



SNC • LAVALIN

Maximizing the Value of Resilience

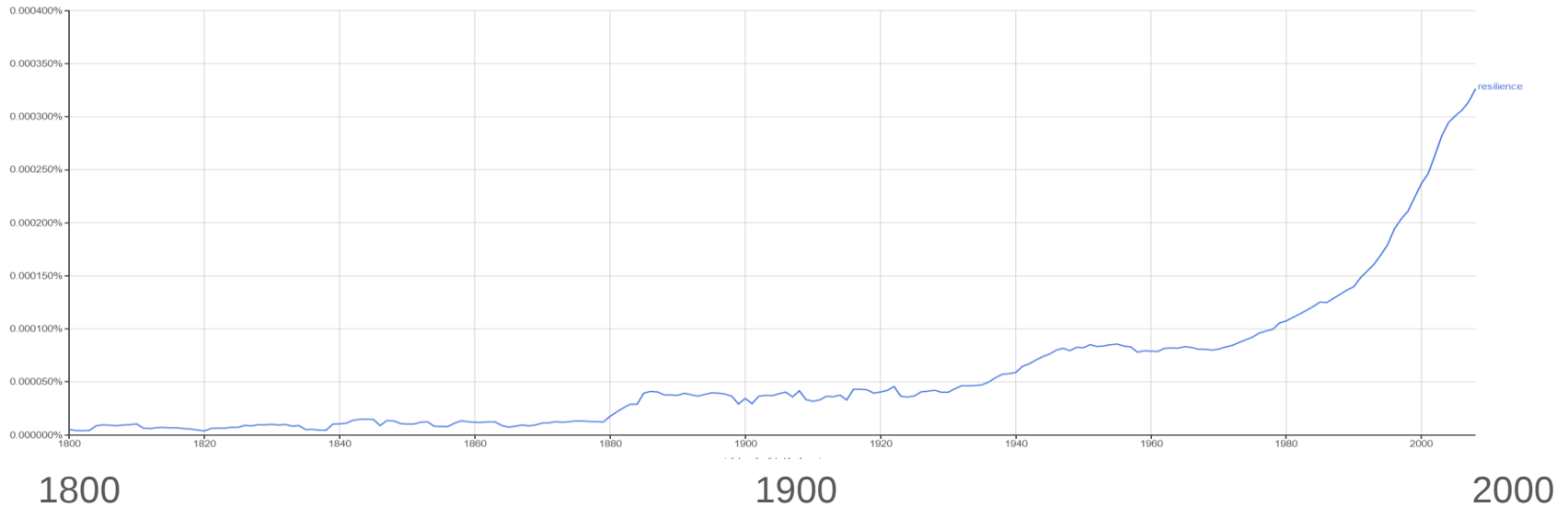
Presented by: Stephen Bourne, P.E.

