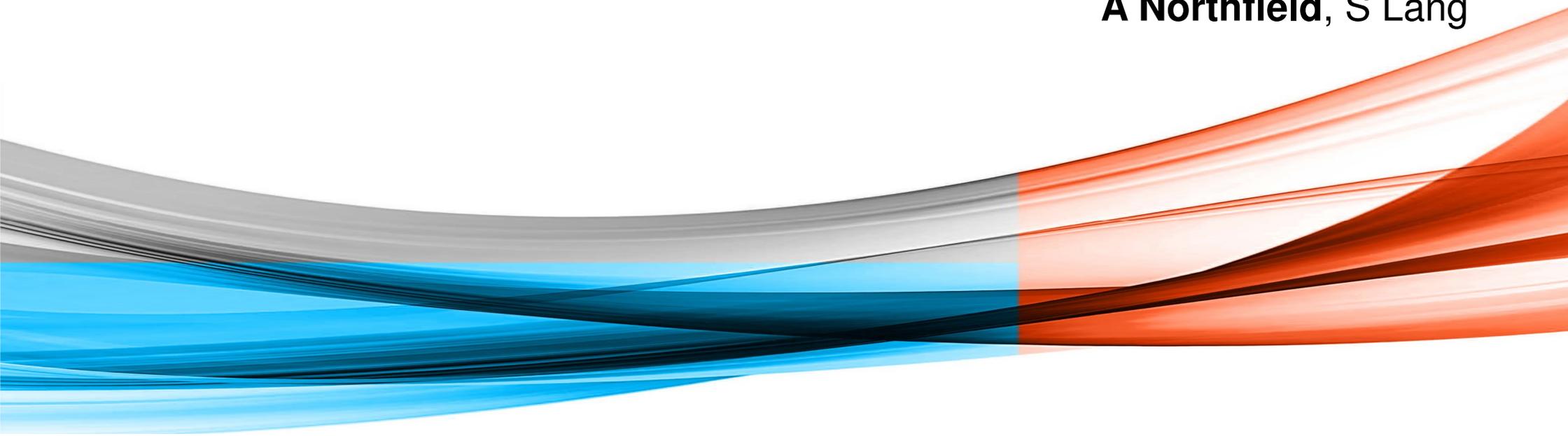


ESTIMATING THE CONSEQUENCES OF RETARDING BASIN FAILURES

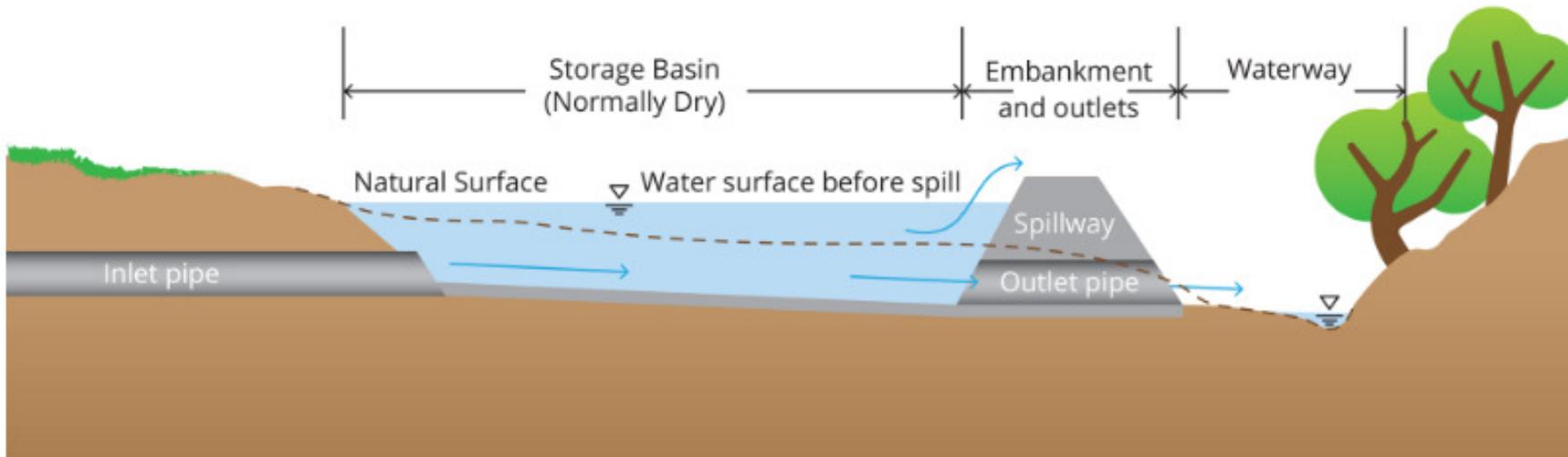
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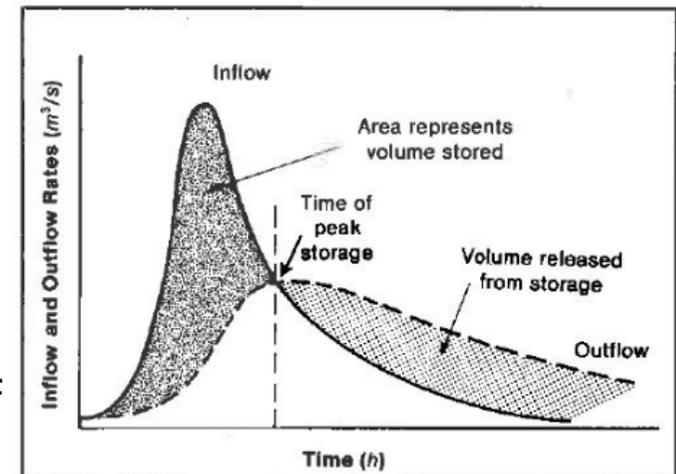
Outline

