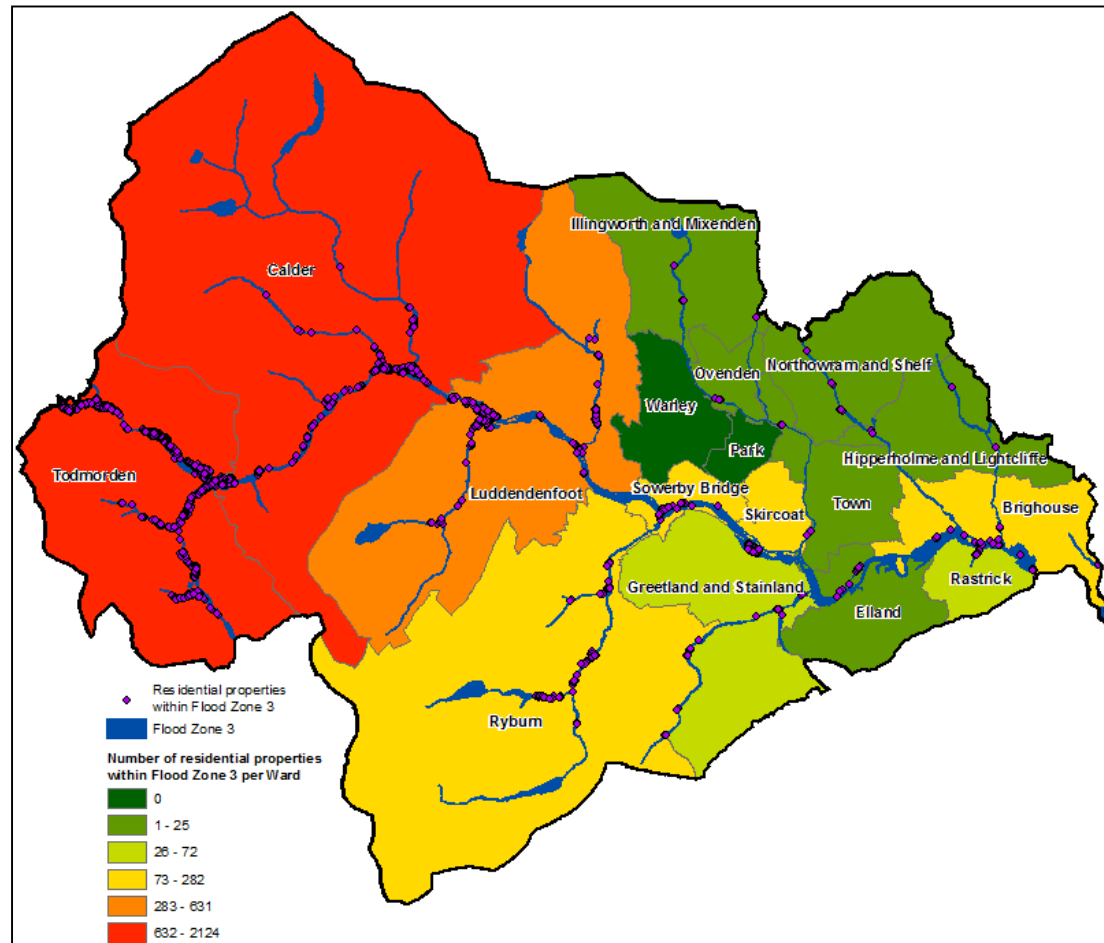


TACKLING FLOODING IN CALDERDALE OVER WINTER 2015

Mohammed Amjid
Engineer
Calderdale Council



The Catchment



- River Calder catchment.
- 19 main rivers.
- Approximately 7000 OWC.
- Development of the flood plain.
- Steep high gradient valleys.
- Rapid response to rainfall.

History of Significant Flooding

Date	Source
June 2000	Main river & surface water
July 2006	Main river, surface water and OWC
January 2008	Main river
November 2009	Surface water
June – August 2012	Main river, surface water and canal
December 2012	Surface water
July 2013	Surface water and OWC
July 2014	Surface water
December 2014	Surface water
November – December 2015	Surface water, main river and OWC

- 500 calls received on average per year on localised flooding.