Stephen.Bourne@AtkinsGlobal.com

ASFPM National Conference, 2018

June 21, 2018

Resilience is the New Black

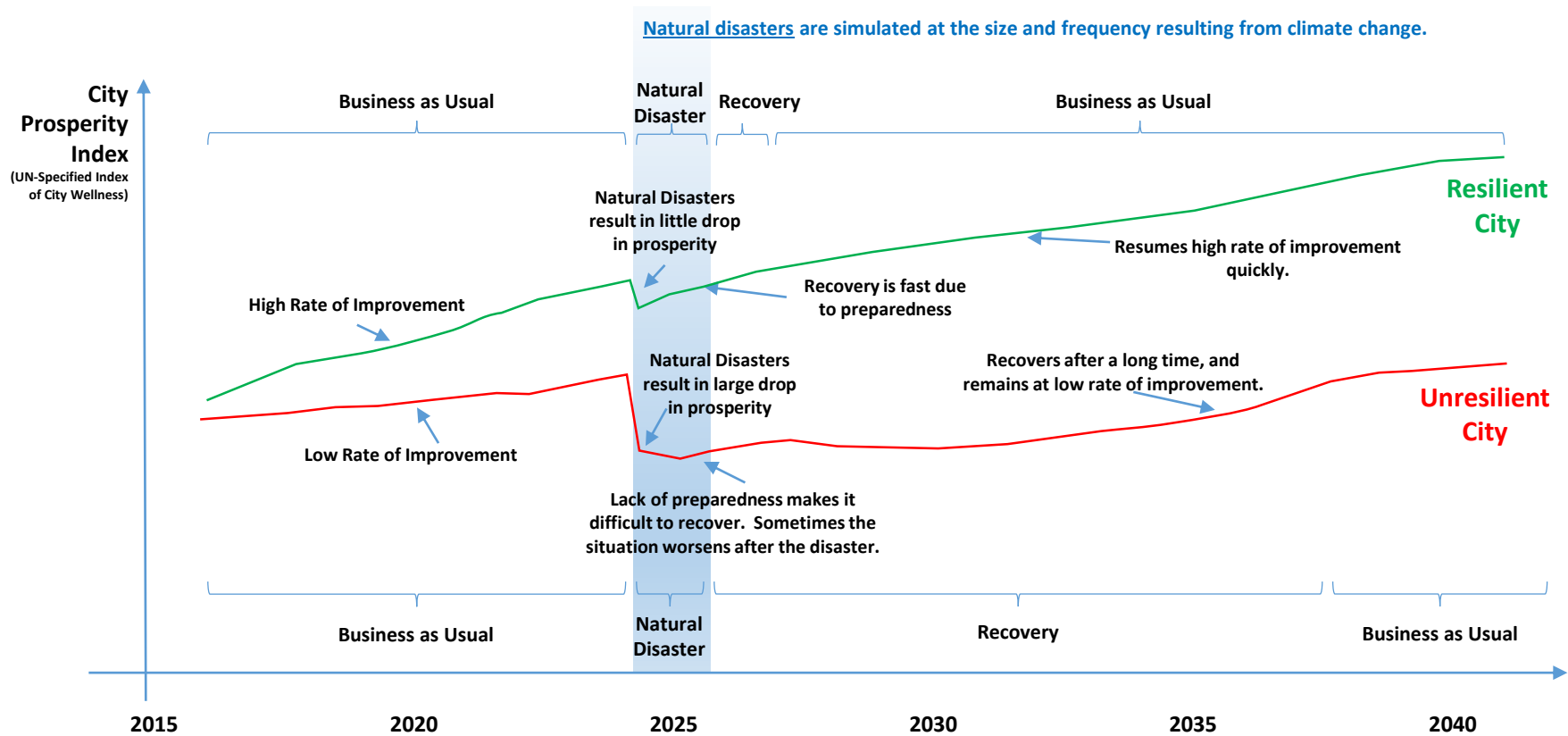


Source: Google N-Gram Viewer

Develop a tool to forecast resilience under current and proposed city master plans