- Context
- Decision Making Tool
- Development of Guidance Notes
- Key Findings
- Conclusions

Context



Diagrams from Australian Rainfall and Runoff



Context

- In Victoria, the safety of dams is regulated by the Department of Environment, Land, Water and Planning (DELWP)
- Dam Safety Commission (DSC) in NSW
- The Australian National Committee on Large Dams (ANCOLD), has produced a number of recommended guidelines relating to dam safety.

Context

Melbourne Water manage the safety of their retarding basins using the risk based approach advocated by ANCOLD

$$\text{Risk} = \text{Consequences} \times \text{Likelihood}$$

Potential Loss of Life (PLL)
Severity of Damage and Loss

Probability of failure

Context

The challenge:

Assessing the risks posed by retarding basins using methods developed for larger dams can overstate (or understate) the flood risk, if not applied carefully

Context

The Response:

- Decision making tool for assessing the level of ANCOLD Consequence Assessment that is justified, based on RB attributes
- Guidance Note on Consequence Assessment (HARC 2016)
- Guidance Note on Failure Probabilities (Jacobs 2016)

Decision Making Tool

Under the ANCOLD Guidelines on the Consequence Categories for Dams (ANCOLD, 2012) there are three levels of assessment



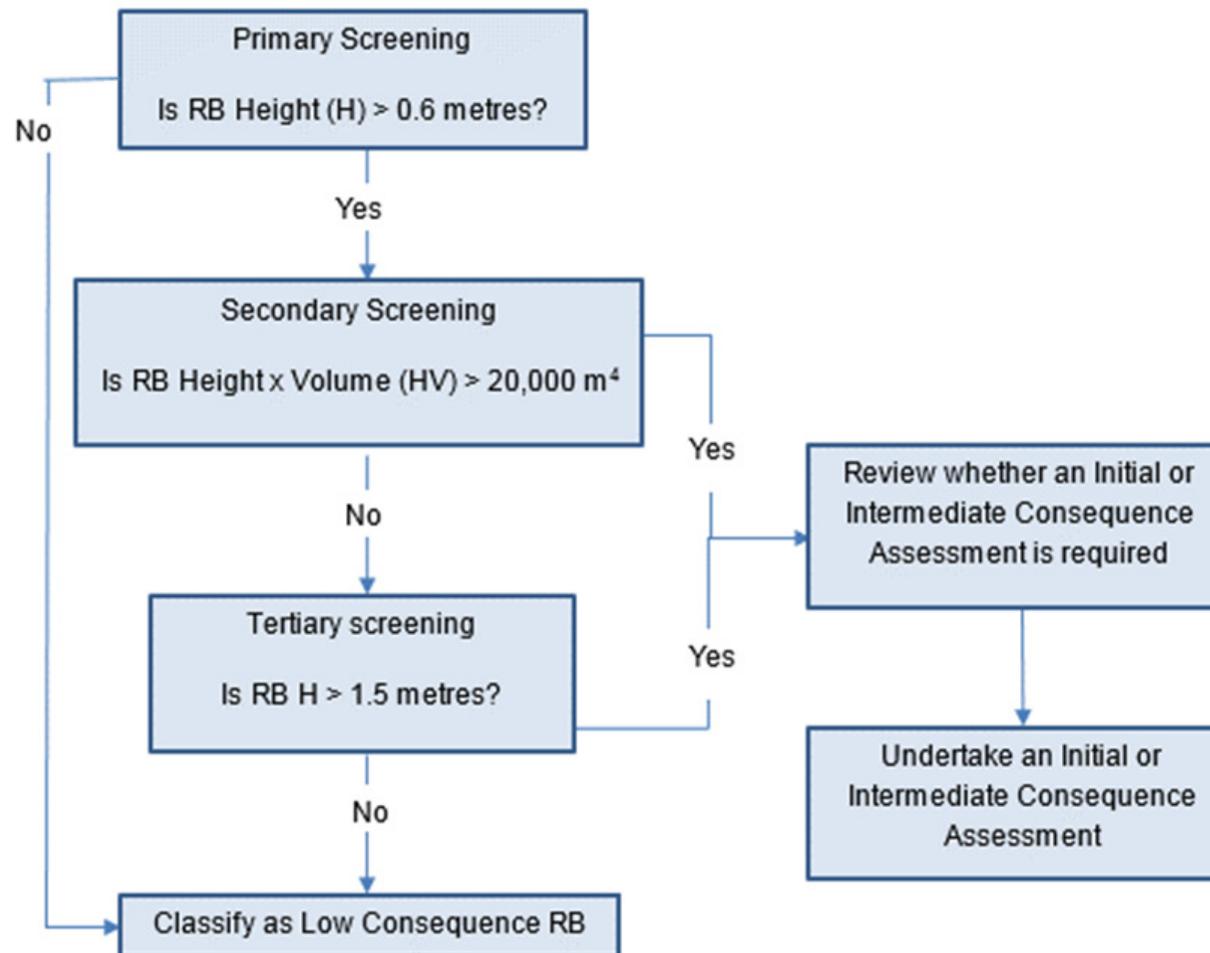
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graph LR; A[Initial] --> B[Intermediate]; B --> C[Comprehensive];
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Initial

