = 282.25m AHD
Modelled Level = 282.21m AHD
Difference = -0.04m

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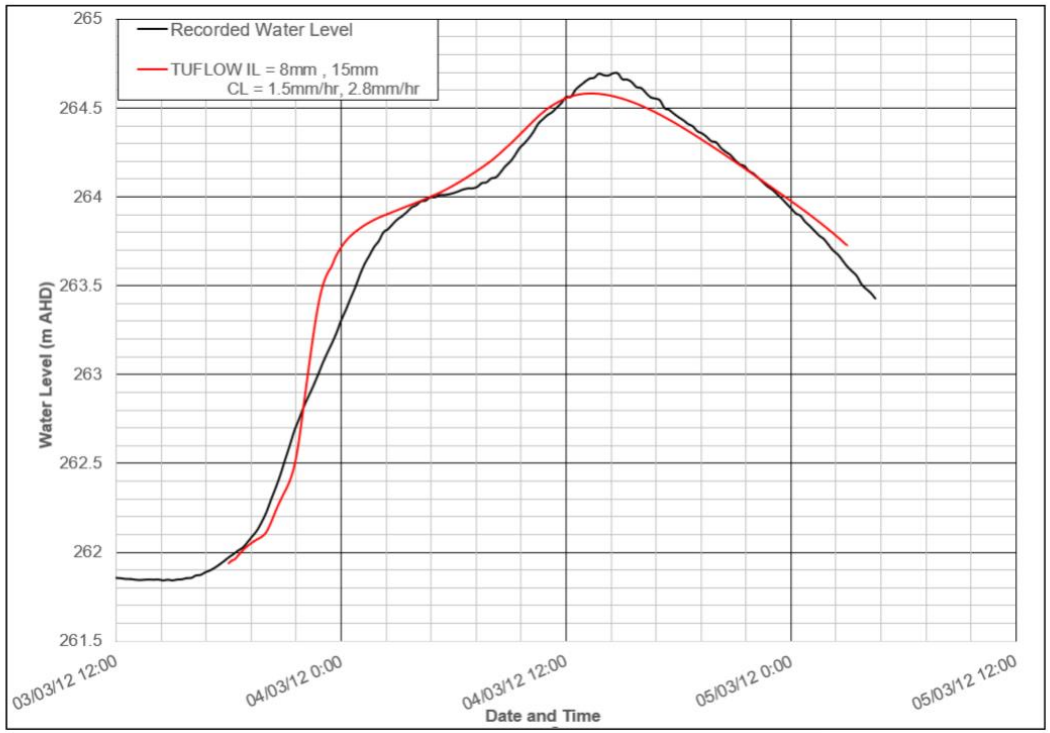
# March 2012




**Tumut River at Tumut (#410006)**
Recorded Level = 264.69 m AHD
Modelled Level = 263.58m AHD
Difference = -0.11m AHD

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# March 2012

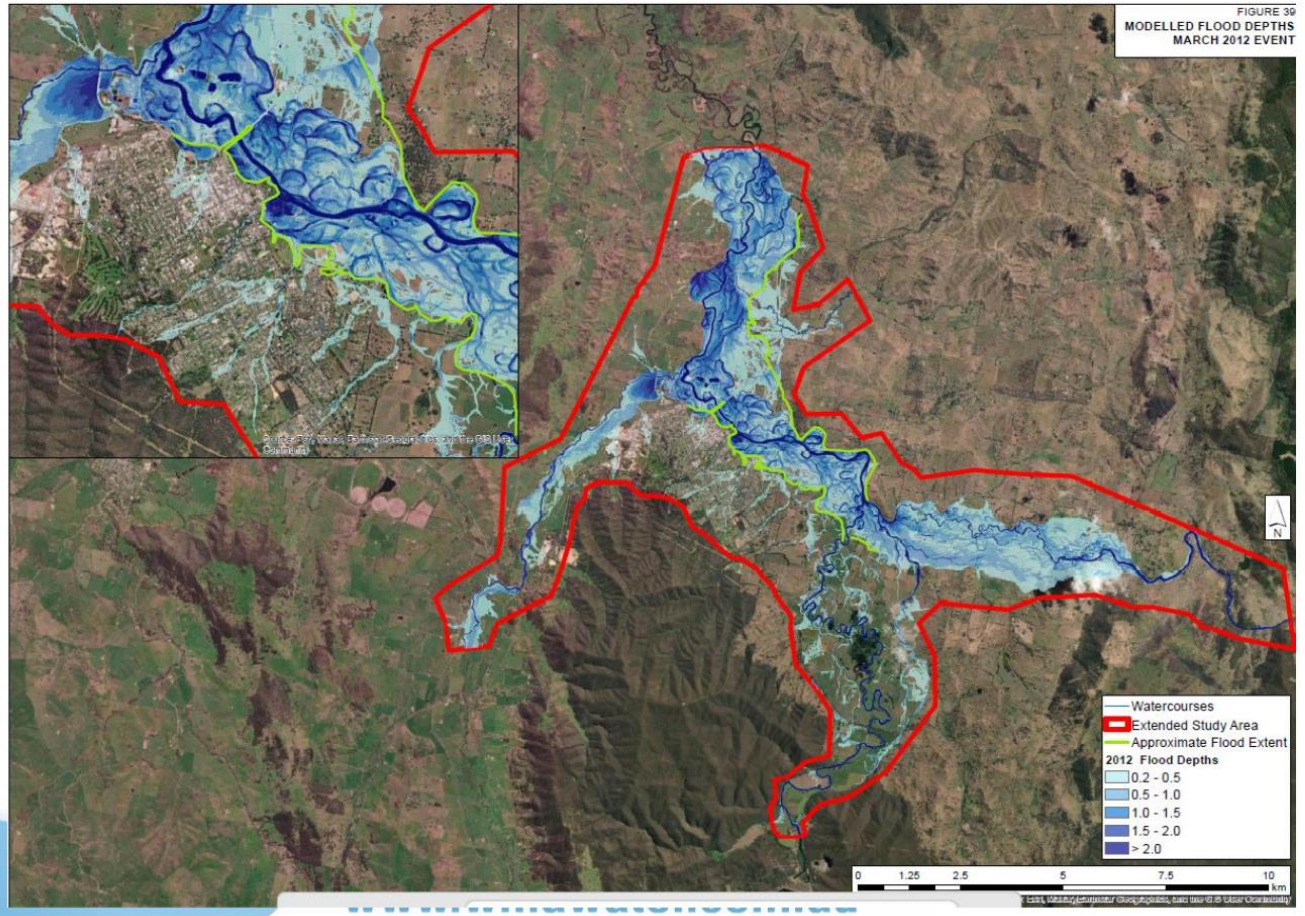
FIGURE 39
MODELLED FLOOD DEPTHS
MARCH 2012 EVENT
Watercourses
Extended Study Area
Approximate Flood Extent
2012 Flood Depths
0.2 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
> 2.0
0 1.25 2.5 5 7.5 10
km