Quantifying Resilience

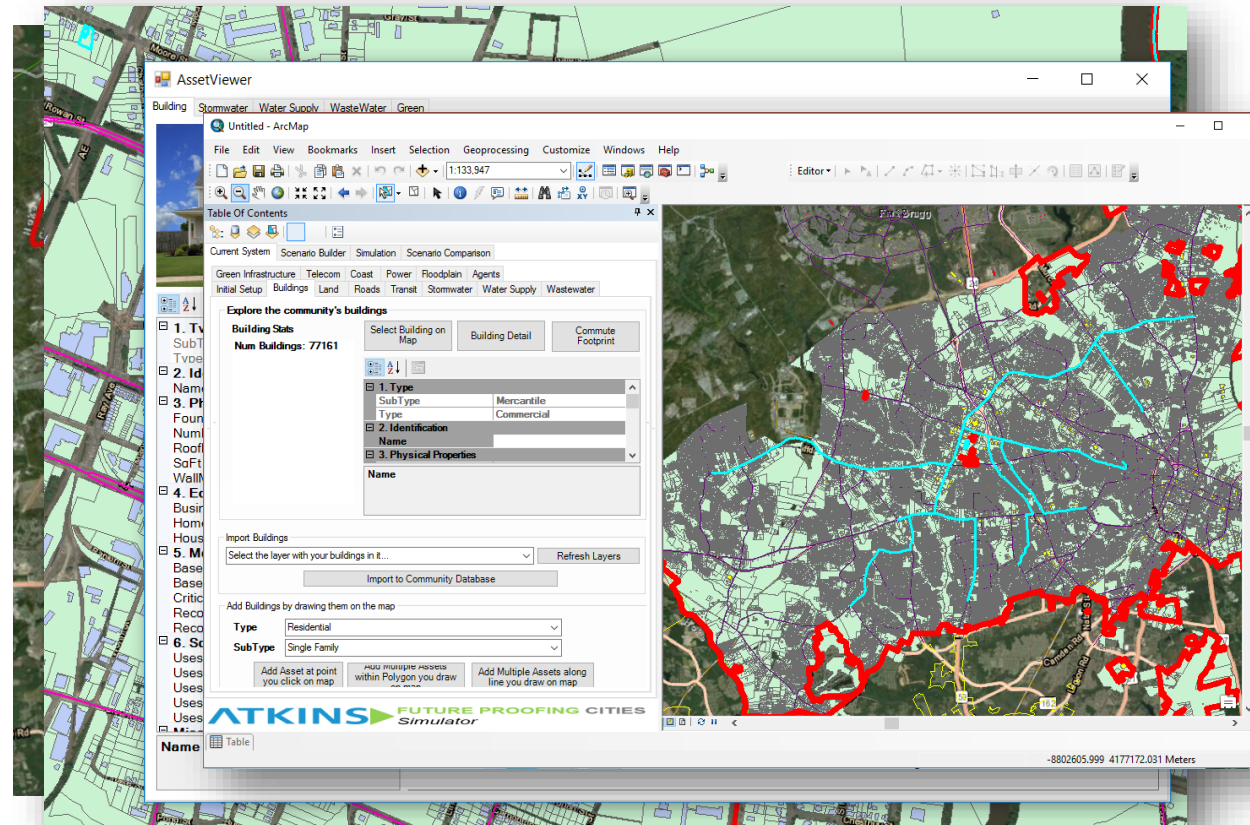


Requirements for Forecasting Resilience

- Capture interacting systems (Economy, People, Infrastructure, Natural)
- Include business-as-usual as well as disasters
- Include disasters that are representative of climate change effects
- Allow for addition of proposed strategies and measures their effect
- Include a long enough time line to measure return on investment