Intermediate

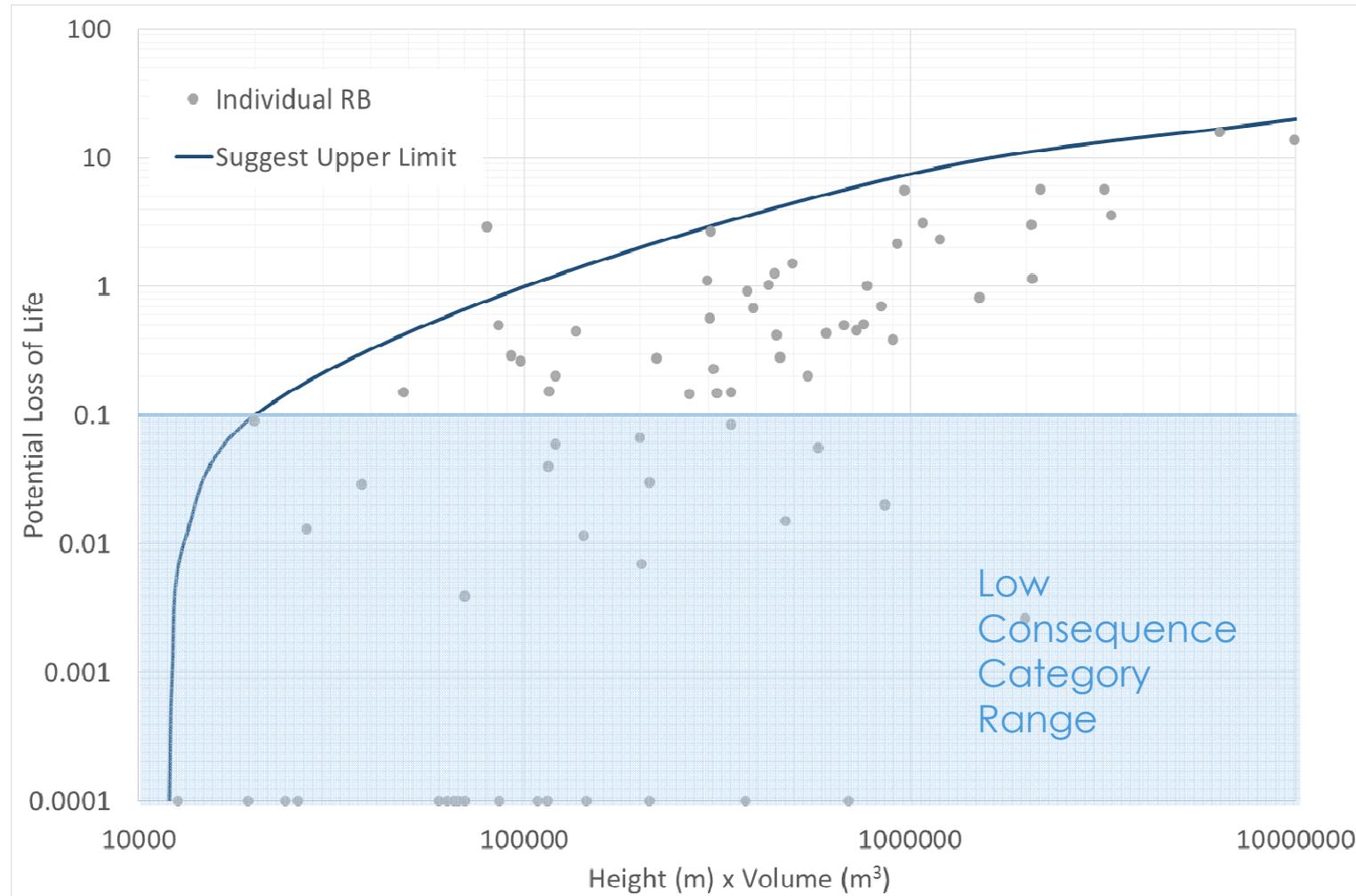
Comprehensive

Decision Making Tool



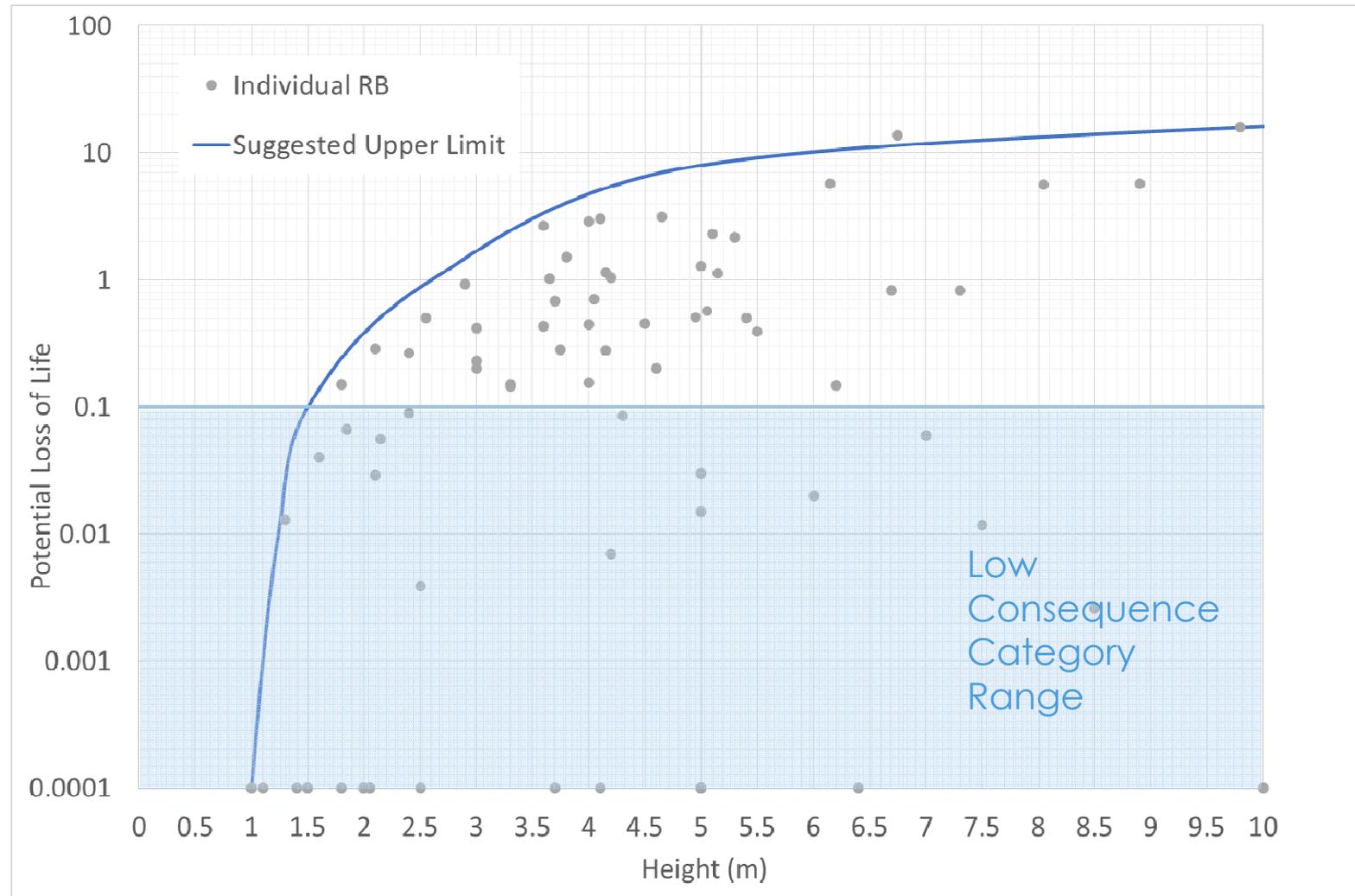
Decision Making Tool

Secondary Screening



Decision Making Tool

Tertiary Screening



Key Findings

- Applied to 88 RBs
- 54 could be classified as Low Consequence
- Remainder required a Consequence Assessment

Development of Guidance Notes

- Guidance Notes that were tailored to enable experienced practitioners to facilitate a consistent approach to risk assessments for RBs
- Live documents, with the intention being to periodically update them to reflect best practice

