

# Dam Break Analysis in an Australian Context

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# Dam Break Analysis in Australia

## How Is It Different?

ITS NOT. BUT IT IS USED FOR AUSTRALIAN APPLICATIONS

- Not unique, but have a local flavour
- Importance of analysis accuracy is shaped by sensitivity of decisions.

## Dam Break Modelling Applications

ASSESS RISK POSED TO THE DOWNSTREAM COMMUNITY

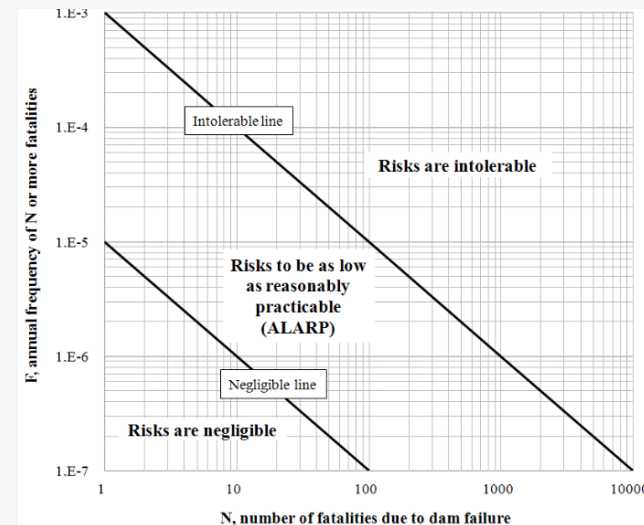
- Identify a defined risk Category
- Quantify the risk algebraically
- Characterise flood progression for emergency planning

## Australian Themes (State Based)

REDUCING APPETITE FOR RISK

- Substantial Upgrade Costs
- Dam Break analysis for very small dams (0.5 m high)

Incremental Potential Loss of Life (PLL)	Severity of Damage and Loss			
	Minor	Medium	Major	Catastrophic
<0.1	Very Low	Low	Significant	High C
≥0.1 to <1	Significant	Significant	High C	High B
≥1 to <5	(Note 1)	High C	High B	High A
≥5 to <50		High A	High A	Extreme
≥50	(Note 1)	(Note 1)	Extreme	Extreme



# So What Does It mean For Dam Break in Practice?

## Dam Break Parameters Matter

THERE IS SUBSTANTIAL VARIABILITY

- Breach times, breach widths double or triple
- Outflows are order of magnitude accuracy
- We want to get it right so investment is appropriate

## Or Do They?

SENSITIVITY IS KEY

- Inputs vary substantially
- Investment decisions based on outcomes
- Model understanding is important



# Dam Break Sensitivity

## Dam Break Analysis Aim

INFORM INVESTMENT DECISIONS

- Correct dam break parameters are not the aim.
- Correct risk assessment categorization is the aim.

## Sensitivity

INVESTIGATE PARAMETERS IN CONTEXT

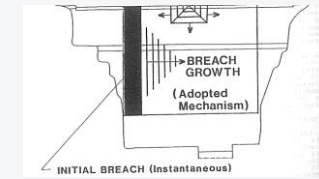
- Do parameters affect risk categorization?
- Do forget other parameters esp. Consequence assessment
- Understand relative importance
- Dam break outflow estimates have order of magnitude accuracy
- Fortunately, risk is assessed at order of magnitude scale