# March 2012

## Racecourse

## Property at Lacmalac Road

## Cnr of Richmond and River St

## Bila Park

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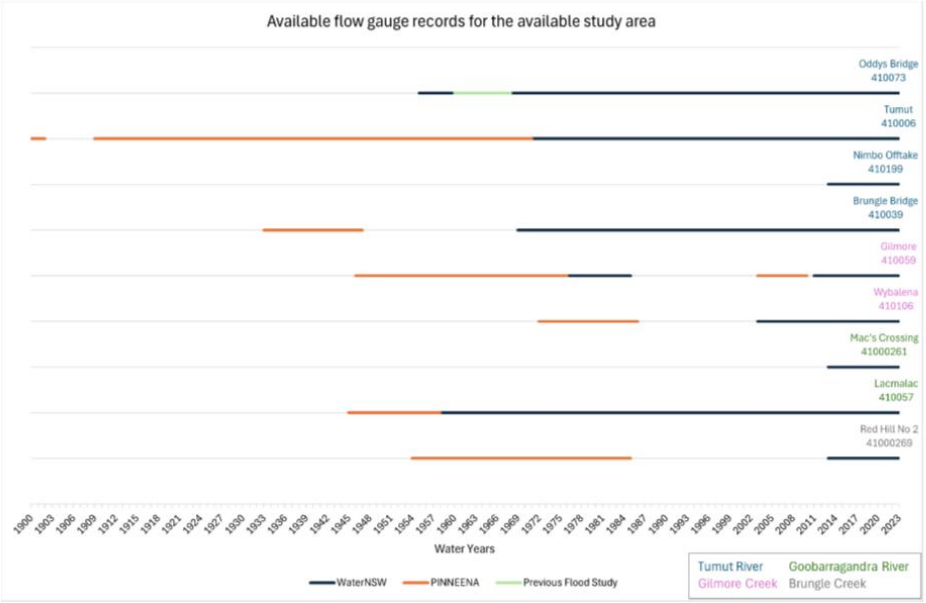
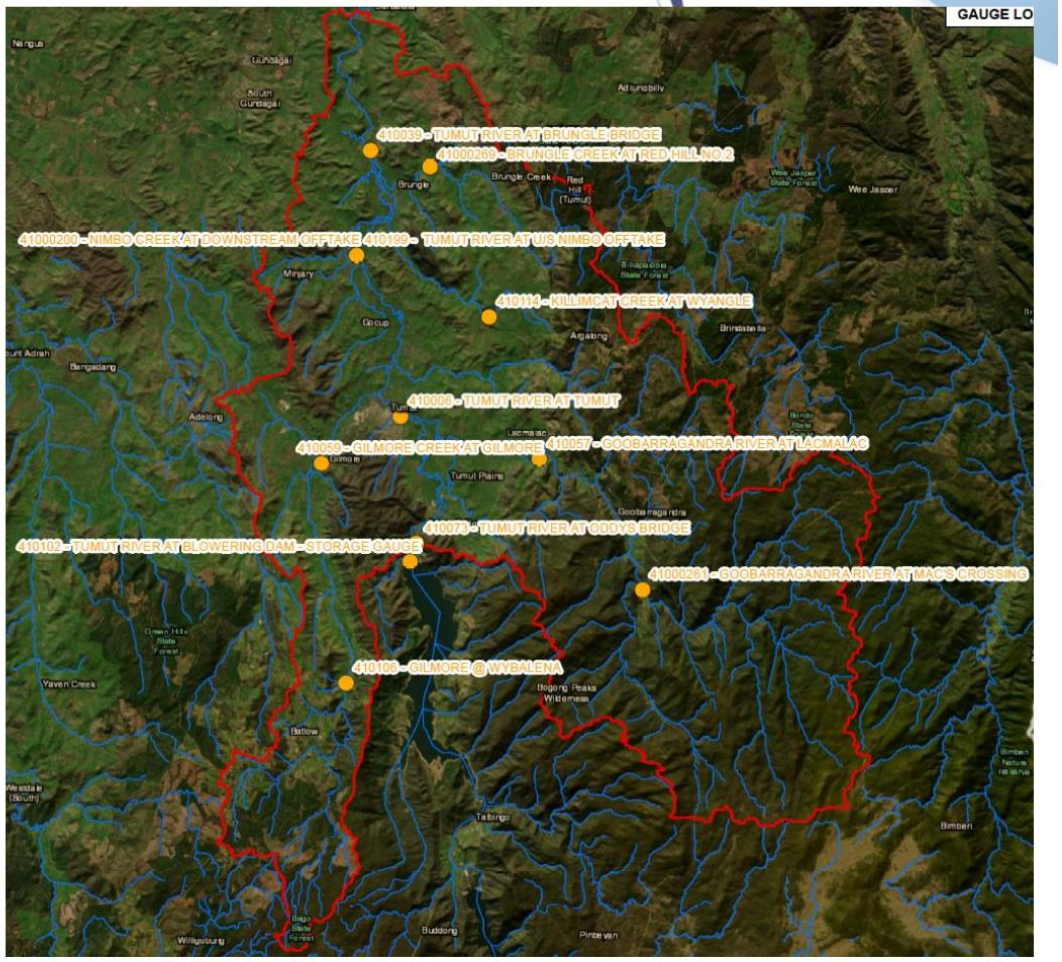
# Flood Frequency Analysis