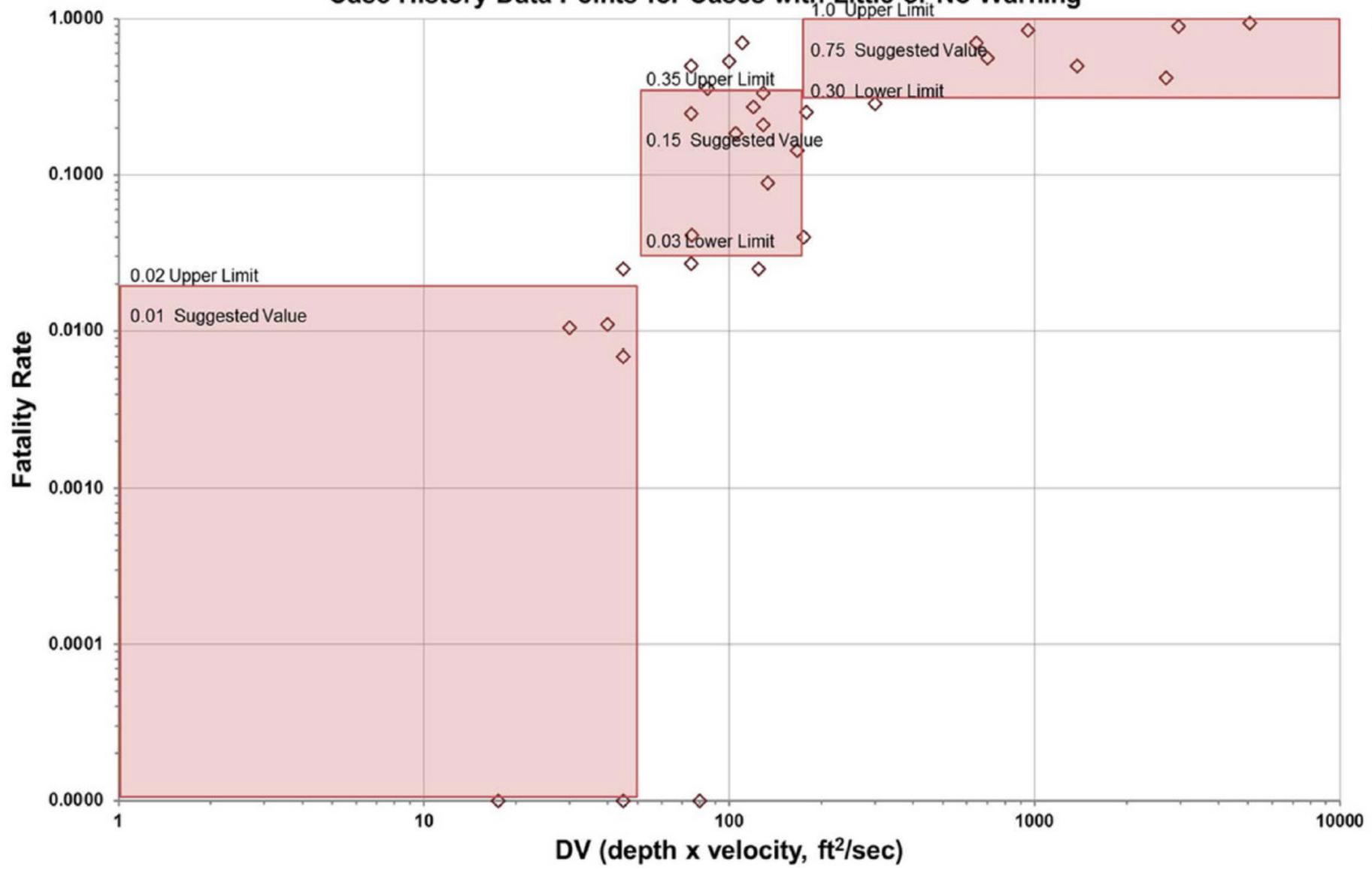
Development of Guidance Notes

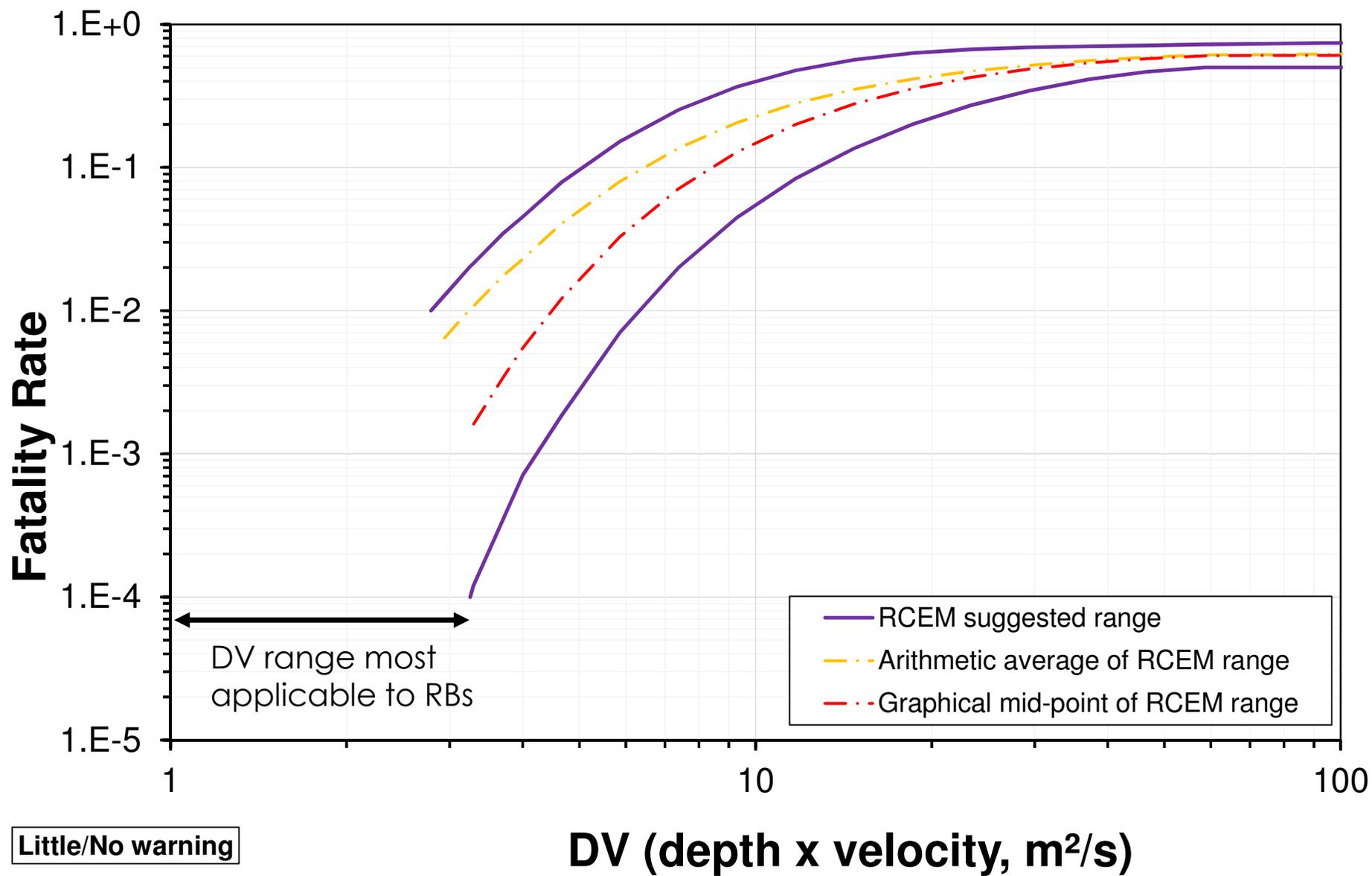
- For further details on the Failure Probabilities Guidance Note see Sih, K., Rodd, R., “Retarding Basin Portfolio Risk Assessment – Life in the fast lane” Proceedings of the 2016 ANCOLD/NZOLD Conference

