Saving Lives through better Disaster Risk Monitoring and Mitigation

Flood Simulation

Mr William Mojapelo
Esri South Africa

esri South Africa

SOUTHERN AFRICA ESRI USER CONFERENCE 2025

KZN Floods : What was the problem?

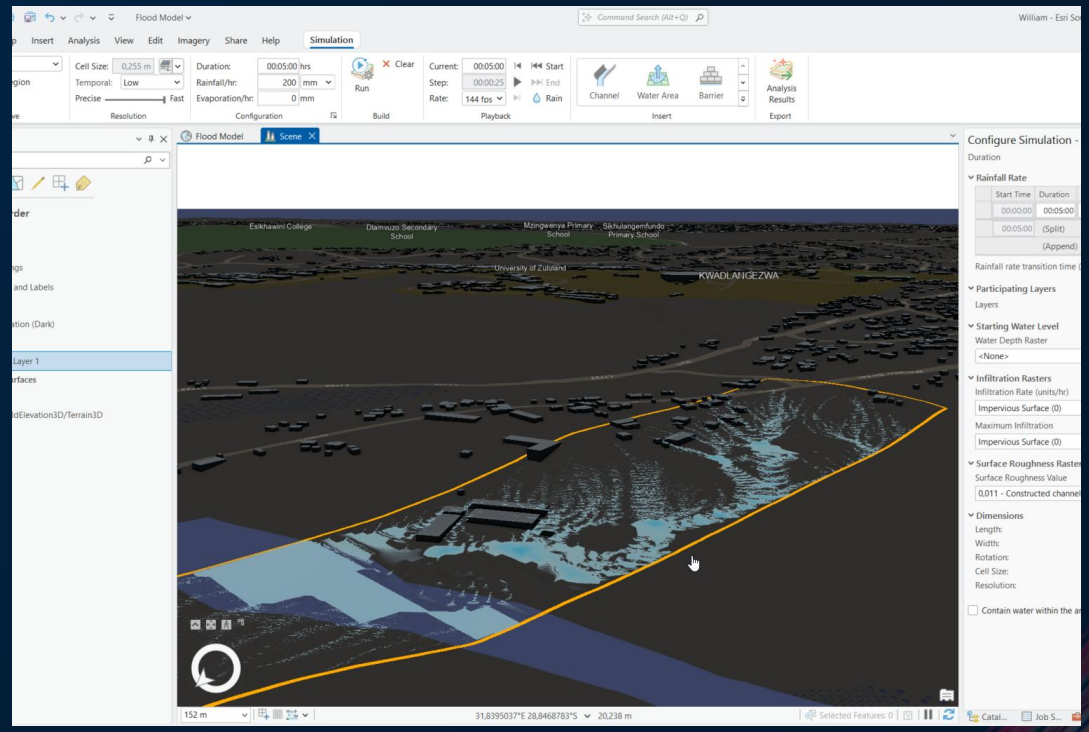
- Severe flooding events caused major infrastructure damage and loss of life.
- Limited predictive tools and preparedness.

- **What could the government have done right?**
  - Implemented GIS-based flood modelling and early warning systems.
  - Improved land-use planning and drainage management.

Source data: https://www.businesspartners.co.za/kzn-floods-economic-impact-update/

Flood Simulation: GIS-Based Approach

- What a Flood Simulation Model Does:
  - Predicts where water will flow during heavy rainfall or overflow.
  - Determines the extent and depth of floodwaters.
  - Estimates duration and timing of inundation.
  - Assesses impact on roads, buildings, and land use.



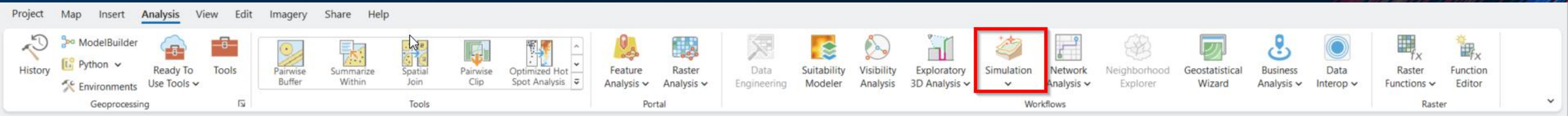
What Do You Need to Run the Tool?

The flood simulation tool is available off-the-shelf in ArcGIS Pro 3.3 and later.

- No additional software installation required.
- Requires appropriate datasets (DEM, infrastructure layer (optional)).

