



# Expanding The Scope Of Flood Risk Management In New Zealand

## Telling better stormwater stories

Julian Fyfe, Craig Martell, Ben Fountain  
Awa Environmental

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**Stormwater2026**

12 – 14 May | NZICC, Tāmaki Makaurau/Auckland

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# UNDRR



A hazard can lead to death, injury, property loss, or environmental harms.

Loss of life Injury Damage or destruction

It's the result of the interaction between hazard, exposure, and vulnerability



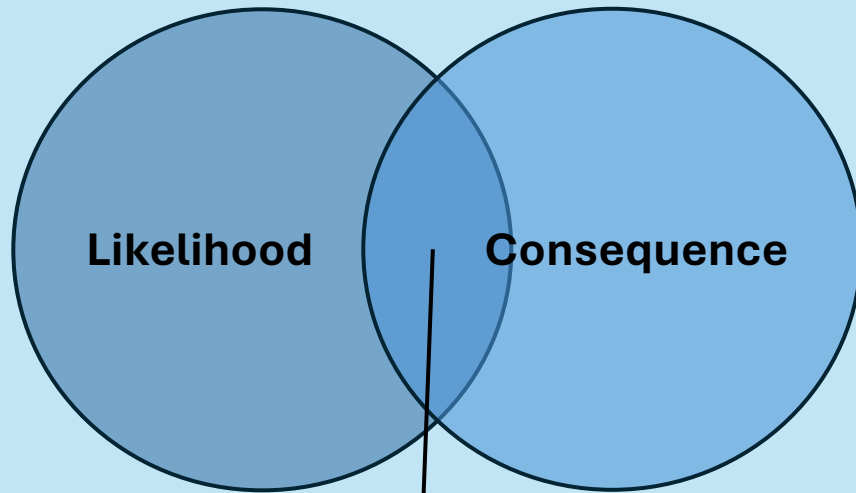
These factors determine how severely people are affected