Development of Consequence Assessment Guidance Note

- Consistent with ANCOLD Guidelines but tailored to the PLL assessment for RBs
- The Graham (1999) empirical model is the most widely applied approach for estimating PLL from dambreak flooding and is recommended by ANCOLD, 2012

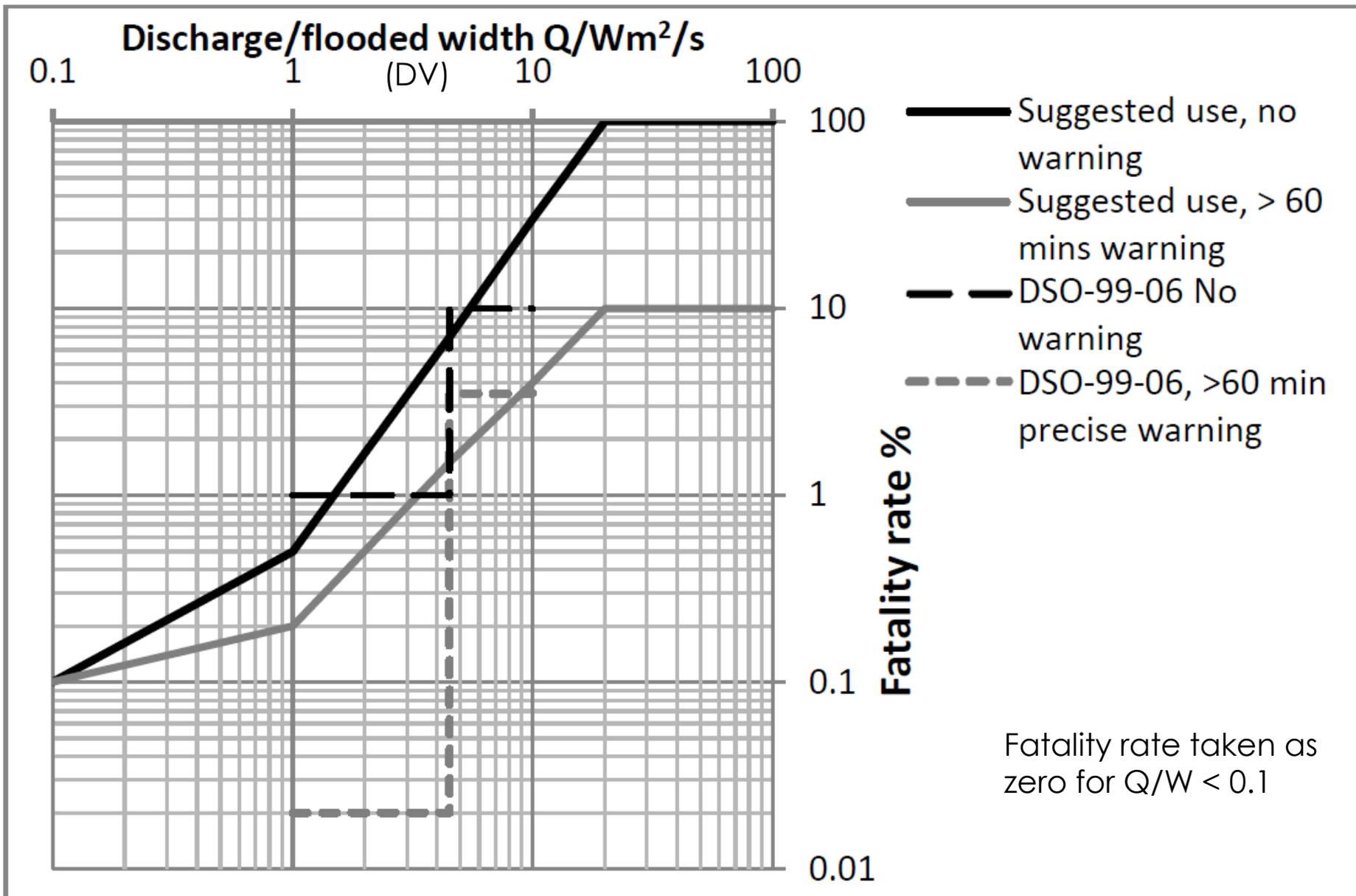
DSO-99-06 Fatality Rates and Case History Data Points for Cases with Little or No Warning