- Flood Frequency Analysis (FFA) involves a statistical analysis of recorded flood data to identify an underlying probability model
- A way of relating the magnitude of a flood to its probability
- With a long enough record, we can estimate what the 1% AEP flood event is.
- There are 2 stages:
  1. Annual Maximum Series (AMS) – a list of peak flows for each available year
  2. Fitting a probability distribution

# Available Data

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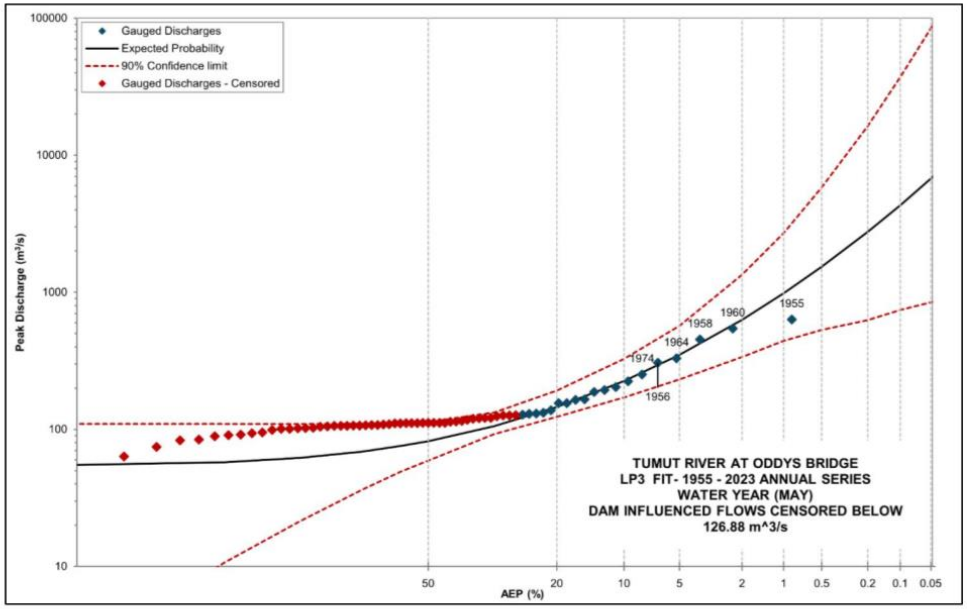
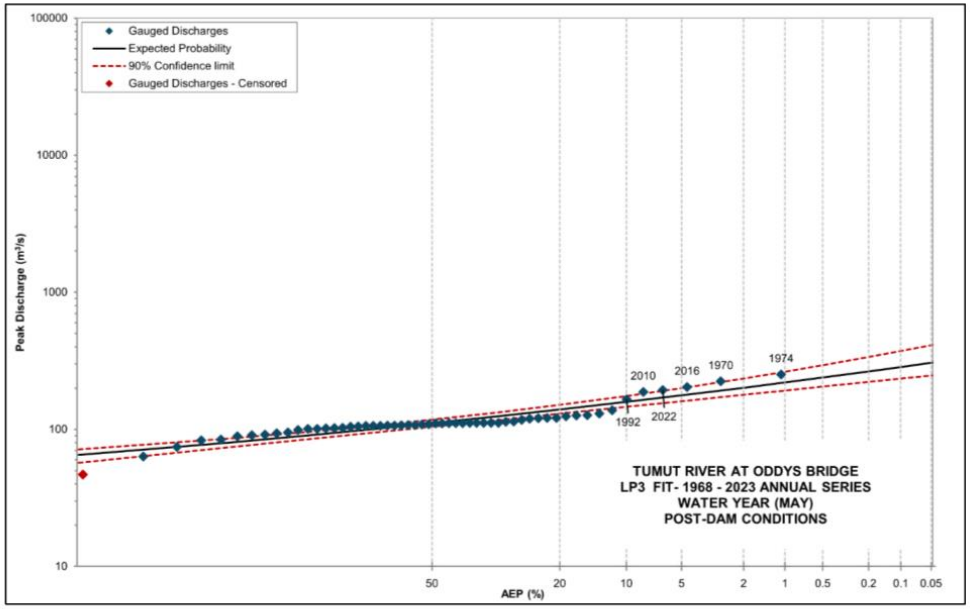
# Tumut River at Oddy's Bridge Gauge (410073)




