Increasing Resilience through Intelligent Water Management

NEWEA Stormwater Conference
2018

Agenda

- Resiliency and stormwater
- Opti's CMAC technology
- Project Case Studies
  - Beckley, WV
  - Ormond Beach, FL
  - NYC:RISE

Resiliency and Stormwater

- Resiliency is the ability to **prepare for, absorb, recover from, and adapt to** abrupt disturbances and persistent stress
- Climate change impacts on water resources
  - ↑ frequency of heavy precipitation events across the U.S.
  - ↑ streamflow in the eastern U.S.
  - ↓ duration and extent of snow cover in most of North America
  - ↑ periods of drought in the West

Intelligent Stormwater Management

Passive → **Adaptive** → **Active + Adaptive**

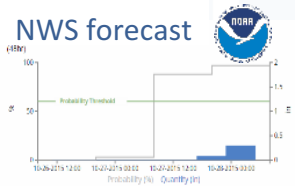
Infrastructure is designed and set for modeled conditions

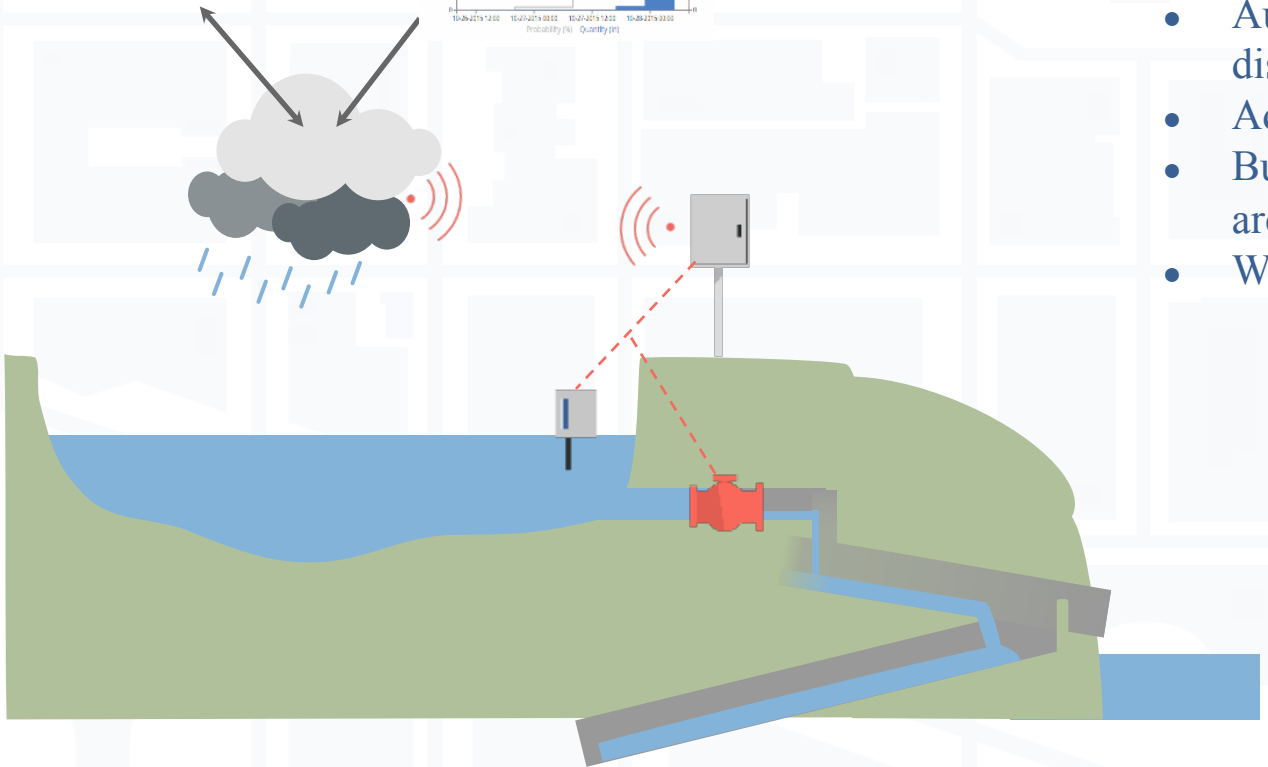
Infrastructure can be adapted over time

Opti

Infrastructure reacts to current and forecast conditions

Opti Continuous Monitoring and Adaptive Control (CMAC)





- Real-time asset visibility and alerting
- Automated forecast-based discharge control
- Adaptable controls
- Built on modern, secure cloud architecture
- Web-based dashboards