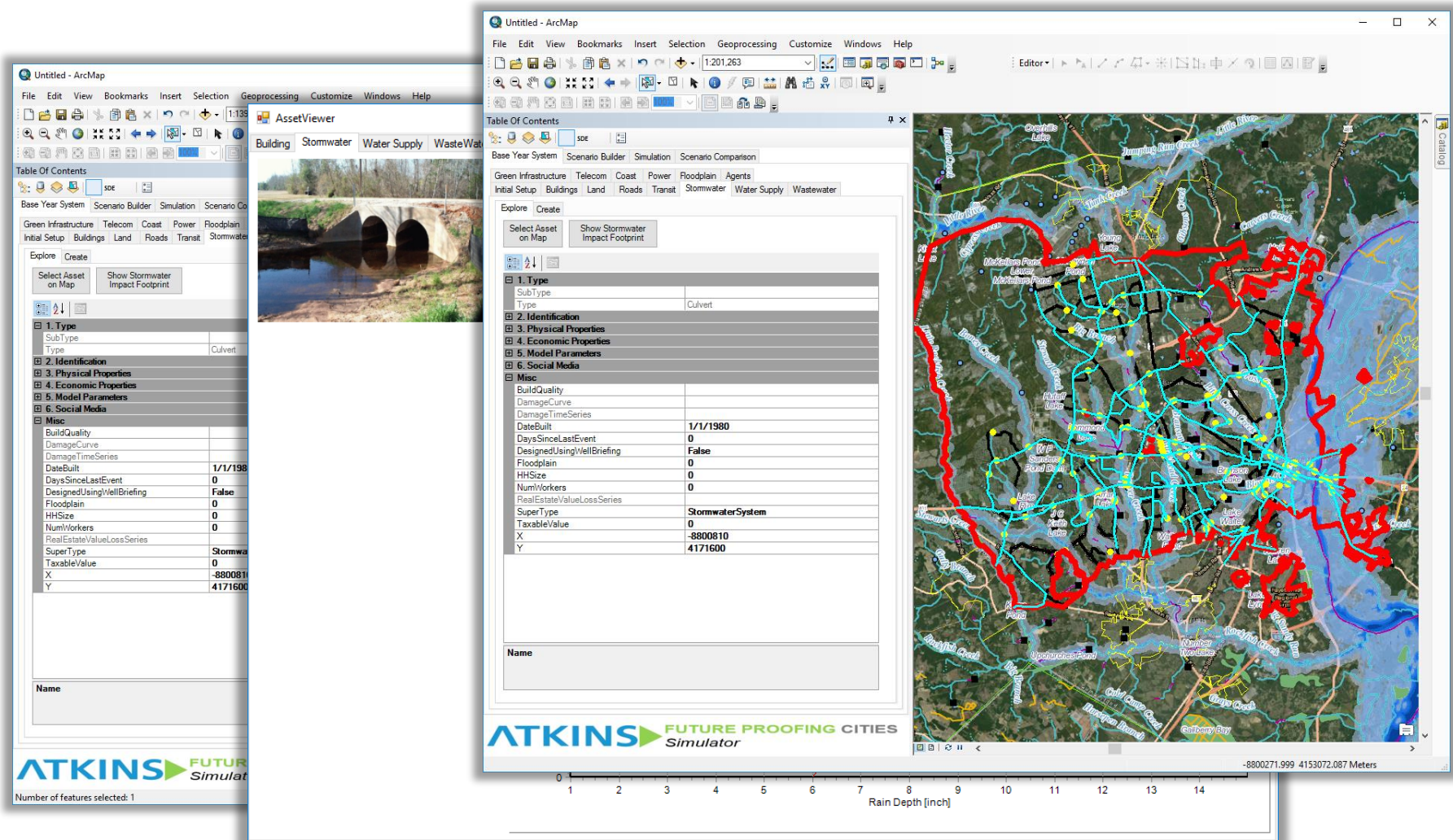
City Information Model

- FVille3.gdb
 - Agents
 - allburn2
 - AnalysisDomain
 - Buildings
 - CensusPopPlaces
 - Counties
 - Landuse
 - Measures
 - NaturalWaterSystemControls_Node
 - OceanLandMask
 - Parcels
 - PointAssets
 - PowerInfrastructure_Line
 - PowerInfrastructure_Node
 - PowerServiceAreas
 - Soils
 - Stormwater_Line
 - Stormwater_Node
 - TimeSeries
 - TransportationLinks
 - TransportationNodes
 - TSDData
 - Zoning_Current
 - Zoning_Proposed