Flood Frequency Analysis – Oddy's Bridge (Gauge No. 410073)
Censored Dam Releases




Flood Frequency Analysis – Oddy's Bridge (Gauge No. 410073)
Post Dam Flows

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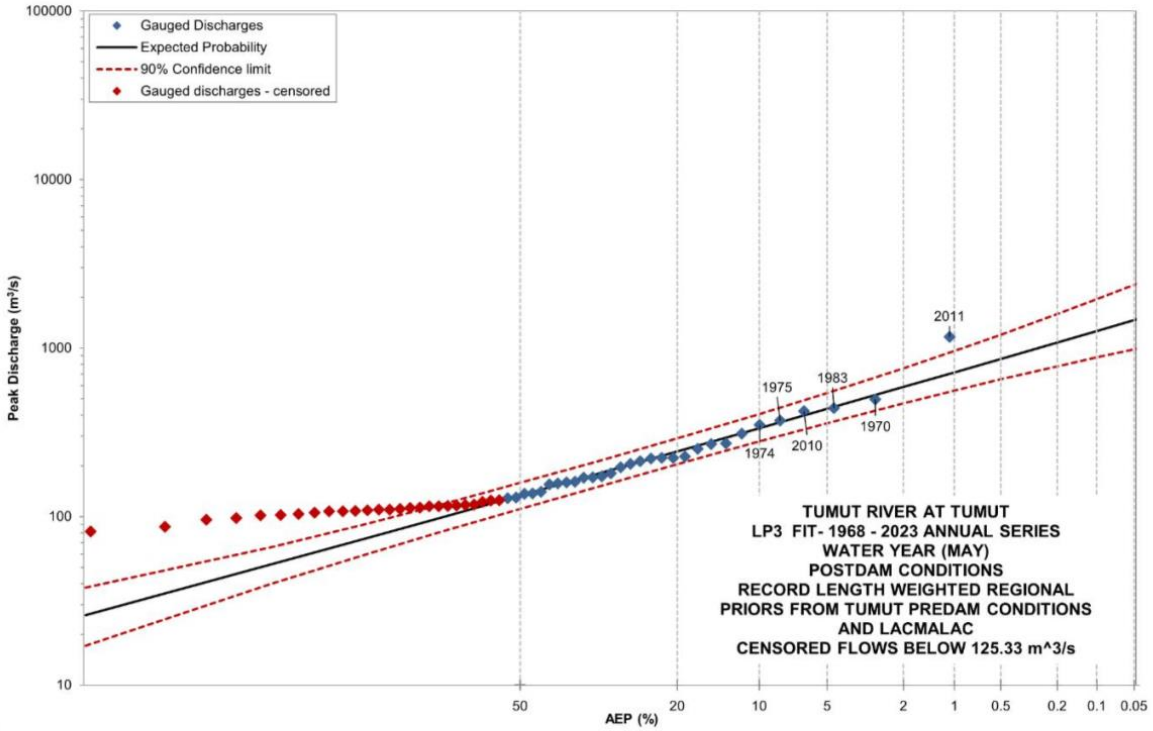
# Tumut River at Tumut Gauge(410006)




| Event (AEP) | Adopted Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 243 |
| 10 % | 334 |
| 5 % | 435 |
| 2 % | 587 |
| 1 % | 717 |
| 0.5 % | 862 |
| 0.2 % | 1079 |