Risk multiplies when vital assets and lives are exposed to hazards

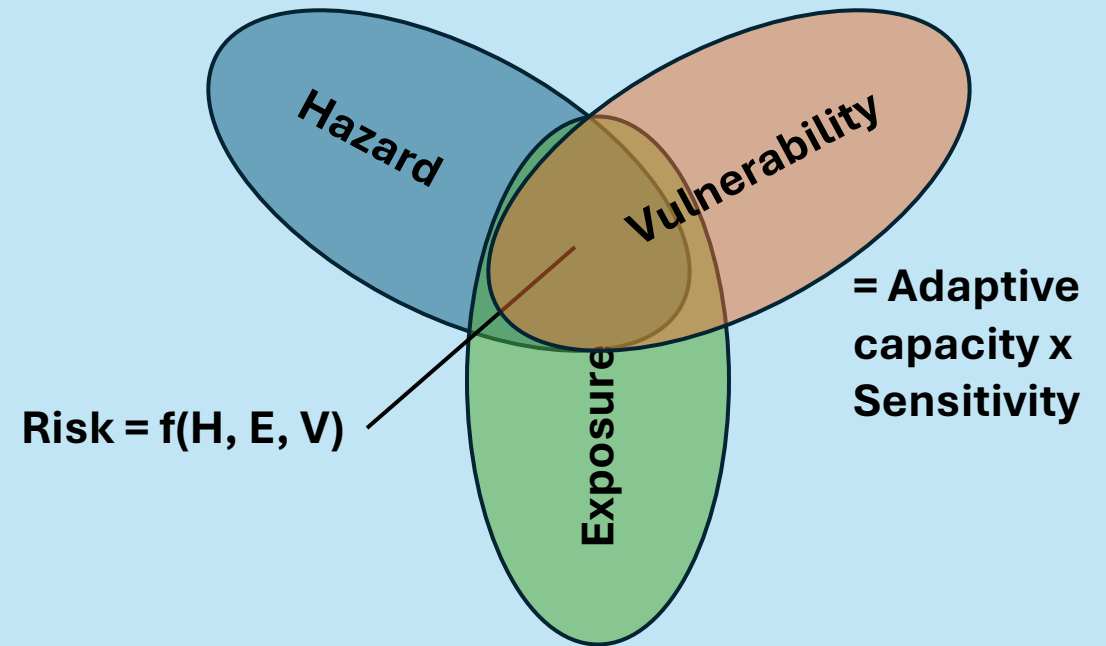
# Risk Assessment Methodologies

## Conventional



$$\text{Risk} = f(L, C)$$

## NCCRA/IPCC



$$\text{Risk} = f(H, E, V)$$

= Adaptive  
capacity x  
Sensitivity

# PARA framework for hazard management

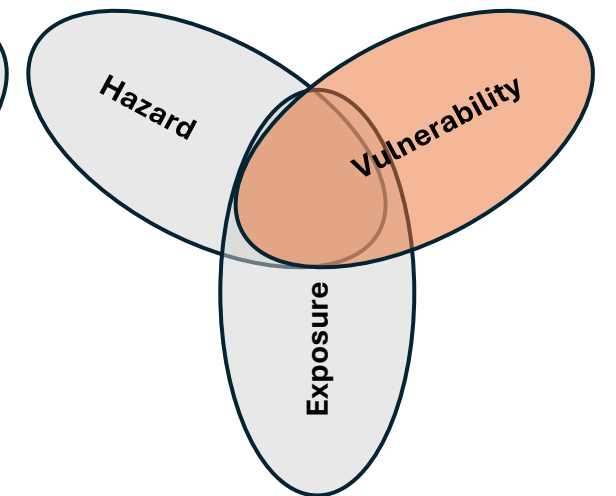
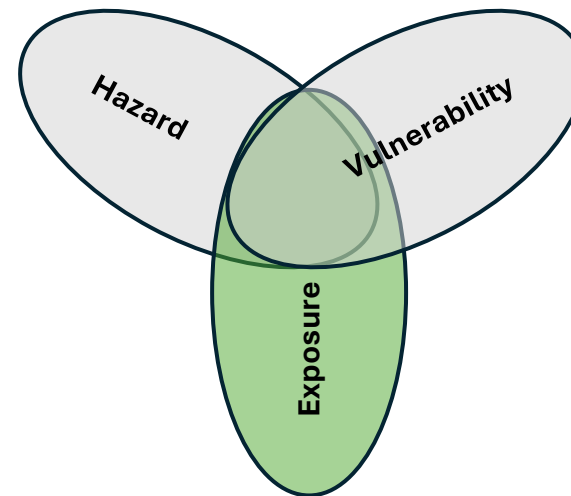
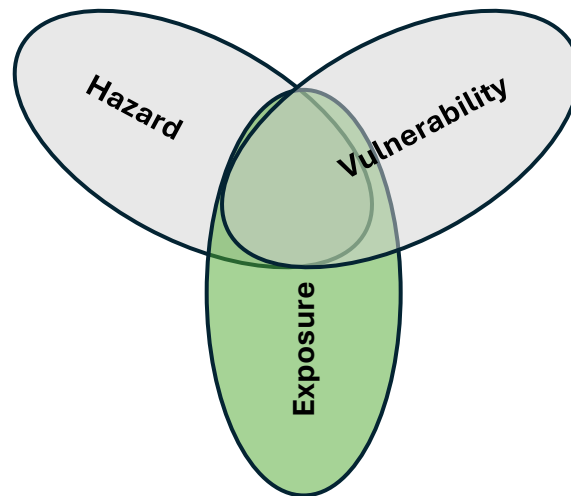
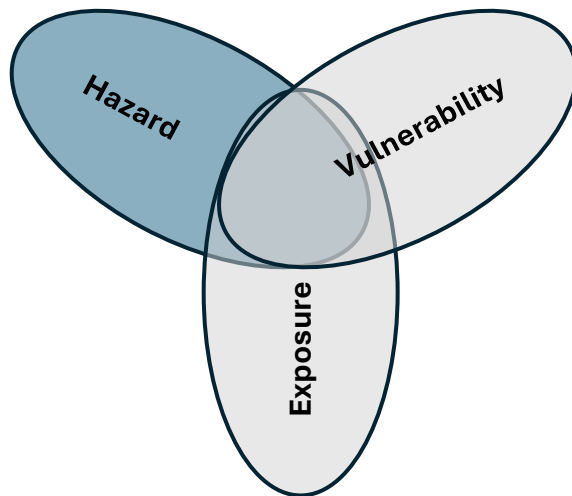