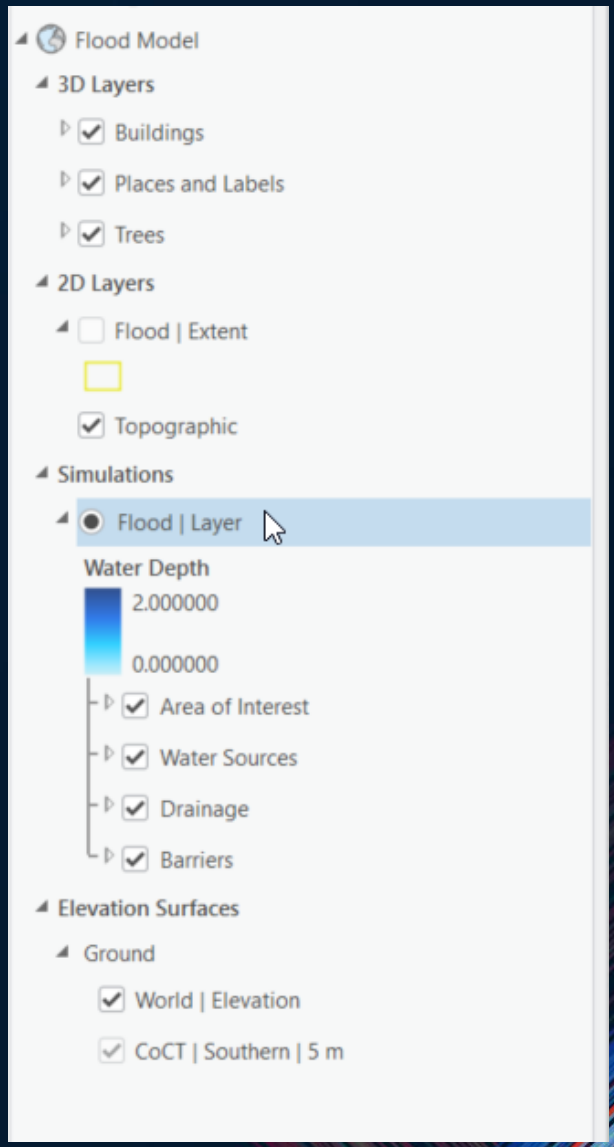
Running the Off-the-Shelf Tool

1. **Navigate to the Flood Simulation Tool in ArcGIS Pro**
2. **Set Parameters:** Configure your flood layer and simulation settings
3. **Run the Tool:** Generate the flood extent and depth outputs
4. **Visualize Results**: Use 2D/3D views and symbology for analysis

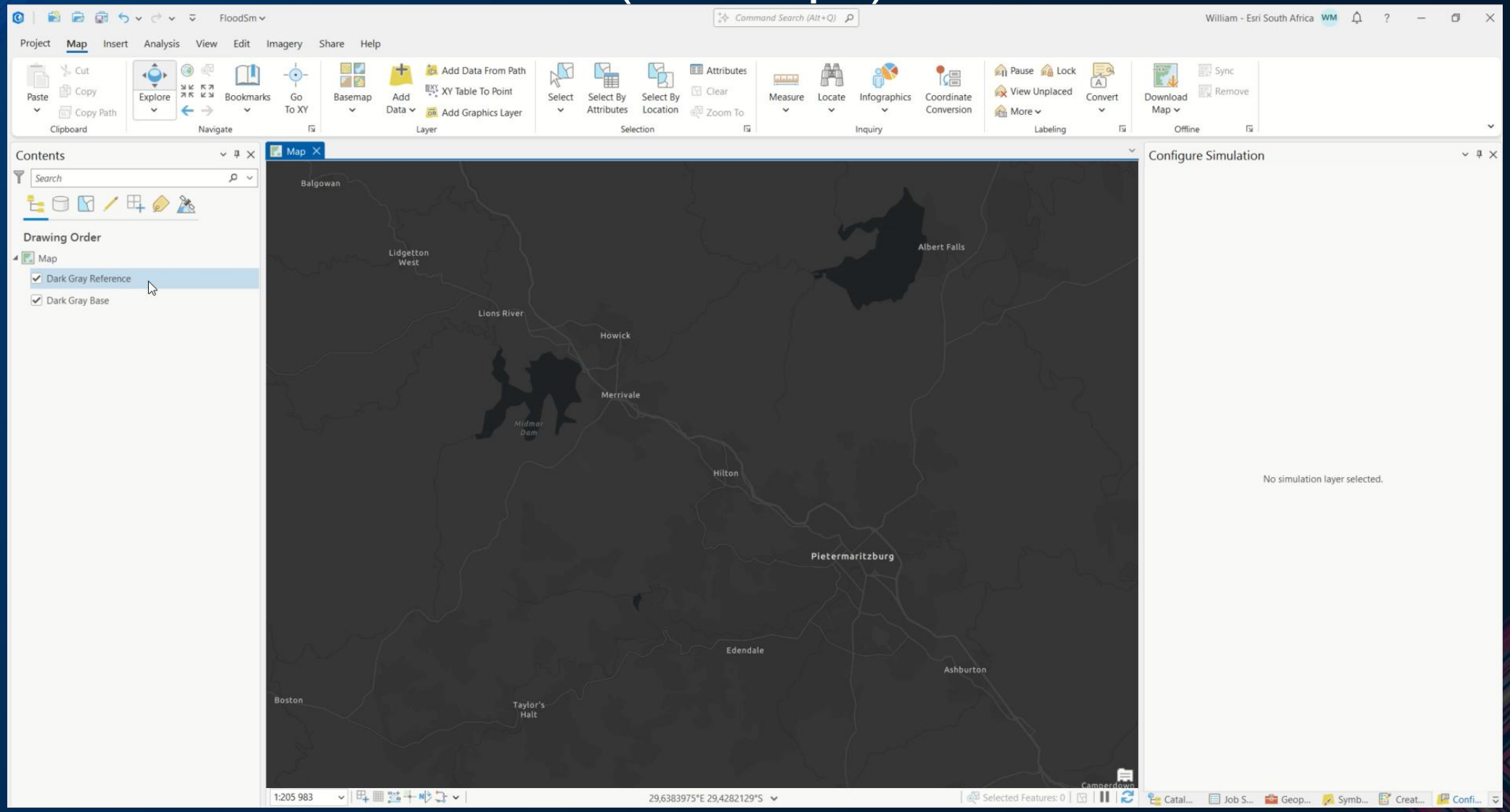


Enhancing the Results

- Feed the Tool with Additional Data:
  - Digital Elevation Model (DEM):
    - High-resolution DEM (1–10 m) recommended.
    - Derives flow direction, accumulation, watershed boundaries, and flood extent.
  - Infrastructure Layers:
    - Roads, buildings, and drainage networks.
    - Enables impact assessment and risk analysis.



Demo: Flood Simulation (back-ups)



Thanks

Any Questions?

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