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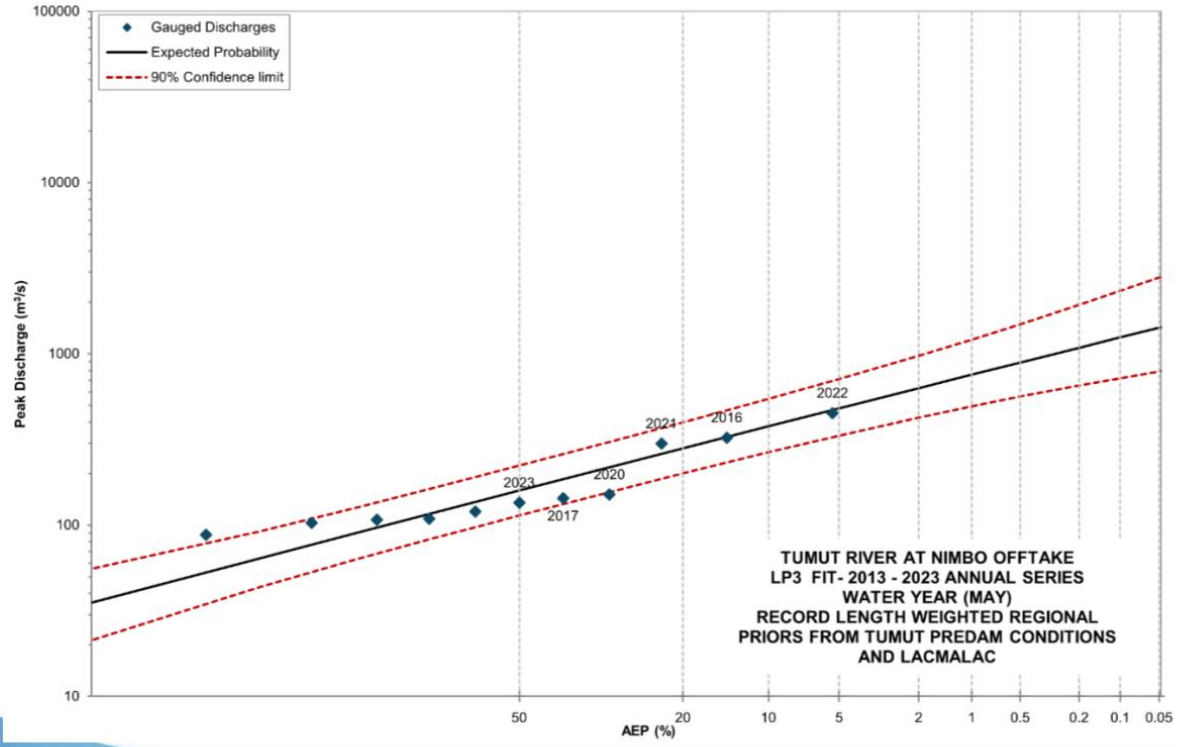
# Tumut River at Nimbo Offtake (410199)




| AEP | Adopted Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 281 |
| 10 % | 378 |
| 5 % | 481 |
| 2 % | 631 |
| 1 % | 755 |
| 0.5 % | 890 |
| 0.2 % | 1085 |

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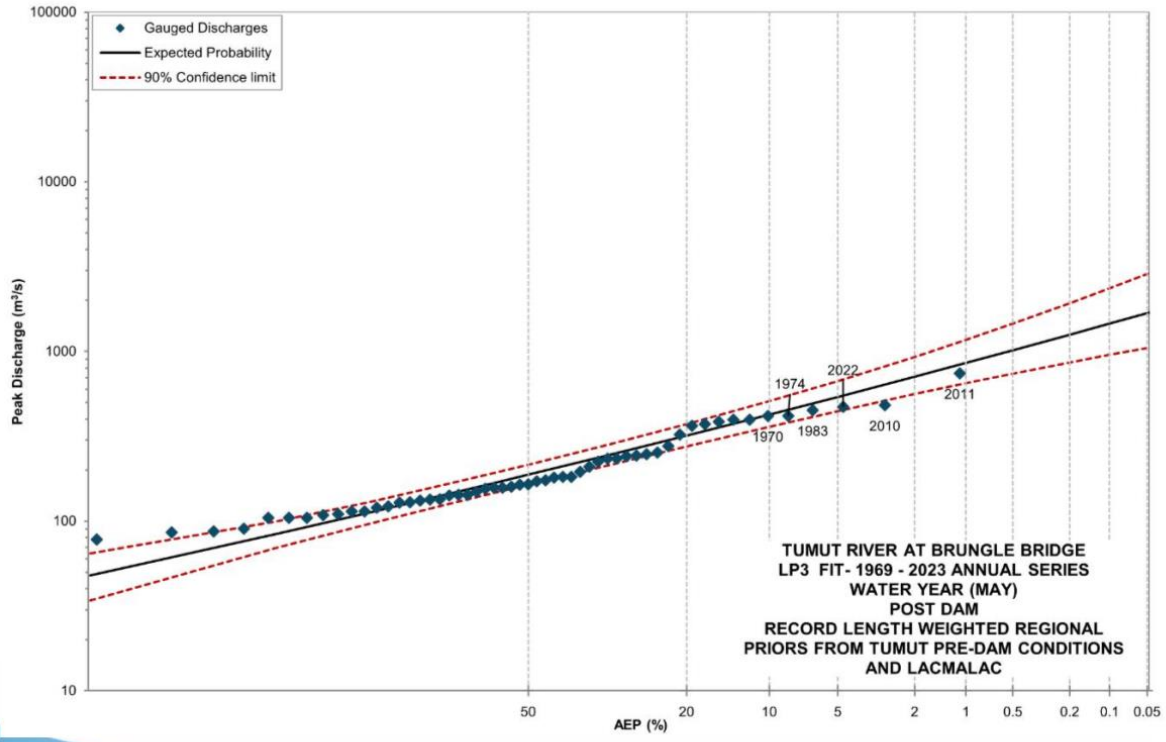
# Tumut River at Brungle Bridge(410039)




| AEP | Adopted Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 319 |
| 10 % | 424 |
| 5 % | 539 |
| 2 % | 710 |
| 1 % | 855 |
| 0.5 % | 1015 |
| 0.2 % | 1254 |