Recent Investment Schemes

- Development of FRRS1 & 2
- **Shop Lock Todmorden**
 - Re-profiling of existing ground to alleviate flooding from overflow of the canal.
- **Bacup Road, Todmorden**
 - Installation of gullies to capture surface water runoff.
- **Nutclough, Hebden Bridge**
 - Improvements to trash screen and flow diversion.
- Gauxholme Overflow, Todmorden
- Pin Hill Lane, Midgley



Winter 2015 Flooding

Significant Events

- 15th November 2015
- 12th December 2015
- 26th December 2015



Localised Flooding

- Approximately 200 flooding reports received from 11/15 to 12/15
- High volume of requests to clear blocked highway infrastructure.



15th November 2015

Alerts and Preparation

- FFC and Met Office warnings received from 13/11/15 at 16:03
- EA set up incidence room. CMBC staff checked on critical areas and infrastructure

The Event

- Heavy persistent rainfall from 15:00 14/11/15 to 22:00 15/11/2015.
- Surface water flooding as a result of highway drainage surcharge. River peaks did not result in fluvial flooding.

Impact

- Residential and commercial properties affected.
 - Damage to infrastructure.
- 

15th November 2015 Major Impact



Hebble Brook trash screen failure.



Ovenden Brook flood Flows.



12th December 2015

Alerts and Preparation

- FFC and Met Office warnings received from 10/12/15 at 14:30
- EA set up incidence room. CMBC staff checked on critical areas and infrastructure. Hotspots attended to

The Event

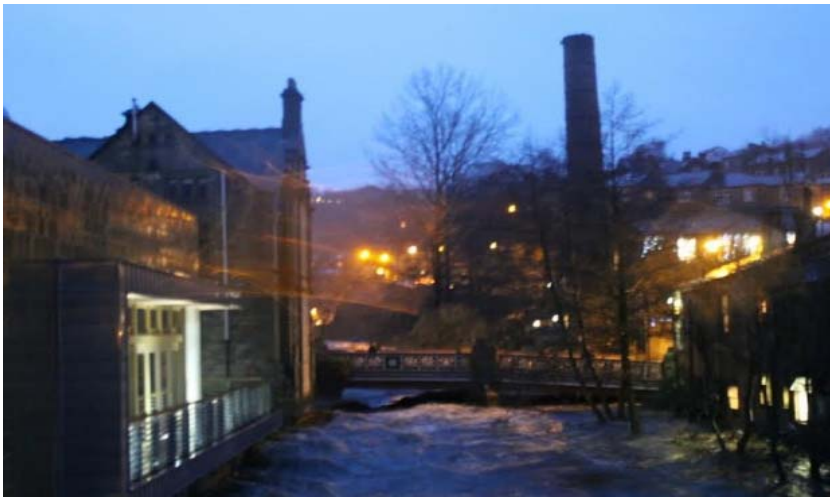
- Heavy persistent rainfall from 09:00 12/12/15 to 20:00 12/12/2015.
- Surface water flooding as a result of highway drainage surcharge. River peaks did result in fluvial flooding.

Impact

- Residential and commercial properties affected.
 - Damage to infrastructure.
- 

12th December 2015 Major Impact

- Unconsented culverting resulted in flooding to approximately 30 businesses in Brighouse.
- River levels on the River Calder were breached in Sowerby Bridge.
- River Hebden breached flooding Oldgate in Hebden Bridge and contributing to flooding in Market Street.



26th December 2015

Alerts and Preparation

- FFC and Met Office warnings received from 23/12/15 at 14:53. Severity updated on Christmas day.
- EA set up incidence room. CMBC staff checked on critical areas and infrastructure. Hotspots attended to.
- Extra resource and personnel bought in to carry out maintenance activities and respond to a possible event.
- Highway and land drainage critical areas updated and attended to following previous two event.
- Temporary infrastructure installed in areas damaged by recent flood event.
- Everyone hoping for the best (Christmas break!).