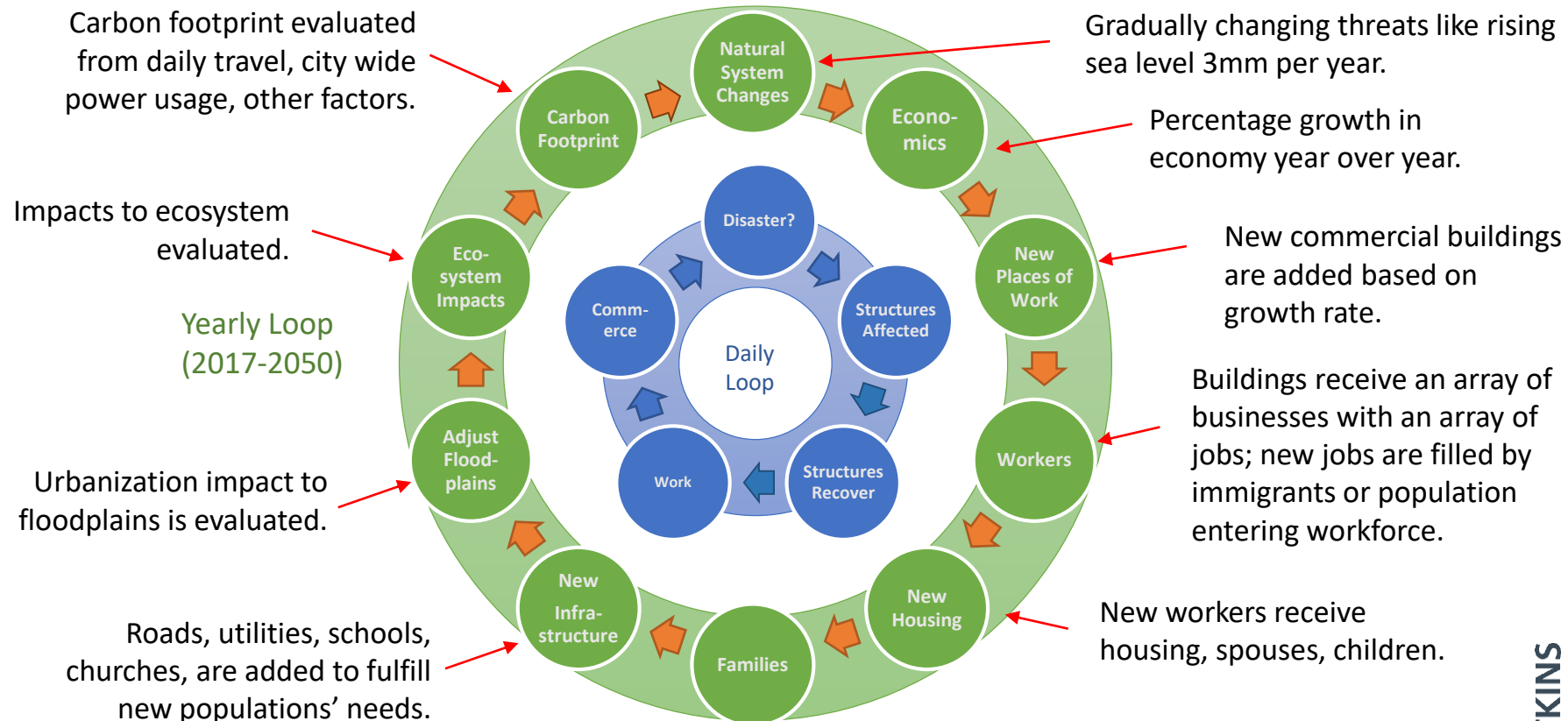
City Information Model

Influence of Stormwater Infrastructure on City Productivity



City Simulator Modeling Process

A nested loop to capture city growth and response to hazards



City Simulator Modeling Process

A nested loop to capture city growth and response to hazards

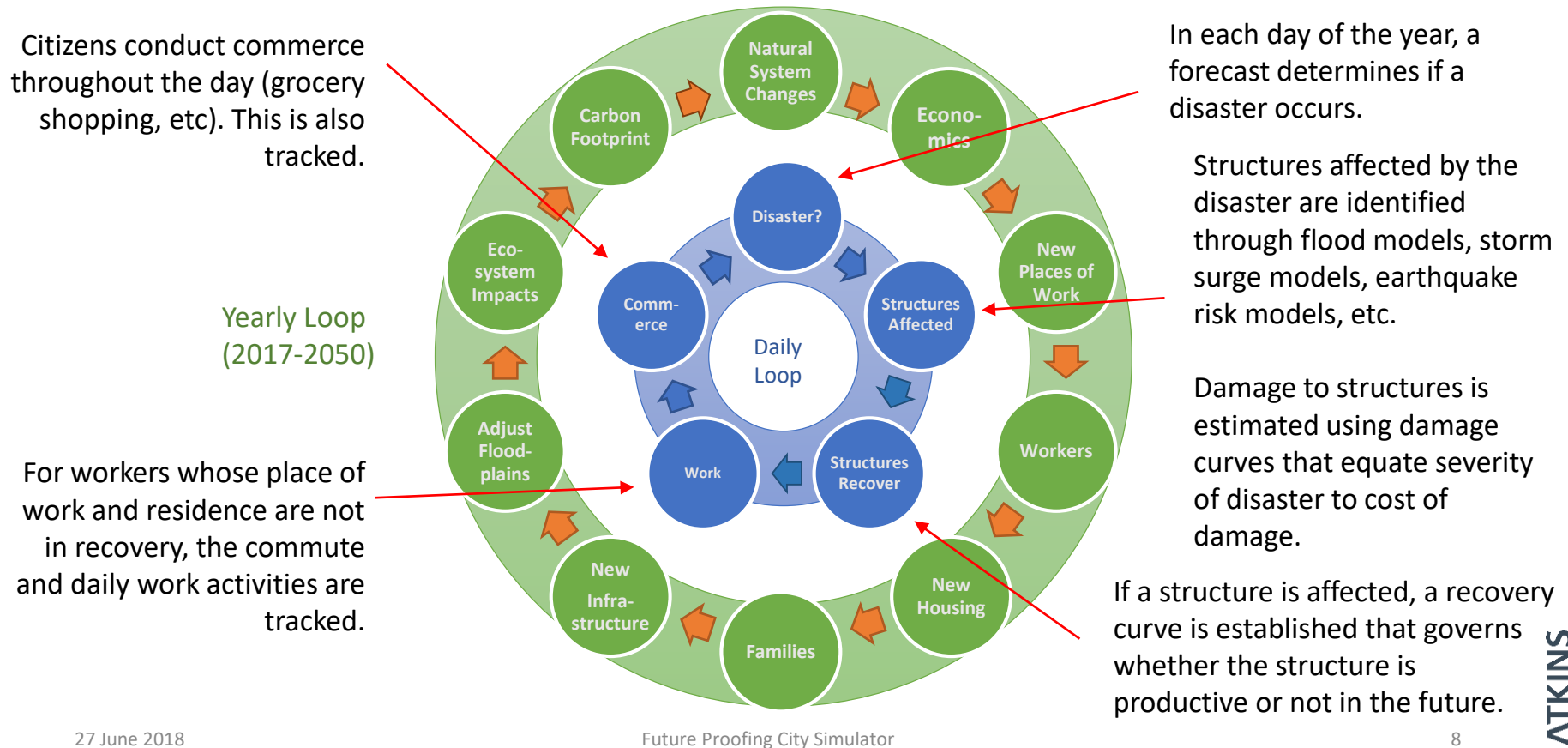


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Current System Scenario Builder Simulation Scenario Comparison

BaseScenario

Load Base Model

Loaded

Run Scenario Simulation

Stop Run

Publish Results

Refresh Results

Transportation Storms and Drought Carbon Footprint Sea Level Rise Public Health Power