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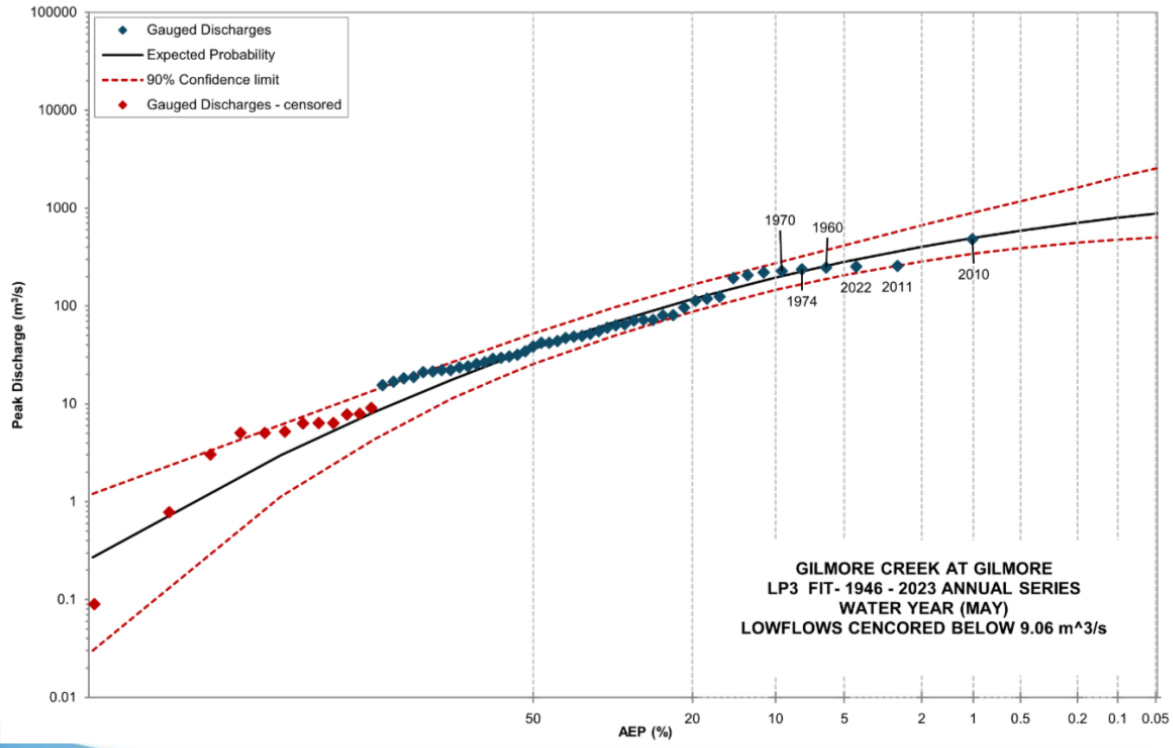
# Gilmore Creek at Gilmore (410059)




| Event (AEP) | Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 118 |
| 10 % | 196 |
| 5 % | 282 |
| 2 % | 403 |
| 1 % | 496 |
| 0.5 % | 589 |
| 0.2 % | 707 |

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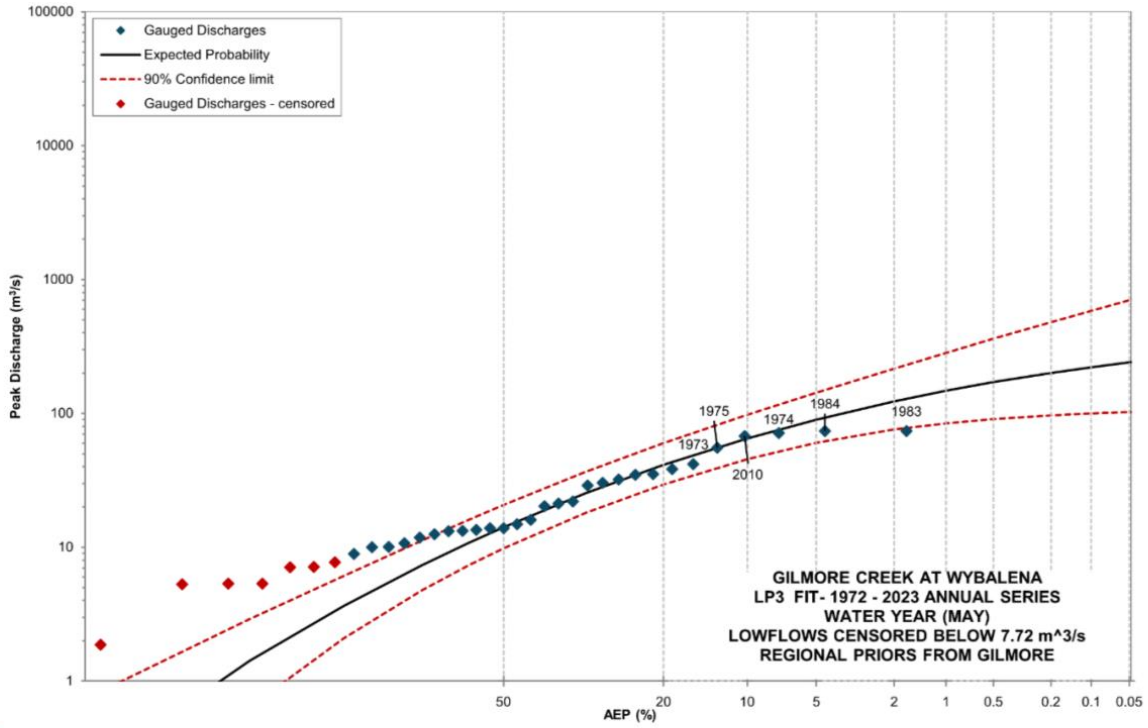
# Gilmore Creek at Wybalena (410106)




| Event (AEP) | Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 41 |
| 10 % | 65 |
| 5 % | 90 |
| 2 % | 123 |
| 1 % | 148 |
| 0.5 % | 171 |
| 0.2 % | 201 |