## Its OK Not to Know

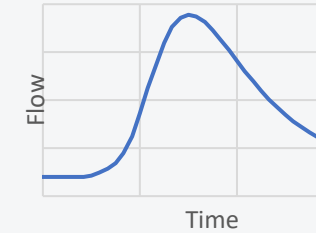
REPORT OUTCOMES TO CLIENT

- Thorough understanding allows informed decision making

## DAM BREAK PARAMETERS



## DAM BREAK HYDROGRAPH



## FLOOD INUNDATION



## CONSEQUENCE EVALUATION

# \$ + LIFE SAFETY

## RISK CATEGORY

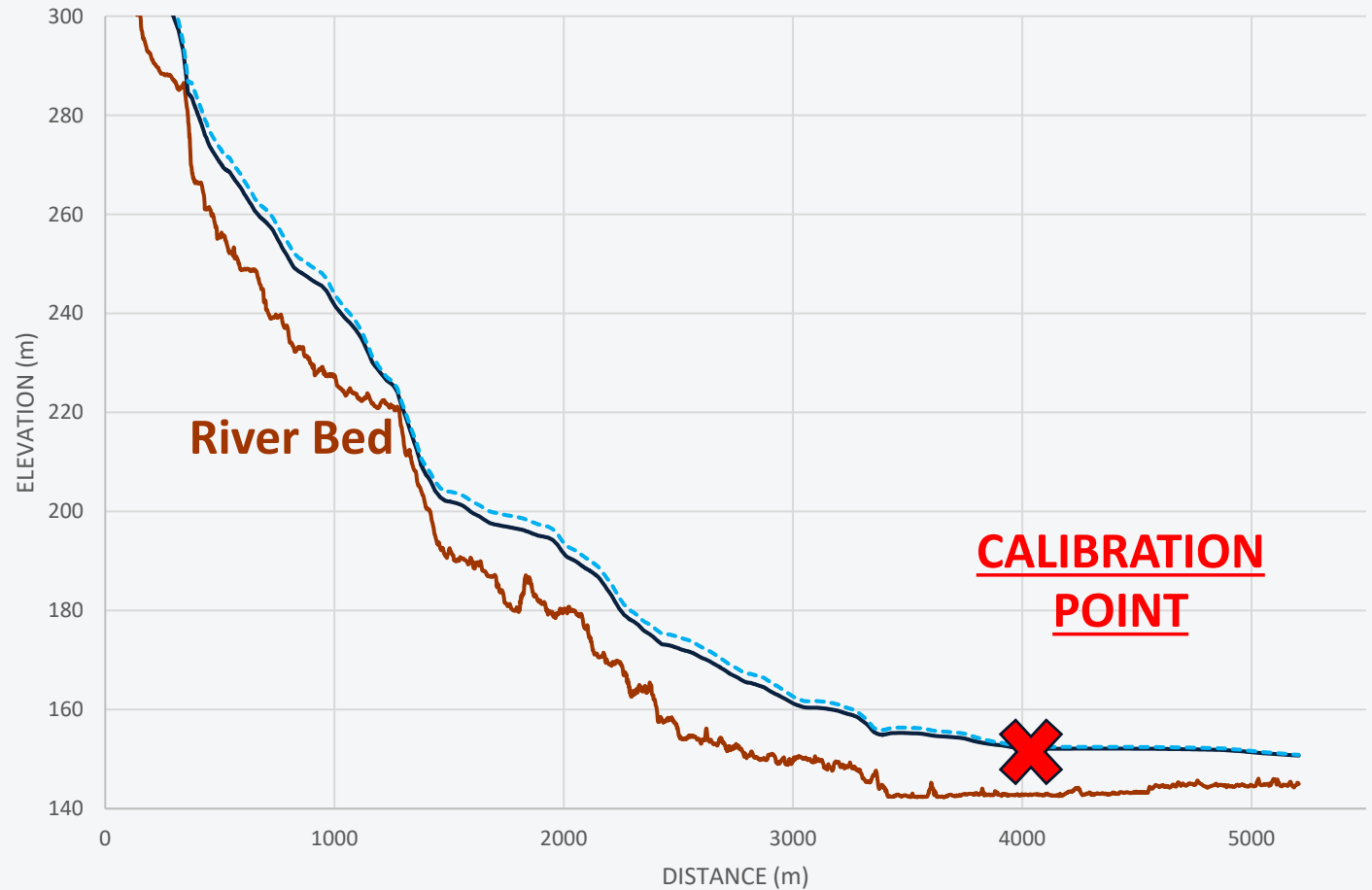


# Example Sensitivity

## Failed Dam

BUILT (1920s) FAILED REBUILT

- Height 27 (m)
- Volume 3,500 (ML)
- Modelled Width 1: 30 m, Modelled Width 2: 60 m
- OUTCOMES
  - Dam Location: 3 m difference
  - Calibration point (building floor level): 0.4 m difference
  - Risk Assessment Result: Insensitive



# Key Messages

## Sensitivity

BREACH FLOW ESTIMATION IS HIGHLY UNCERTAIN

- Utilise sensitivity analysis to determine if outcomes are sensitive to parameters
- Incorporate other parameters into analysis to assess dam break sensitivity in context
- Report on potential variability in outcomes.
- Define uncertainty to allow for informed decision making by the client.





# Q&A

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