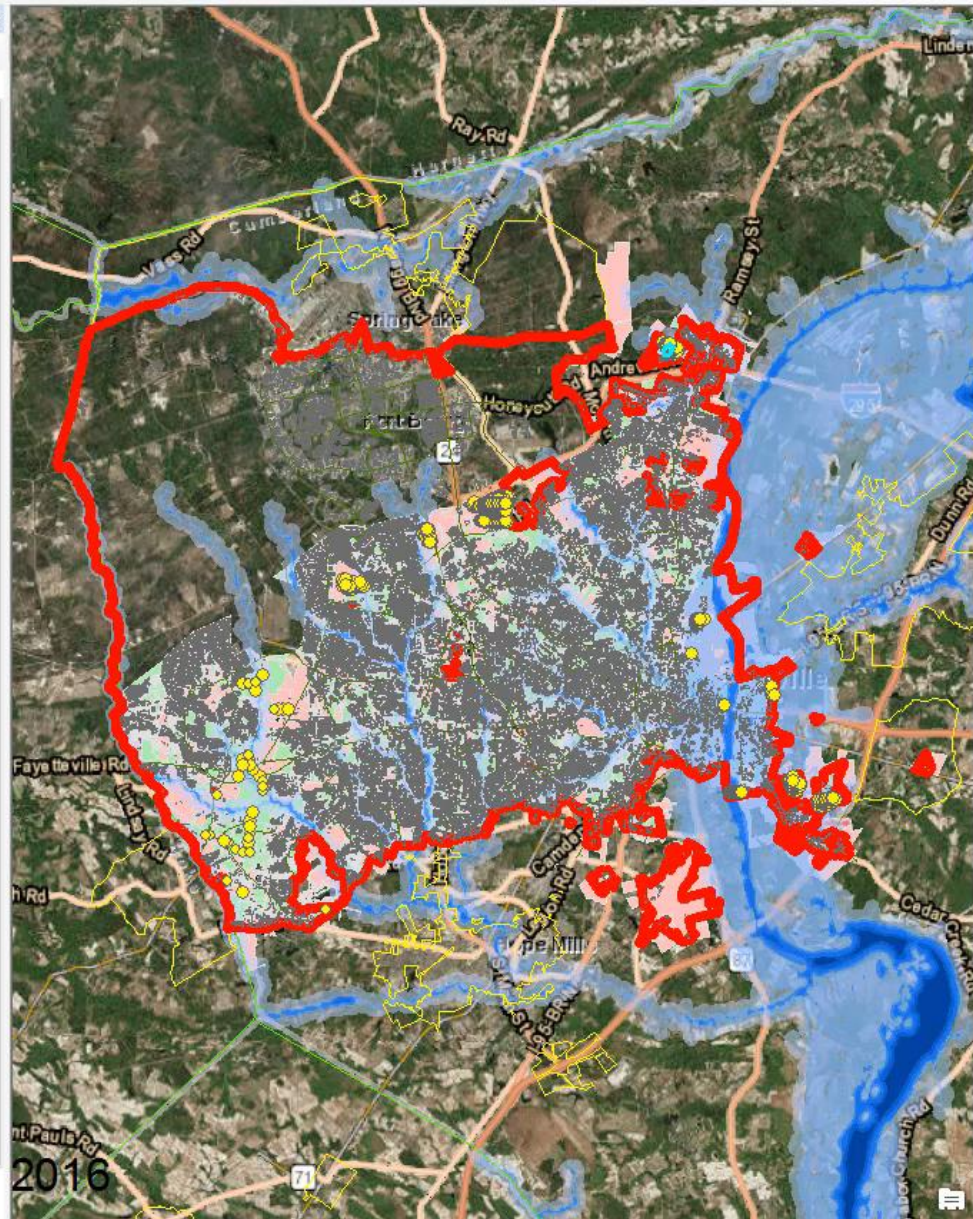
Simulation Progress Summary City Financial Employment Job Types Demographics

2020

2020 12/06

Rain [in.]

