Understanding the Risk: Comprehensive Systems Modeling using Innovyze software
Abstract

As climate change and extreme rainfall events continue to hammer away at the local and regional civil infrastructure, inadequate or unidentified assets are putting people and resources at risk. A recent report in Illinois identified 90% of urban flooding damage occurs outside of mapped floodplain. Urban Flooding is the scourge of many communities where nuisance flooding causes damage and can occur before, during or after a storm. As one US community states on their website, “It’s not a matter of if but when, [we] will experience the next flood disaster.” In many cases, the tools stand in the way of identifying the problem and potential solutions. The many timesaving and comprehensive tools within XP SWMM help identify problems and provide the time to simulate all scenarios. With the Solve Manager, multiple scenarios and integrated 1D/2D calculations no longer need to be run in series, but rather in parallel. Learn how to leverage these tools to search for the most effective solution.
HURRICANE SANDY

CALIFORNIA RAINS

MATTHEW HARVEY, IRMA, MARIA...

FLOODS, MONSOONS, TYPHOONS

MIDWEST STORMS

THEY HAPPEN
“Based on existing data, it is evident that the 100-year floodplain is a poor predictor of property damage and that, particularly in coastal areas, there is no solid evidence to justify a default 1% annual chance design level for flood reduction.”

“The reliability of modeled flood risk can thus quickly deteriorate as time goes on, especially in rapidly developing regions.”
HOW IS RISK COMMUNICATED?

CLEAR
Nature of reporting flood depths, velocity and hazard are visual & easily understood.

ACTIONABLE
Results provide actionable intelligence with reasonable risk assessments for evacuation planning or hazard analysis.

SHARED
Results can be shared by video, or export the spatial extents of the hazard, depth or time to inundation.
COUPLED 1D / 2D MODELS

STRUCTURES
INCLUDE ELEMENTS LIKE BRIDGES, CULVERTS, BUILDINGS, TIME-VARYING BREACHES

BUILD
SIMPLE TO CONSTRUCT TERRAIN TOGETHER WITH GIS DATA

UNDERSTAND
PROVIDE A VISUAL STORY OF HOW THE FLOOD PROGRESSES
Overland flow paths
Overland flow paths
Live modelling

Real time data

Rainfall Forecasts

Integrated Catchment Model

Operational forecasts
Smart / Live / Operational models
CUSTOMER SUCCESS

City of Minot – 18th Avenue Southeast

- Tributary area
  Approx. 138 acres
- Topography
- Overland flow routes
THE ISSUE
1D APPROACH
2D APPROACH
CALIBRATION EVENT

Existing Conditions

After Project
MODEL 4 BOTH BASINS

MIXED MODEL
• 239 SUB-BASINS
• 1914 NODES
• 651,000 2D GRID CELLS

MIXED HYDROLOGY
• SWMM RUNOFF w/HORTON
• HMS MODEL & CITY GAGES
2D INTERBASIN SPILLAGE
PERFORMANCE

BENCHMARKED COMPLEX 2D ONLY
49,265 cells (25x25 cells)
Dell Precision 7510 Laptop

HEC-RAS 5.0.3
13 hrs 41 min 28 sec

xpswmm
6 hrs 35 min 38 sec
9 min 38 sec
Quadro K1000M
GET TO KNOW THE RISK

SCENARIOS

GLOBAL STORMS

CONCURRENT
Thanks for attending

Matt Anderson, PE
Products Manager

TELEPHONE:  +1 888 554 5022
Matt.Anderson@innovyze.com

WWW.INNOVYZE.COM