Protect

Avoid

Retreat

Accommodate



# What's at risk?

**Economic**



**Human Safety**



**Recovery & Resilience**



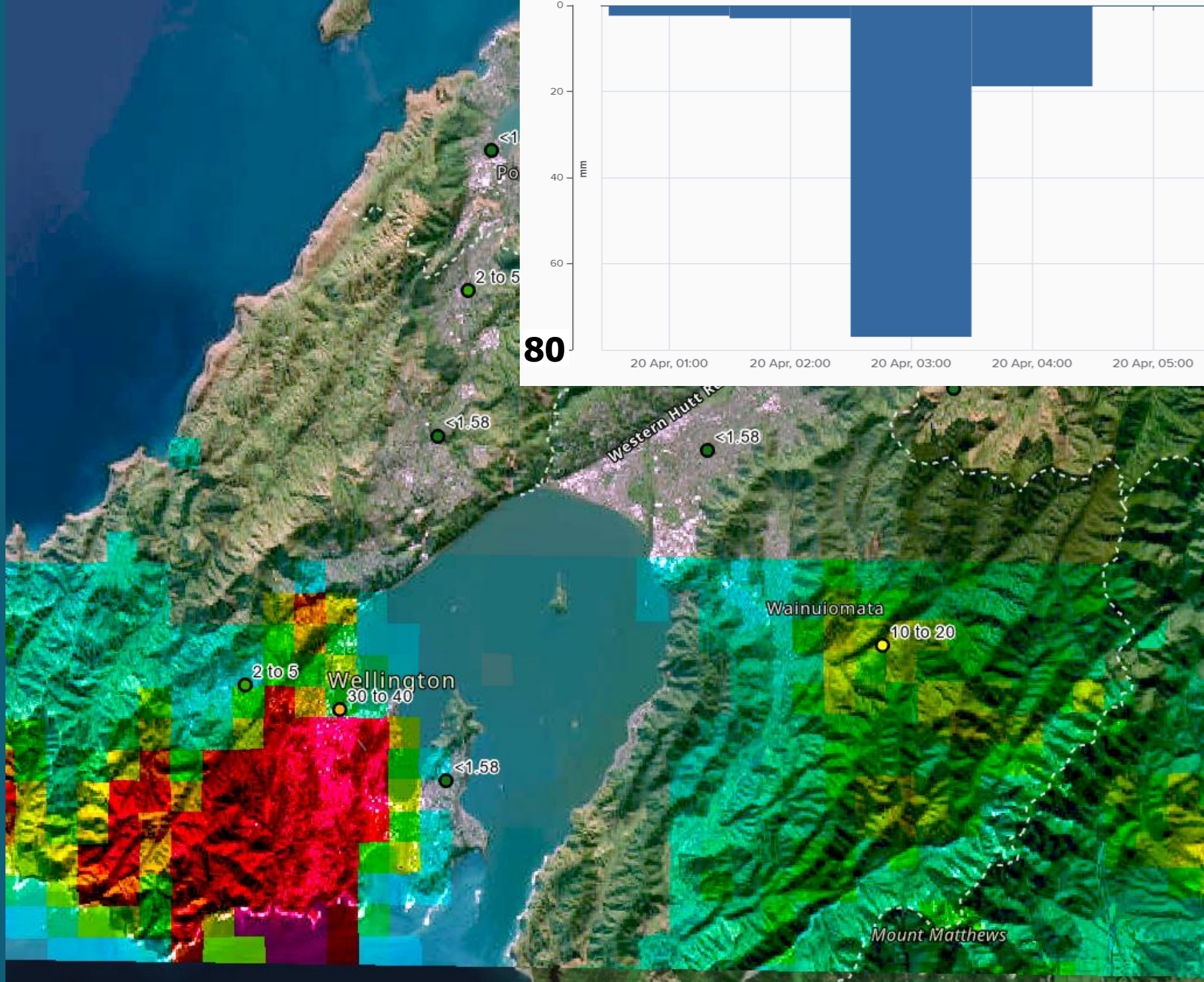
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A stylized graphic of three white, overlapping mountain-like shapes or waves, positioned to the right of the 'water' text.

# 20 April 2026



Posted Wellington Alive FB



Posted Wellington Alive FB





Posted Wellington Alive FB

Posted Wellington Alive FB



# Unhelpful



*Image generated with Ai*

# Unhelpful



Assumed to be AI generated

# What's at risk?

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A stylized graphic of three white mountain peaks or waves, positioned to the right of the 'water' text.