26th December 2015

The Event

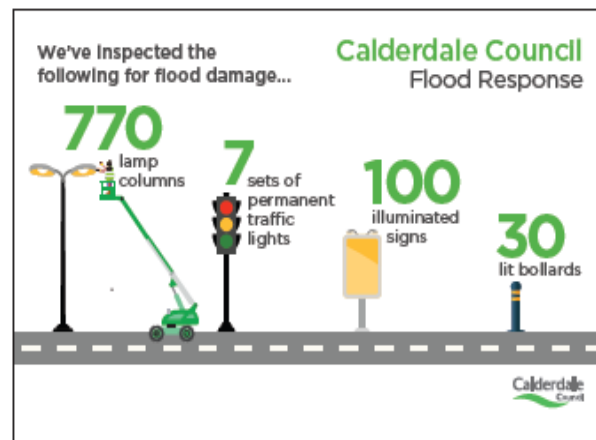
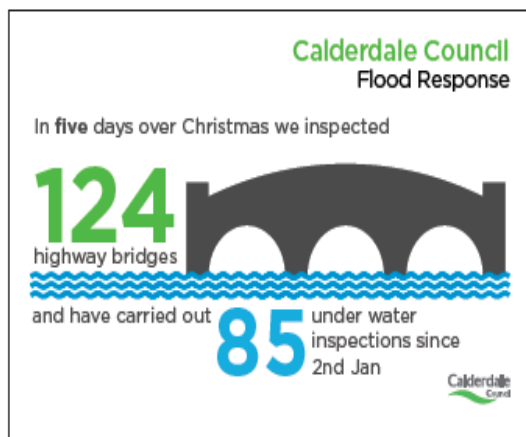
- Catchment conditions contributed significantly.
- Record river levels.
- Flooding from main rivers, OWC, surface water, sewers and highway drainage occurred.
- Backup of watercourses and debris blockages widespread.
- Some areas more extensively flooded than previous significant flood event of 2012.
- Most areas that experienced flooding from earlier events in 2015 experienced flooding again.



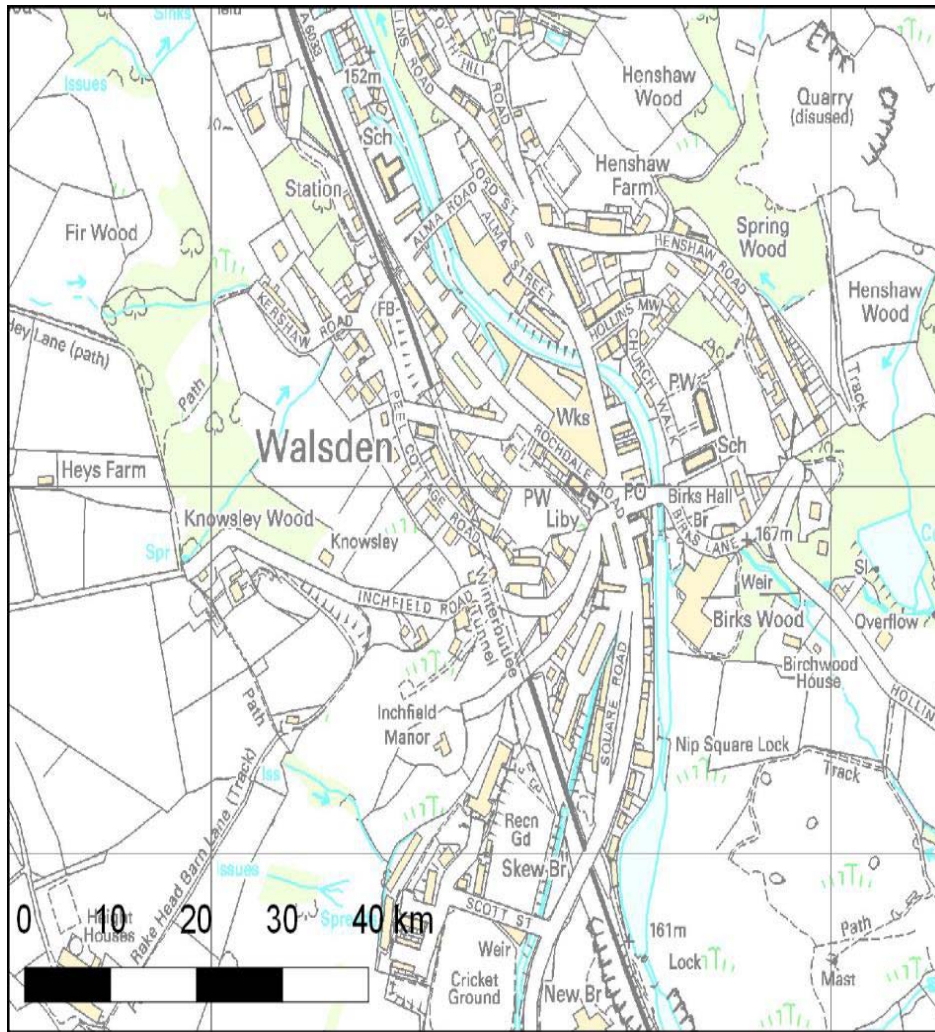
26th December 2015

Significant Impact

- Over 2500 residential premises and over 1500 business premises affected.
- Significant damage to highway assets and infrastructure.
- 10 substations affected
- Utility infrastructure including pump stations affected.
- Numerous landslips.