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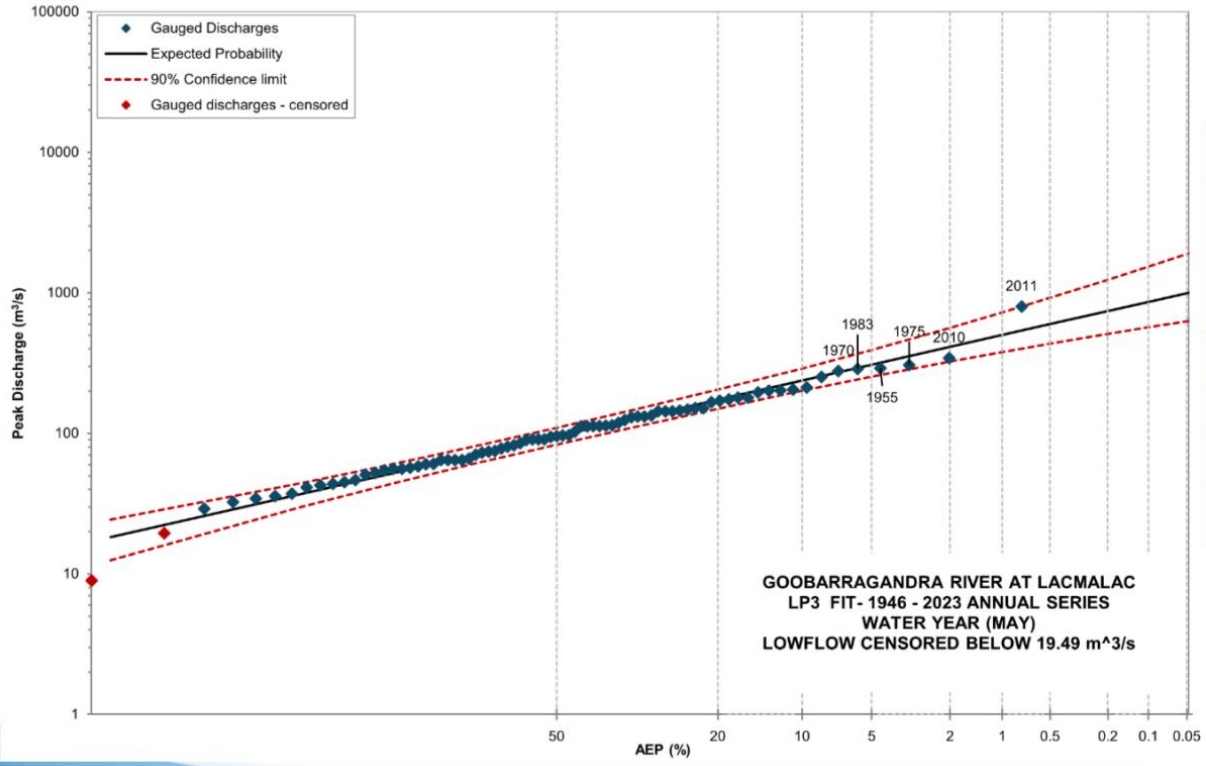
# Goobarragandra River at Lacmalac (410057)




| Event (AEP) | Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 174 |
| 10 % | 238 |
| 5 % | 308 |
| 2 % | 412 |
| 1 % | 500 |
| 0.5 % | 598 |
| 0.2 % | 742 |

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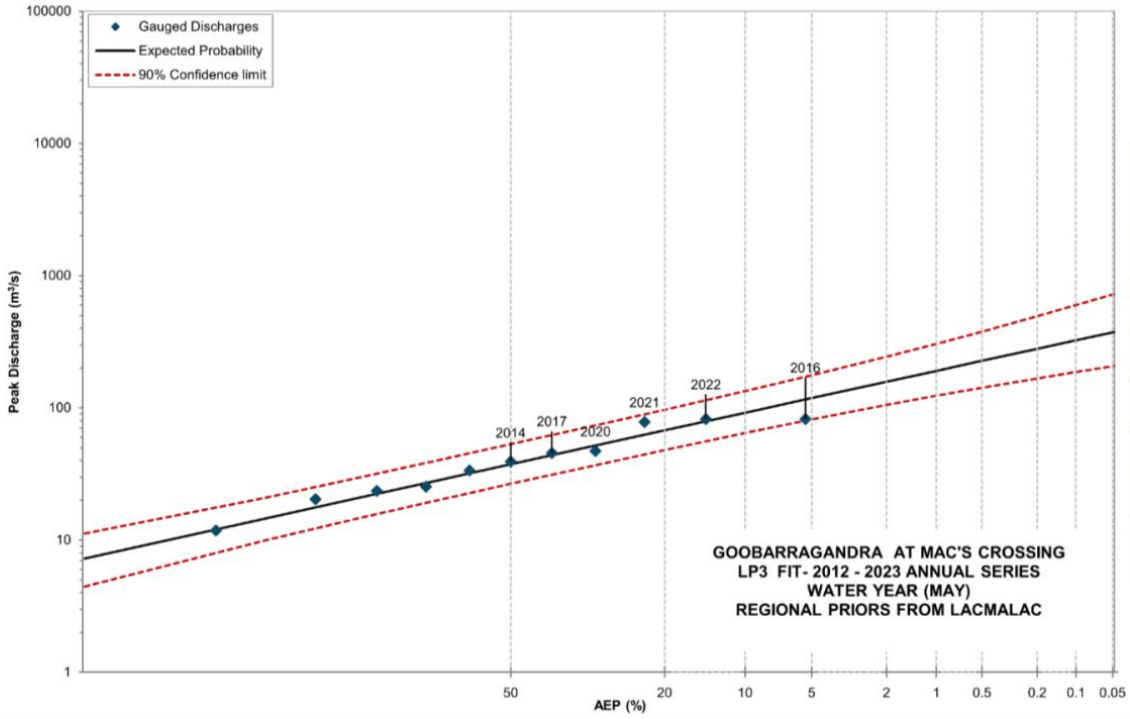
# Goobarragandra River at Mac's Crossing (41000261)