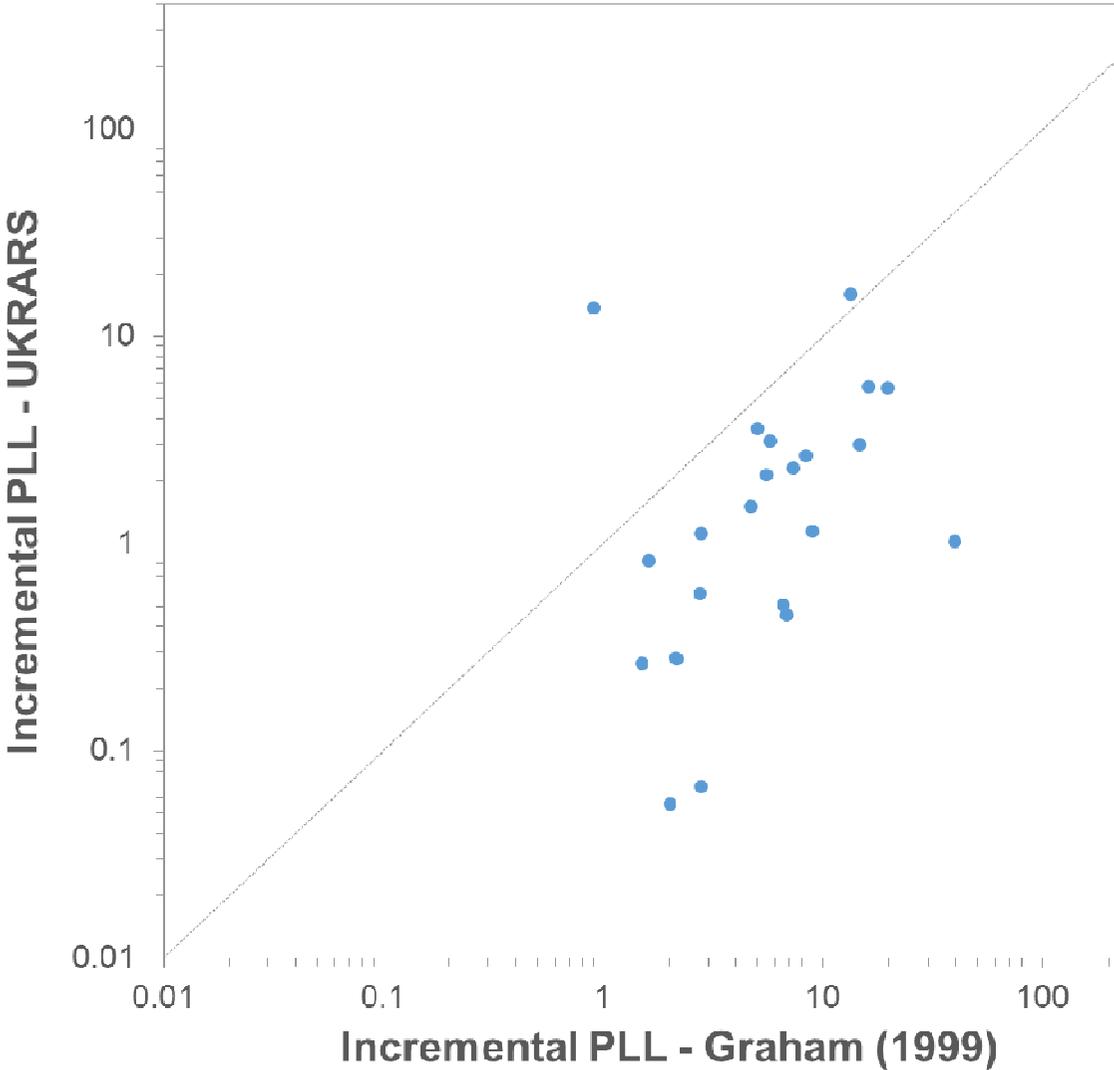


Development of Consequence Assessment Guidance Note

- Six methods were applied to a number of case study to estimate the PLL
- The UKRARS method was recommended as it reduces fatality rates towards zero as flood severity decreases



Key Findings



Conclusions

- The decision making tool could be considered to inform the level of consequence assessment that is required
- Consider using or adopting the principles from the Guidance Note to assist in developing a better understanding of the consequences and risk profile

Additional Research

- Linking fatality rate to flood severity, for smaller floods, to improve the PLL estimates for RBs

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