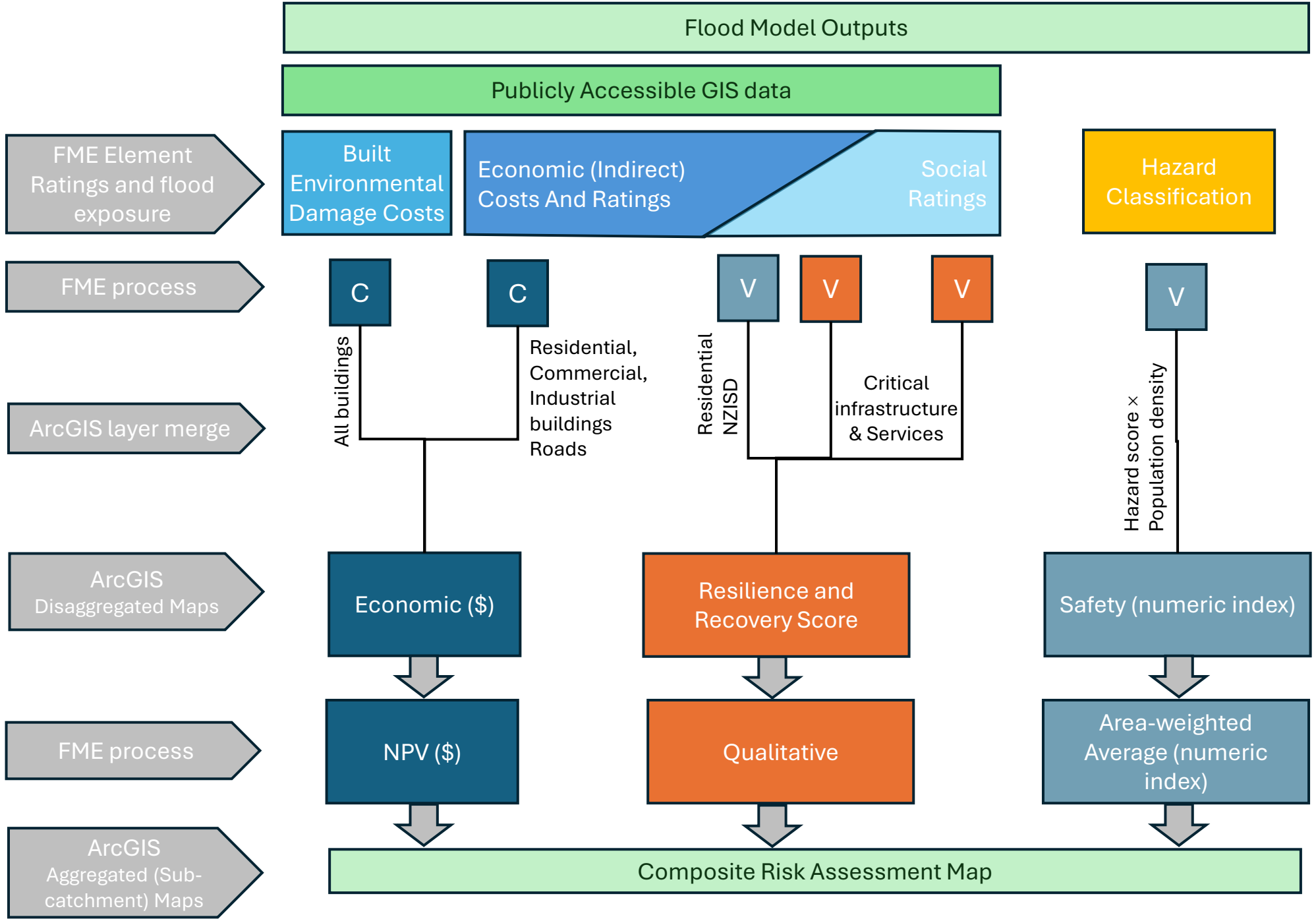
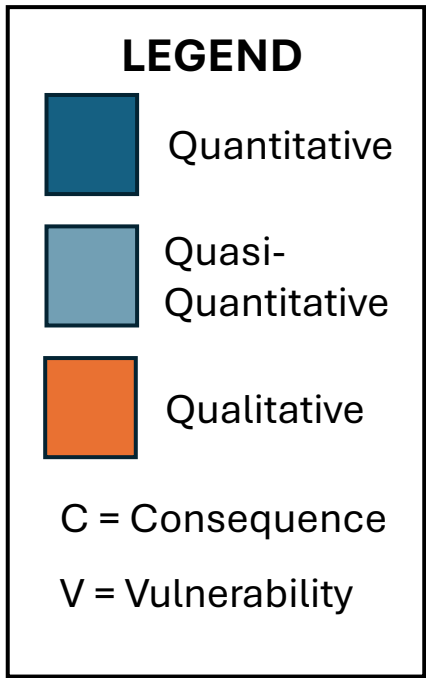


# Risk Assessment Tool

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Flood Model Outputs

Publicly Accessible GIS data

FME Element Ratings and flood exposure

Built Environmental Damage Costs

Economic (Indirect) Costs And Ratings

Hazard Classification

FME process

C

C

V

V

V

V

ArcGIS layer merge

All buildings

Residential, Commercial, Industrial buildings Roads

Residential NZISD

Critical infrastructure & Services

ArcGIS Disaggregated Maps

Economic (\$)

Resilience and Recovery Score

Safety (numeric index)

FME process

NPV (\$)