26th December 2015 Impact

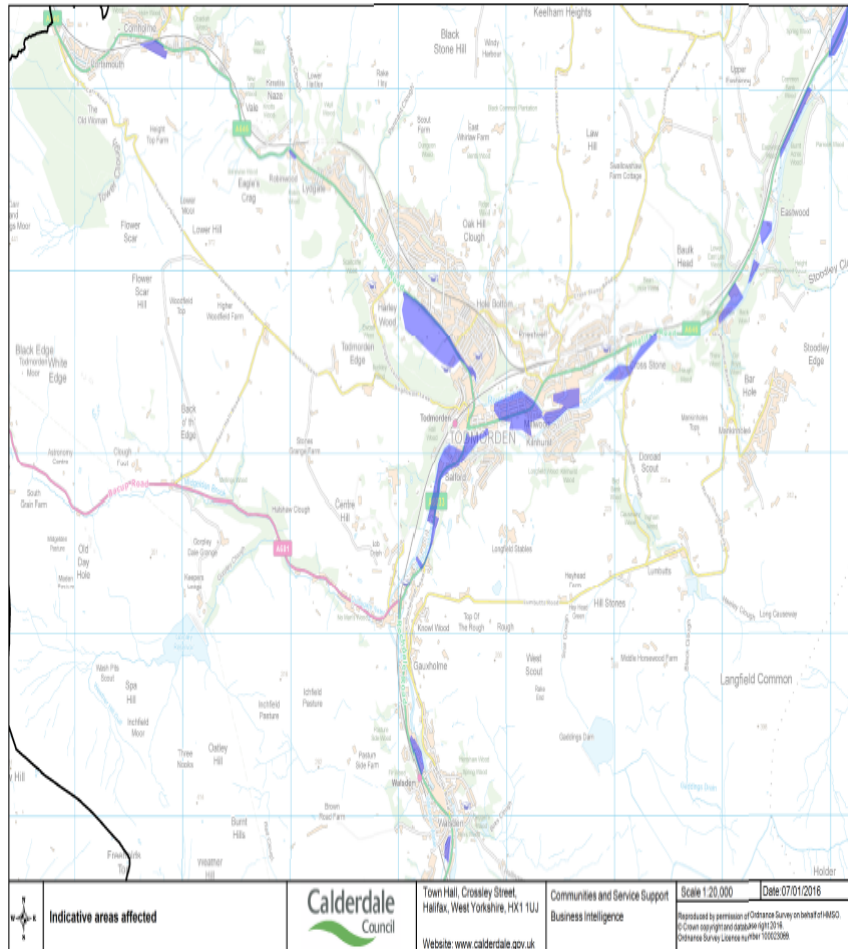


Walsden

- Fluvial flooding occurred on the morning of 26/12/15.
- Railway bridge overtopped resulting in flooding of Rochdale Road.
- Back up of culvert caused flooding to properties.
- Various streams of flood flows converged on Rochdale Road significant impact to properties and highway.