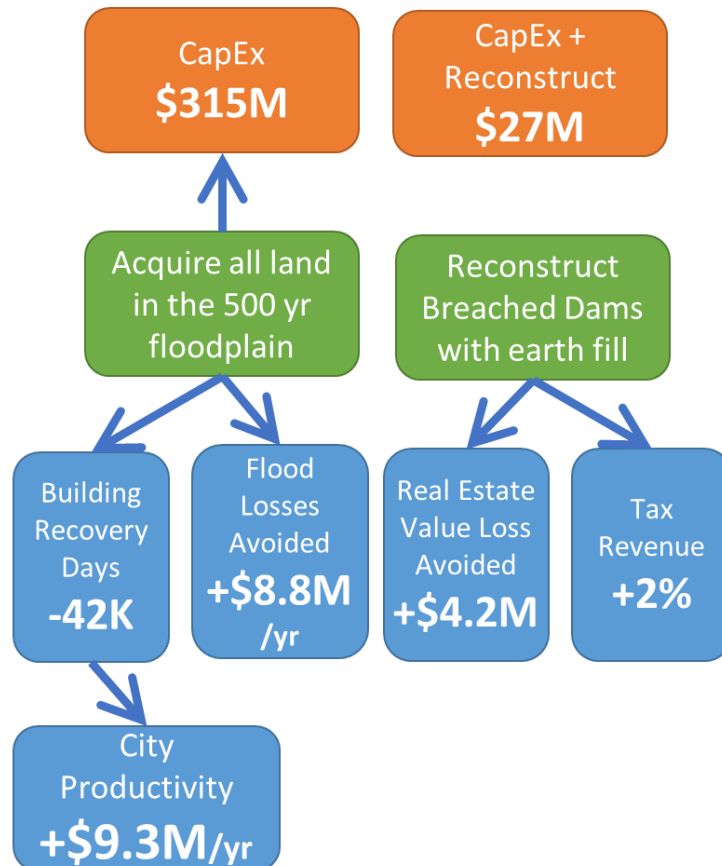
Workforce Engaged



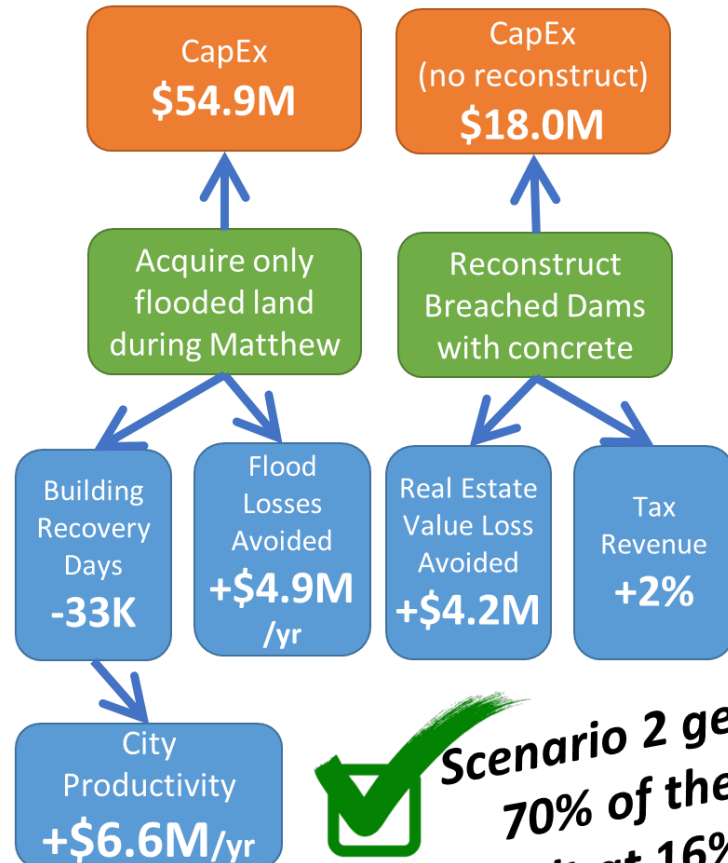
Catalog

Prioritizing Hurricane Response in Fayetteville

Scenario 1: High Cost/Low Risk



Scenario 2: Budget Conscious

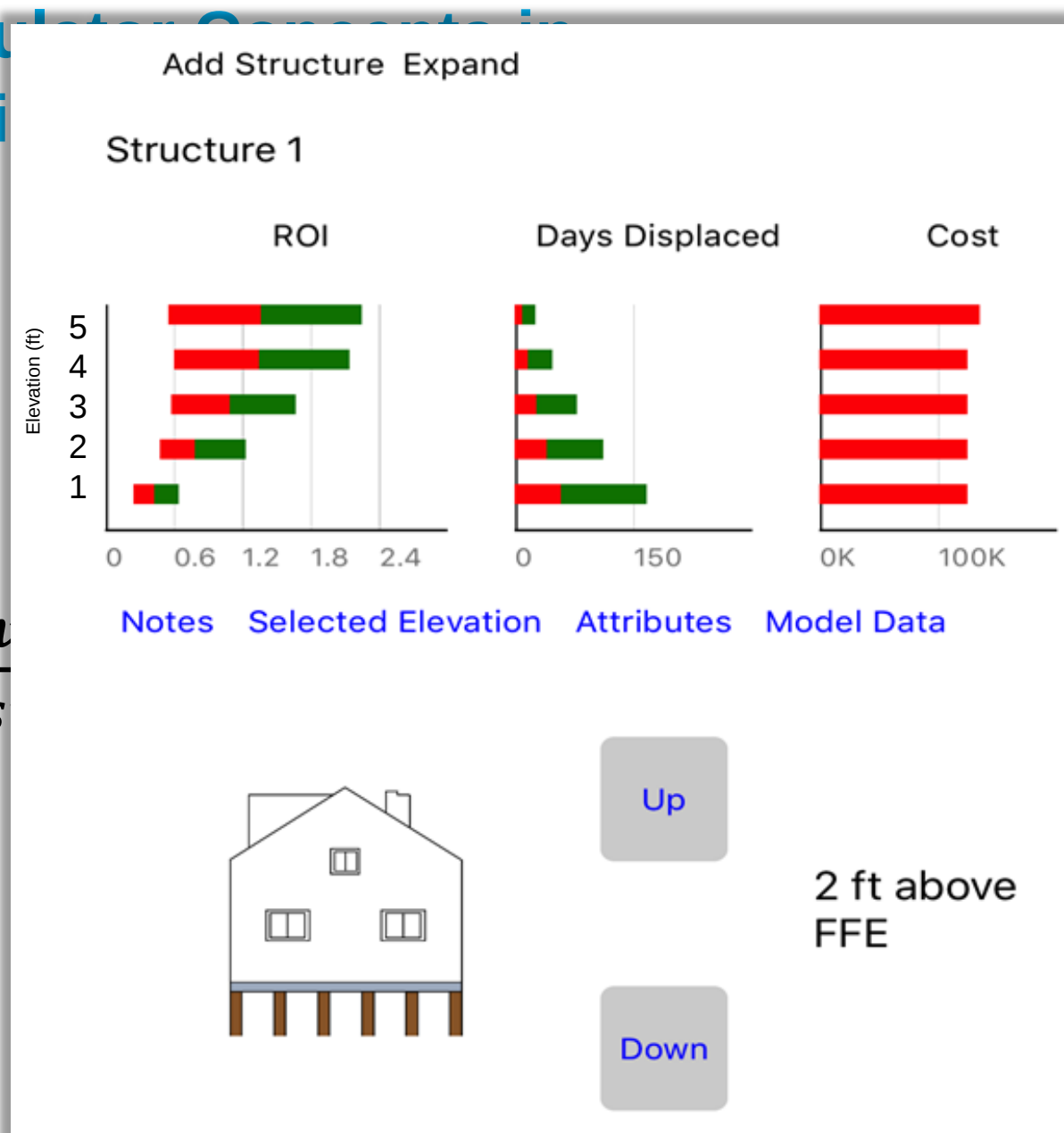


 Scenario 2 gets 70% of the result at 16% of the cost.



Using City Simulator Concepts in FEMA's Mitigation

$$ROI = \frac{\text{Losses Avoided}}{\text{Cost}}$$



SN



American Water
Resources Association

ORLANDO
APRIL 22 - 25

Key Note

2018 Spring Specialty Conference
FINAL PROGRAM
GIS & Water Resources X - Spatial Analysis of Watersheds:
Ecological, Hydrological and Societal Responses


 Convened by:  Environment Agency | 20-22 March 2018 |  Telford International Centre, UK



HOME VISIT CONFERENCE HODDING EXHIBIT & SPONSOR CONTENT & COMMUNITY PROJECT EXCELLENCE AWARDS CONTACT US

2018 Winners & Shortlist

Finalist
UK EA
International

Excellence Award

CATEGORY: COMMUNITY LEADERSHIP

- Slowing the flow at Brompton. Team(s) Brompton Flood Prevention Group
- Shipston Area Catchment Based Approach. Team(s) Shipston Area Flood Action Group, Coventry University
- WINNER: Churchtown Flood Action Group. Team(s) Churchtown Flood Action Group



WaterBriefing

HOME TENDERS SHOWCASE WATCH REPORTS DIRECTOR

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Stephen Bourne, Atlanta-based project director at Atkins, talks about a new tool which can help cities strengthen their resilience in the face of population growth and the growing impacts of climate change.

Stephen Bourne: Cities across the world, especially those located on the coasts, are fighting what can only be described as a double-edged sword – as populations and economies are growing and placing higher demands on social systems and infrastructure, cities are subject to more extreme natural disasters than ever before. Resilience, in the face of losing power, telecommunications, water, and transportation, is becoming more and more important to sustain our 'always plugged-in, service-based economy' needs.

Richard Stanbrook, Director at Pension Water Services, shares his views on the first anniversary of the water retail market which opened for business in England on 1st April 2017

[Click here to read more](#)

wide computer simulation. Based on a City Information Model (CIM), the map-based model captures all utility systems, roads, rail, buildings, lakes, streams; essentially all the physical elements that make up the city. It also integrates agent-based modeling, which means there is a virtual population living, working, commuting, shopping, recreating and playing in the model. To create the agent-based model, the model simulates

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