Qualitative

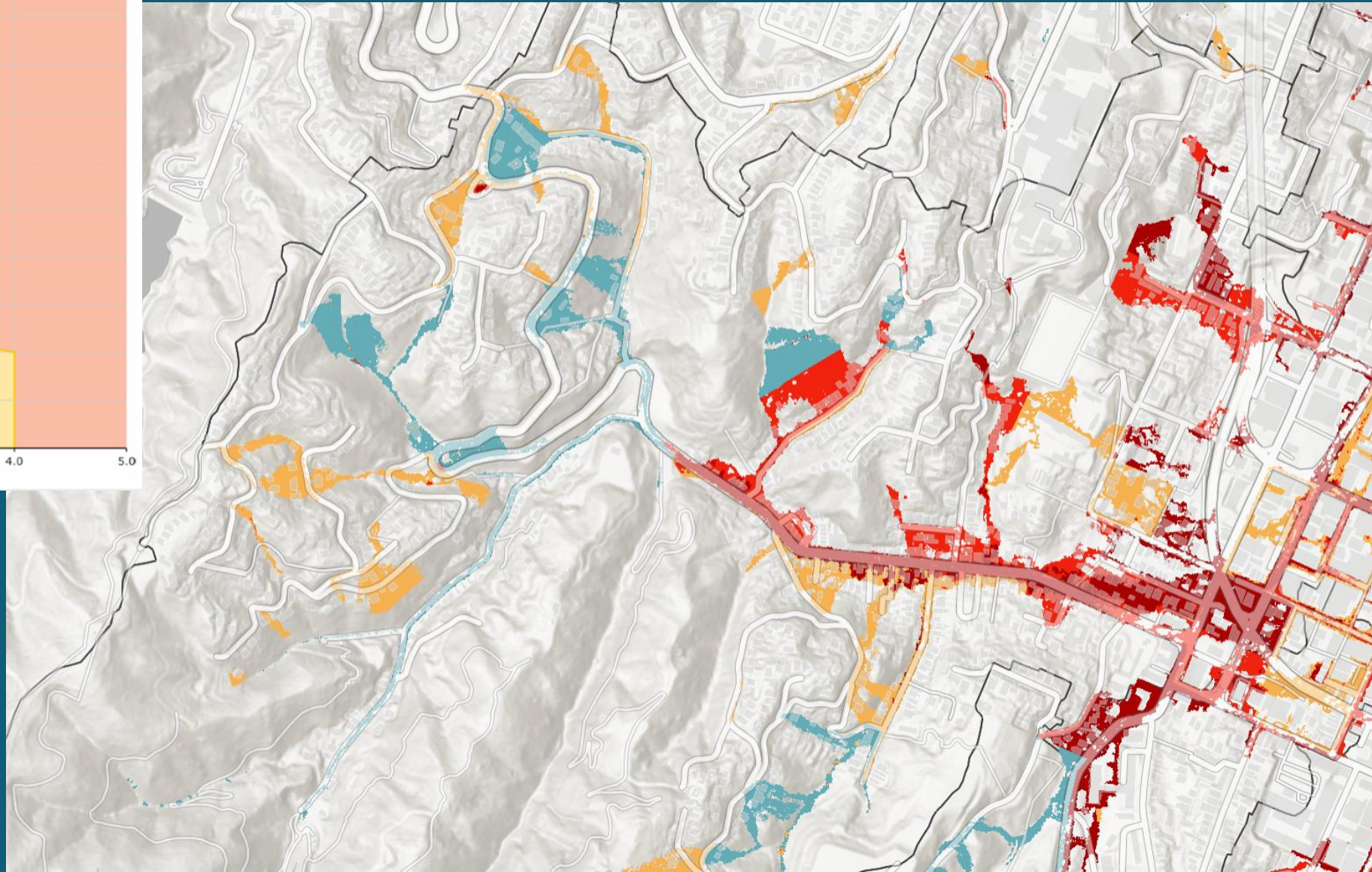
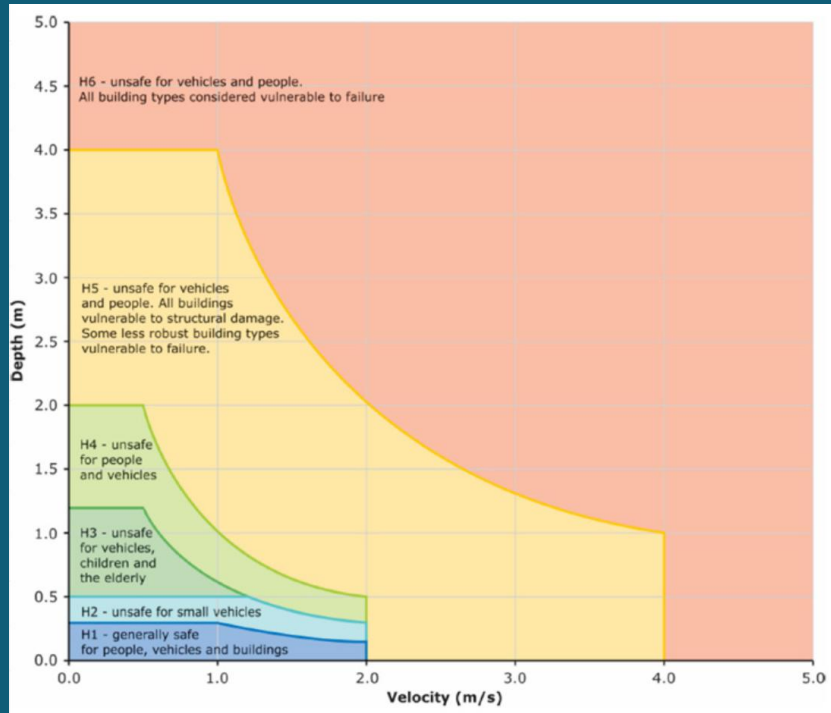
Area-weighted Average (numeric index)