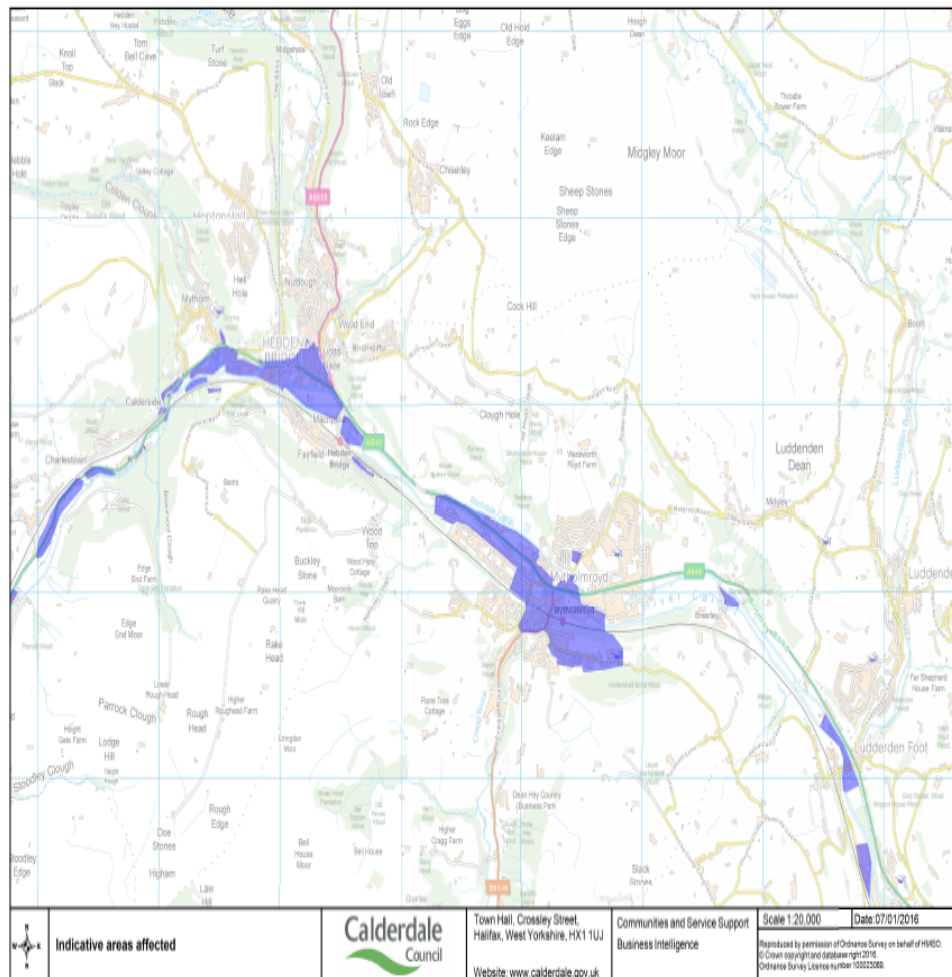
26th December 2015 Impact

Todmorden



- Walsden Water overtopped new defences albeit at a lower level than 2012 floods.
- Canal flooding combined with flood flows from Walsden caused significant impact to businesses.
- Back up of drains and rising groundwater caused flooding to residential properties.
- Blocked trash screen caused further flooding.