| Event (AEP) | Adopted Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 68 |
| 10 % | 92 |
| 5 % | 119 |
| 2 % | 158 |
| 1 % | 191 |
| 0.5 % | 227 |
| 0.2 % | 280 |

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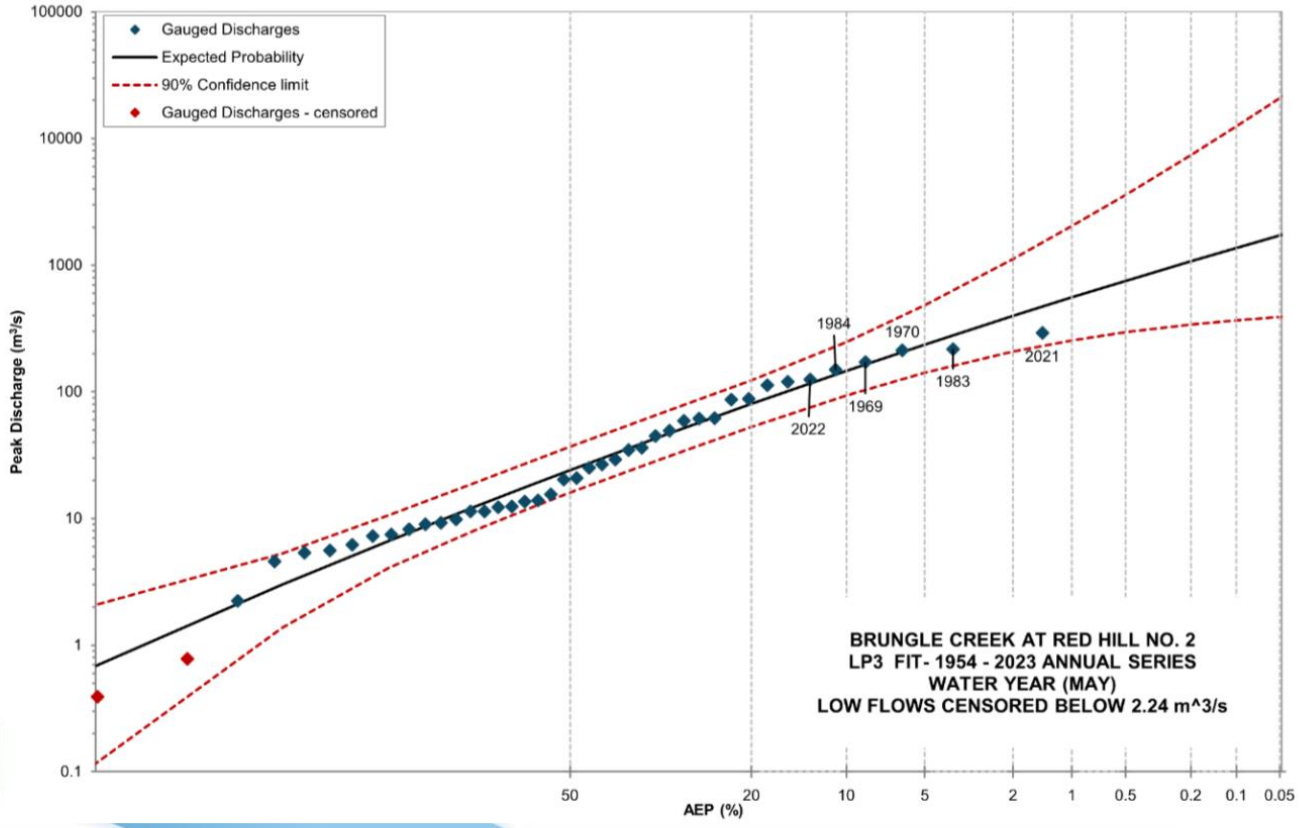
# Brungle Creek at Red Hill No.2 (41000261)




| AEP | Adopted Peak Flow ($m^3/s$) |
|---|---|
| 20 % | 81 |
| 10 % | 147 |
| 5 % | 236 |
| 2 % | 397 |
| 1 % | 556 |
| 0.5 % | 751 |
| 0.2 % | 1072 |

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# Next Steps

- Flood Frequency Analysis (FFA)
- Full Suite of Design Events: 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2% AEP and PMF
- Range of outputs from the Design Events:
  - Depths & Levels
  - Hydraulic Categories
  - Hydraulic Hazard
  - Flood Planning Area
  - Damages Assessment (Floor level database ongoing)

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