ArcGIS Aggregated (Sub-catchment) Maps

Composite Risk Assessment Map

Hazard score x Population density

# Threat to Human Safety



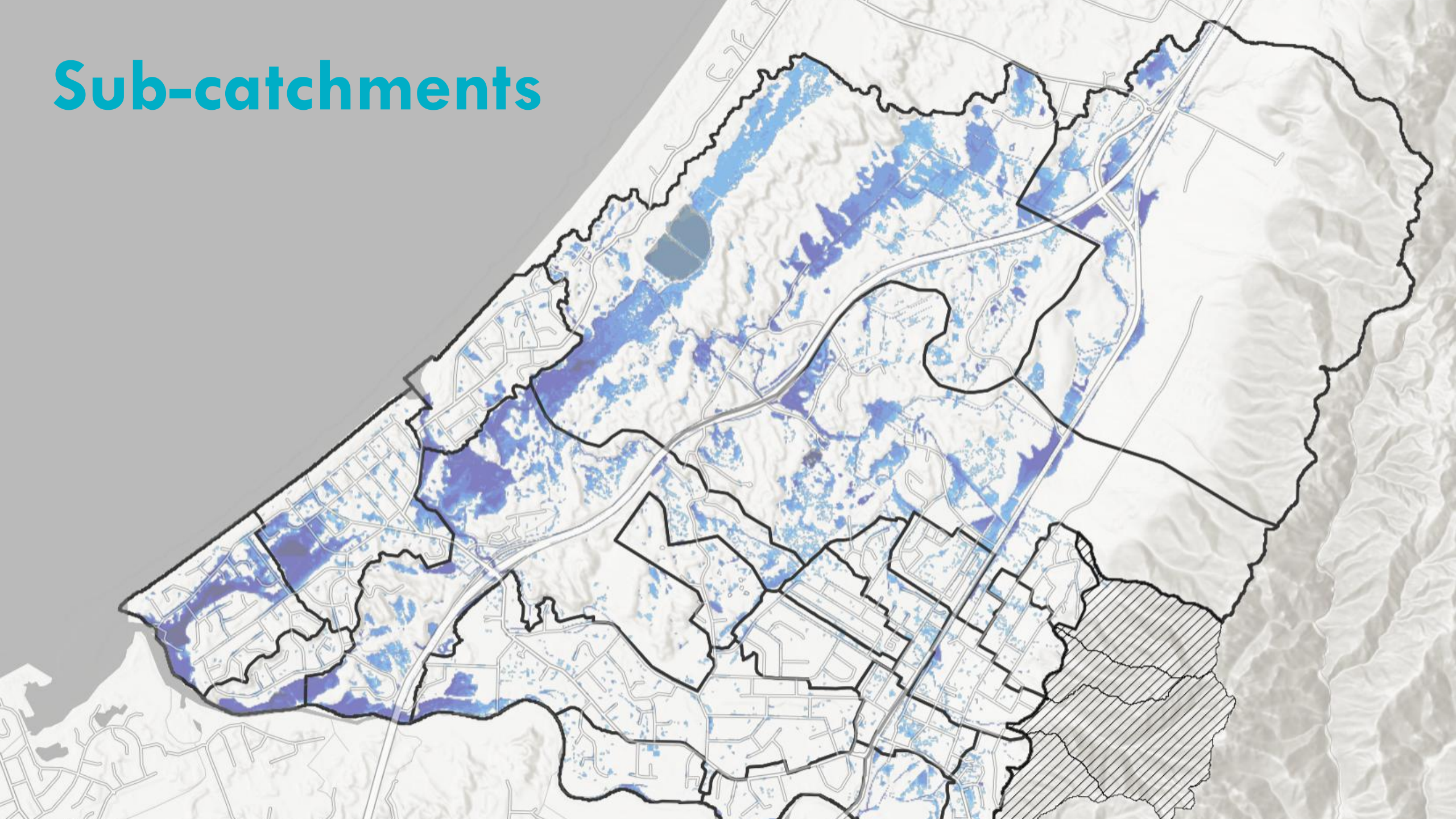
# Economic Damages

$$\text{Building Flood Damage Cost} = \text{Min} \left( \frac{27 \times \sqrt{\text{flood depth}}}{100}, 1 \right) \times \text{Property Improvement Value}$$

