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Resilience to Fluvial Flooding: Knowns and Unknowns

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Understanding Fluvial Flooding

The construct of "Known Knowns, Known Unknowns and Unknown Unknowns" was used to assess scientific knowledge on fluvial flood generation, management and resilience through a literature review and stake-holder workshop. VOSviewer was used to and visualise thousands of publications in terms of keywords. Four themes emerged from the analysis (Figure 1):

1. **Climate Change (Blue)**
2. **Flood Generation Hydrology (Red)**
3. **Natural Flood Management (Yellow/Green)**
4. **Stakeholder Engagement (Yellow).**

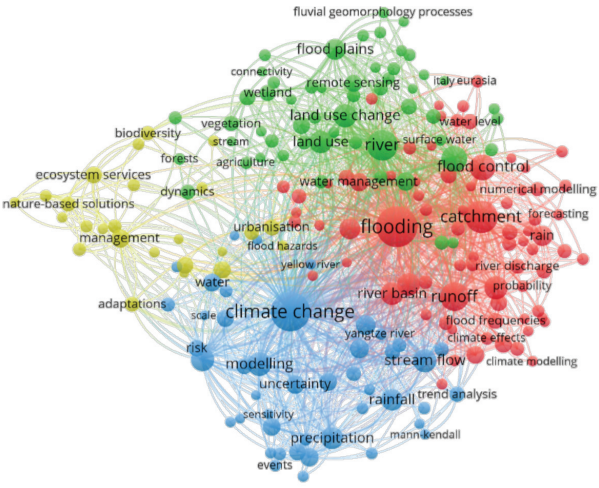

Figure 1: Network Analysis Map based on Keywords

Knowns

Climate Change:

- Expected increase in winter rainfall will increase the likelihood of fluvial flooding.
- The north and west of Scotland will likely experience higher percentage increases in precipitation and flood peaks.

Flood Generation Hydrology:

- Rainfall to runoff is a non-linear process and is catchment and event specific.
- Desynchronising flood peaks from tributaries reduces flow downstream.

Natural Flood Management:

- NFM can slow the flow in small catchments for small storms.

Stakeholder Engagement:

- Intentional stakeholder engagement is essential for flood risk management.

Unknowns

Climate Change:

- How will uncertainty of probabilistic climate modelling be accounted for in fluvial flood management?

Flood Generation Hydrology:

- Can NFM achieve the lag times required to desynchronise tributaries?
- Is it possible to generalize the processes that cause floods which are catchment and event specific?

Natural Flood Management:

- Is NFM effective at larger spatial scales and larger storm events?

Stakeholder Engagement:

- How can Scotland achieve a fair, safe, and affordable level of flood resilience in the long term while meeting other goals?

Please reference this project summary as follows: Pattison I, Lewis CME, Tabas AD (2024) *Resilience to Fluvial Flooding: Knowns and Unknowns Project Summary.* CSPF2023_02. Centre of Expertise for Waters (CREW).
To access the outputs project, please visit: crew.ac.uk/publication/fluvial-flooding-knowns-and-unkowns

Visual minutes from project workshop.
Graphic Artist: Jenny Capon.