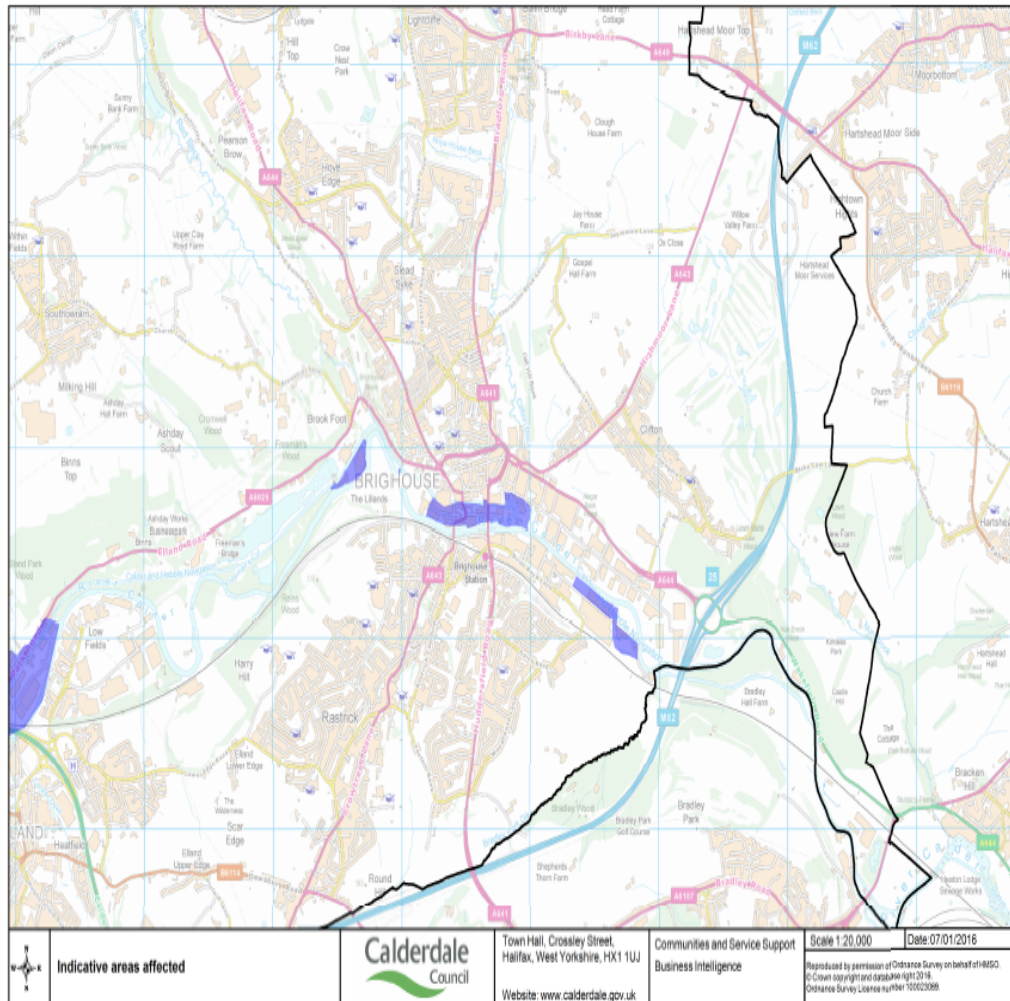
26th December 2015 Impact



Hebden and Sowerby Bridge

- Hebden Water, River Ryburn and River Calder caused fluvial flooding.
- Canal flooding combined with upstream flood flows caused significant impact to businesses.
- Reported maximum flood depth of 2m.
- Combination of canal, pluvial and fluvial flooding occurred in some locations.

26th December 2015 Impact

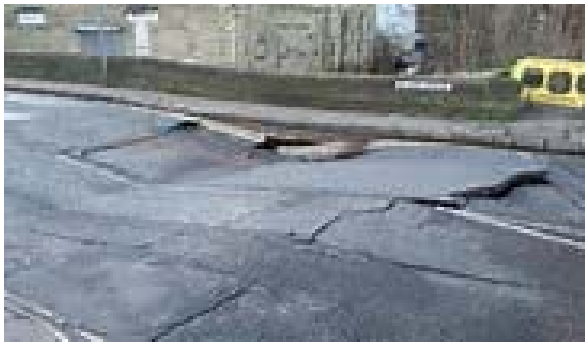


Brighouse

- Significant pluvial flooding.
- Canal flooding combined with fluvial flooding from the River Calder.
- Area more susceptible to sewer flooding.
- Historic works to Clifton Beck resulted in flooding to approximately 40 businesses.

26th December 2015 Impact

Major Infrastructure Affected



Elland Bridge



Scout Road



A646 Falling Royd



Copley Bridge



Midgley Road



Crowther Bridge



Post Flood Event Actions

- Post flood surveys conducted by the Environment Agency.
- Assessment of critical and reported infrastructure.
- Five flood hubs set up.
- Affected businesses and residents visited.
- Investigations on-going by CMBC.
- Grants made available to businesses and residents.
- 2000 tons of waste material removed.
- Section 19 investigation.
- Flood Commission set up.
- Review of flood risk management within CMBC.
- Review of implemented and proposed flood resilience schemes including identification of possible new schemes.



Success of Investment Schemes

- **Shop Lock Todmorden**
 - Re-profiling of existing ground to alleviate flooding from overflow of the canal.
- **Bacup Road, Todmorden**
 - Installation of gullies to capture surface water runoff.
- **Nutclough, Hebden Bridge**
 - Improvements to trash screen and flow diversion.
- Gauxholme Overflow, Todmorden
- Pin Hill Lane, Midgley

Could implementation of further planned schemes have reduced the impact??



Lessons Learnt

Prevention

- More efficient mechanism to deliver flood defence schemes.
- Further studies on critical infrastructure being compromised.
- Increased resilience measures.
- Improved catchment monitoring.

Response

- More relevant flood warnings from all agencies.
- Increase public awareness.
- Better coordination and communication between all stakeholders.

Post Flood Event

- Quantify vulnerability of those affected.
- Improve data sharing between all stakeholders – central database?



Any Questions

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