# Recovery and Resilience



# Sub-catchments



# Human Safety

## LEGEND

Human Safety Severity

Score

0

1

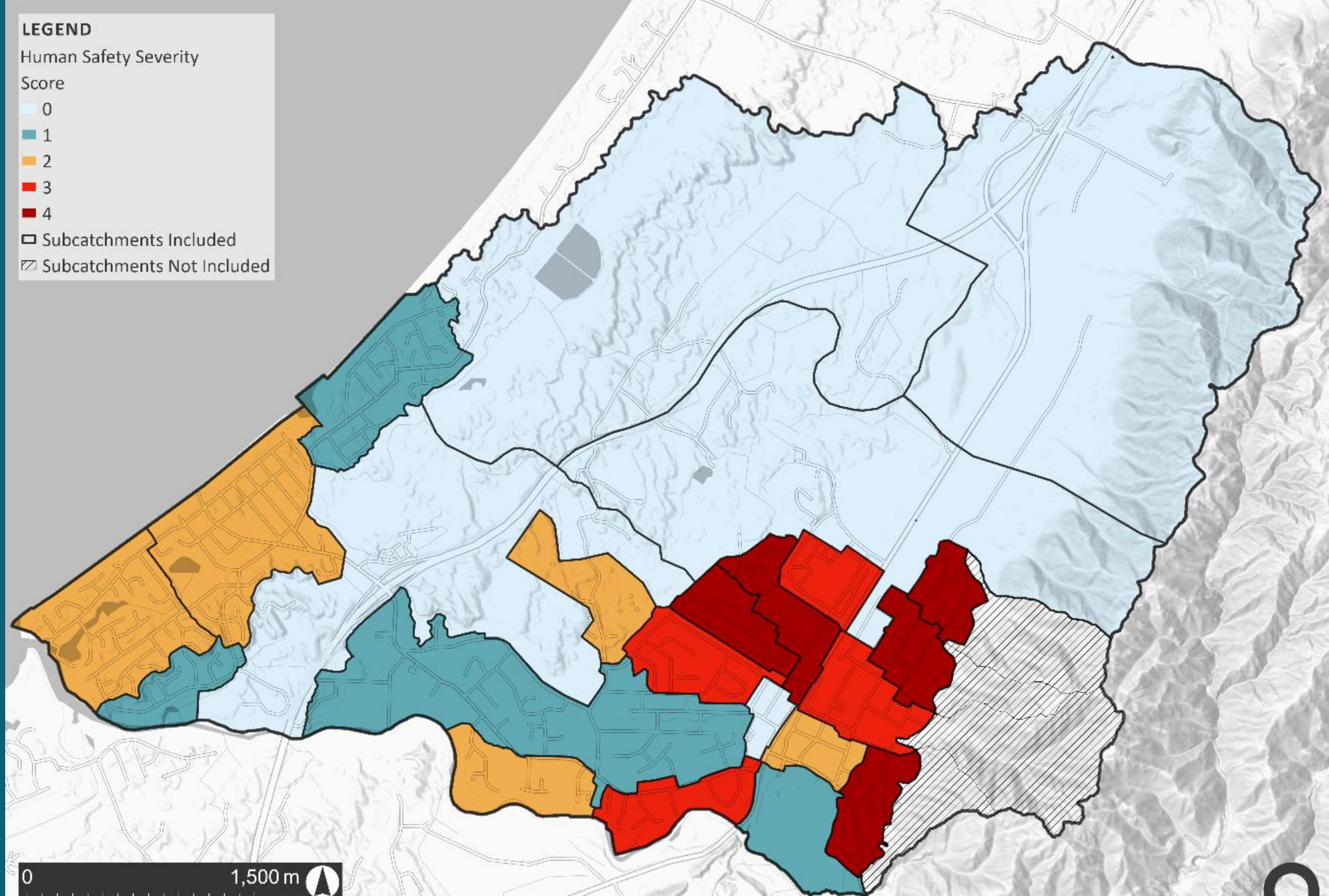
2

3

4

▣ Subcatchments Included

▨ Subcatchments Not Included



0 1,500 m



# Recovery and Resilience

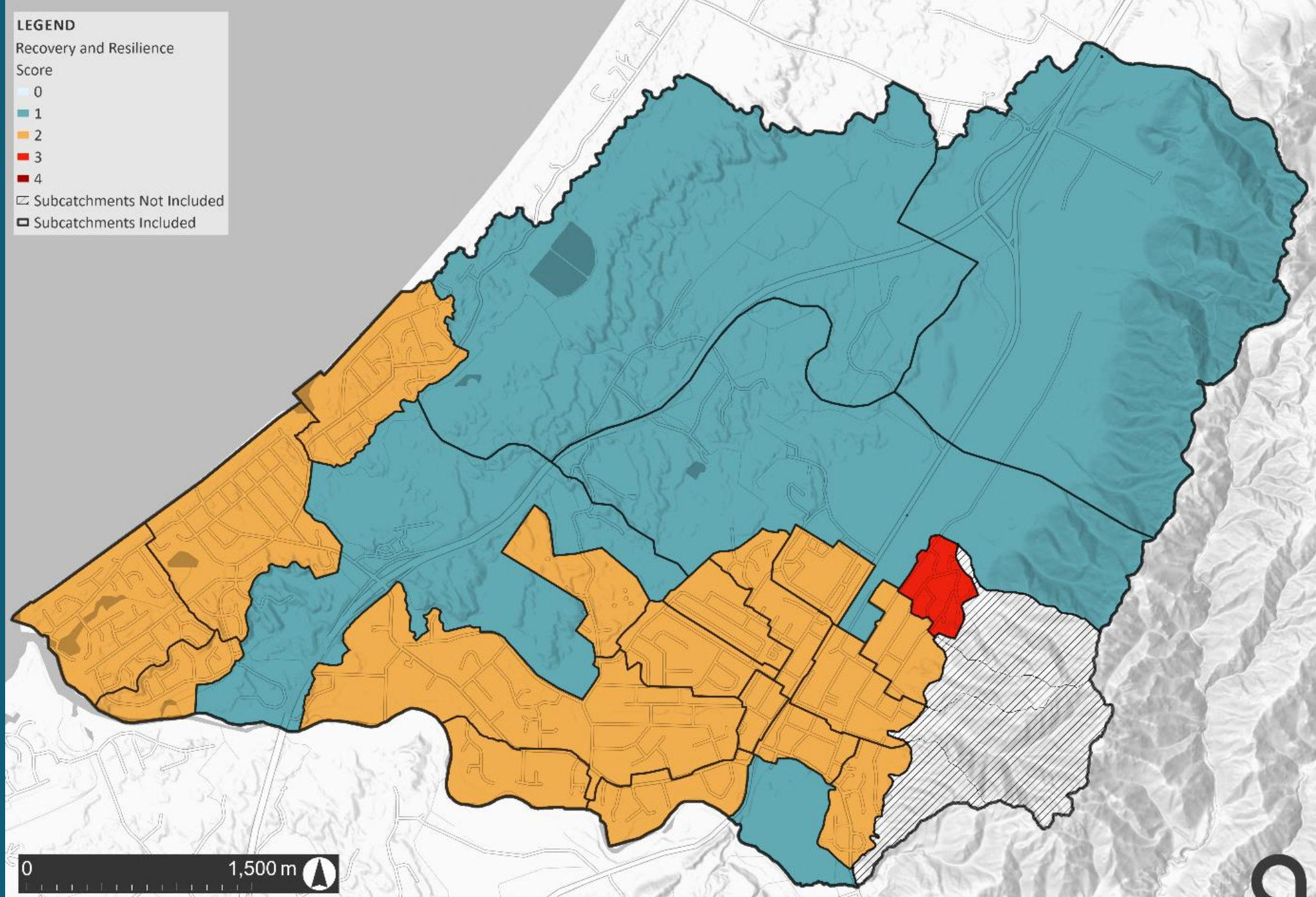
**LEGEND**

Recovery and Resilience Score

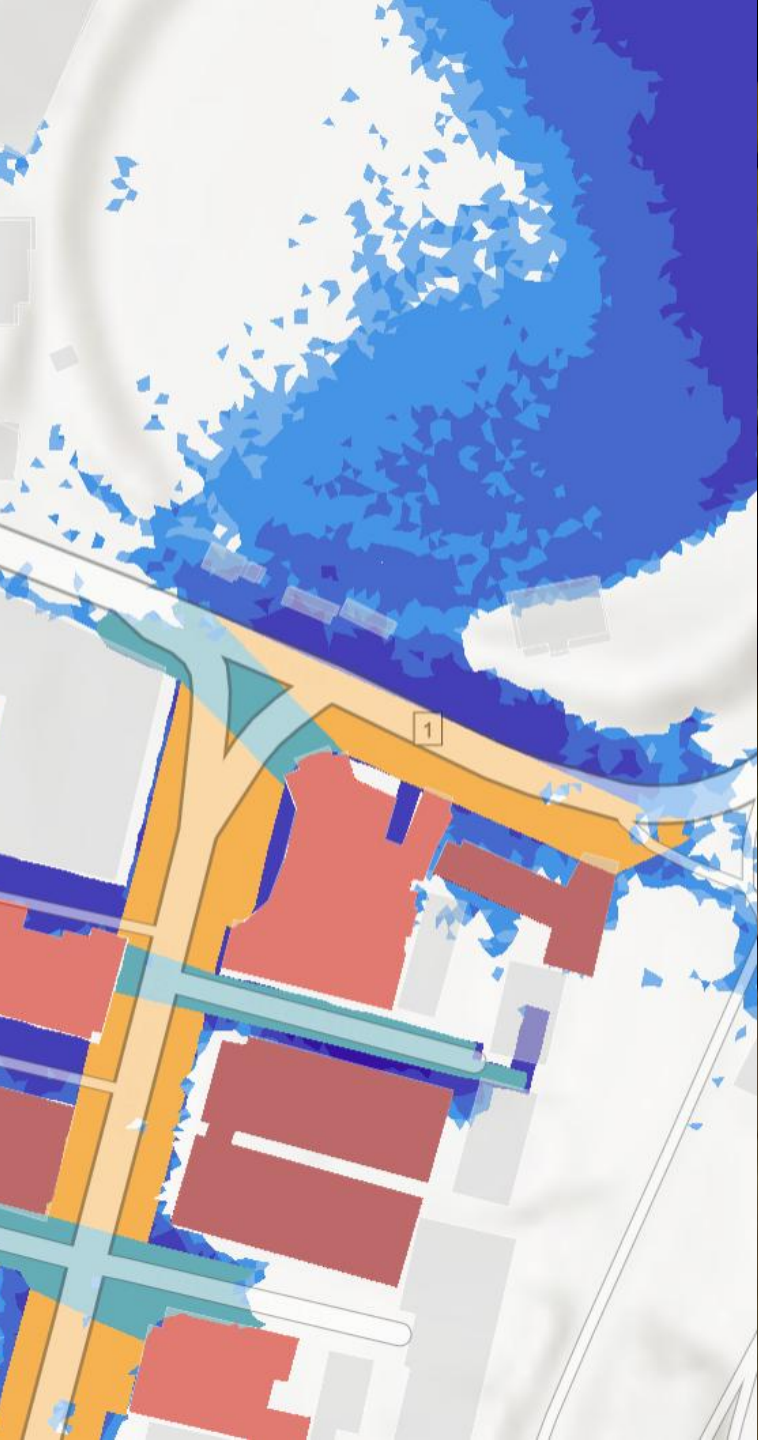
- 0
- 1
- 2
- 3
- 4

▨ Subcatchments Not Included

▣ Subcatchments Included



Date: 11/09/2025 | Data sources: Sources: esri, TomTom, Garmin, FAD, NOAA, USGS, OpenStreetMap contributors, and the GIS User Community, Esri Technology, L.L.C.



**Thank you!**

**Patai?**