Resiliency in Beckley, WV

Absorb and adapt to persistent stress

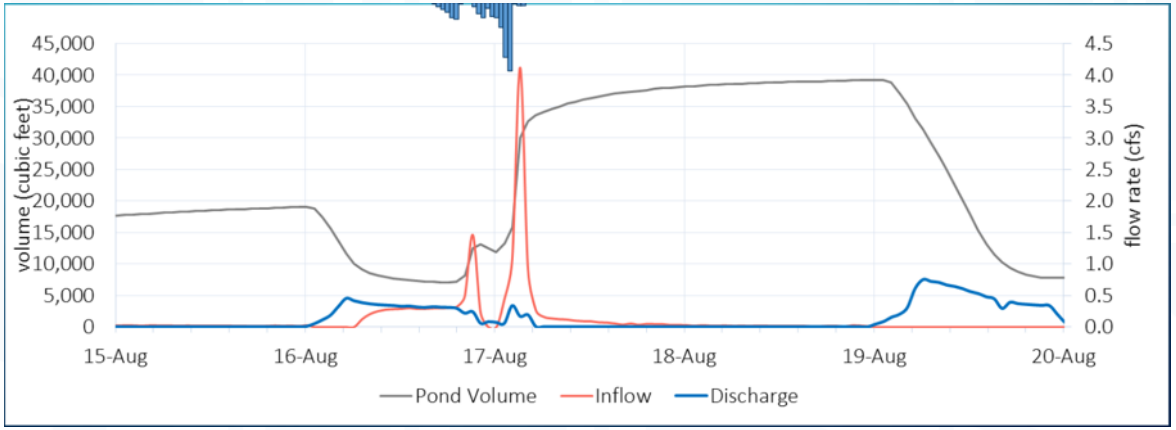
- Pre-conditions:
  - Consistent flooding of major roadway
  - Passive pond built in 2013 to address flooding
  - Still experiencing infrastructure damage

Resiliency in Beckley, WV

Absorb

"iPond" project (Feb. 2017) adding CMAC technology to passive pond

Controlling outflow before, during and after wet weather



Resiliency in Beckley, WV

Adapt

2013 — **Build Passive Pond**

To address flooding at Robert C Byrd Drive

Feb 2017 — **Install Opti**

Begin continuous monitoring and adaptive control

4 months

June 2017 — **Weir 1 Retrofit**

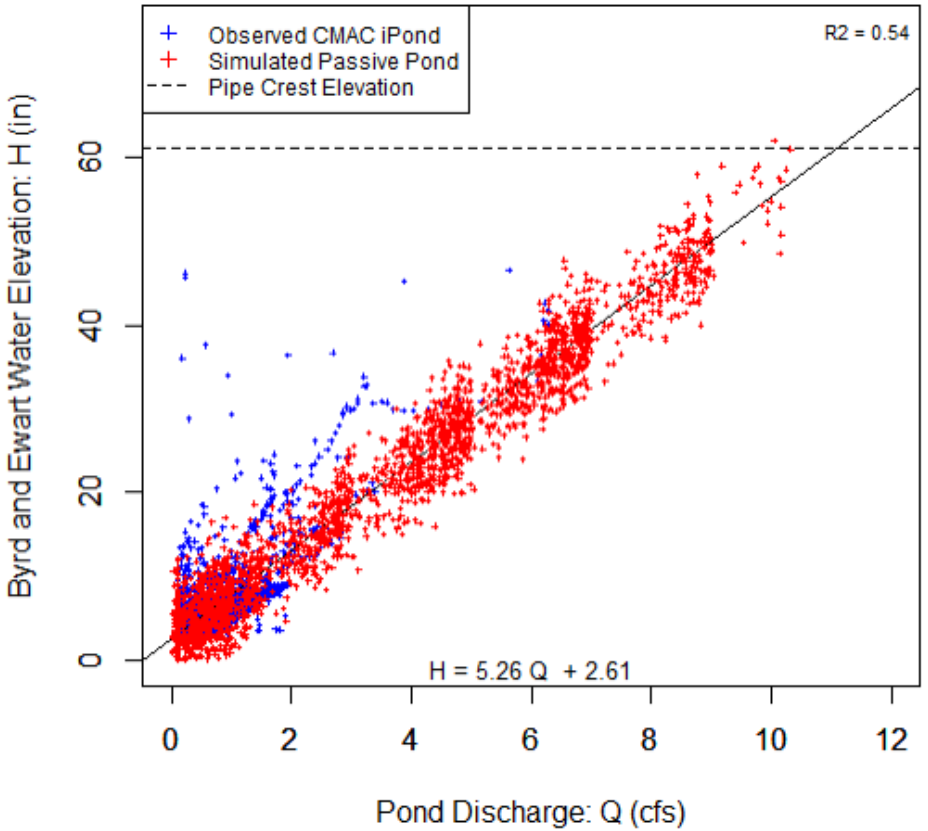
Increase capacity of pond to further reduce wet weather discharge

- Compare real-time data to previous assumptions
- Weir 1 retrofit: increased capacity from **~43,000 cf to 77,000 cf.**

Resiliency in Beckley, WV

Measureable Downstream Flood Mitigation

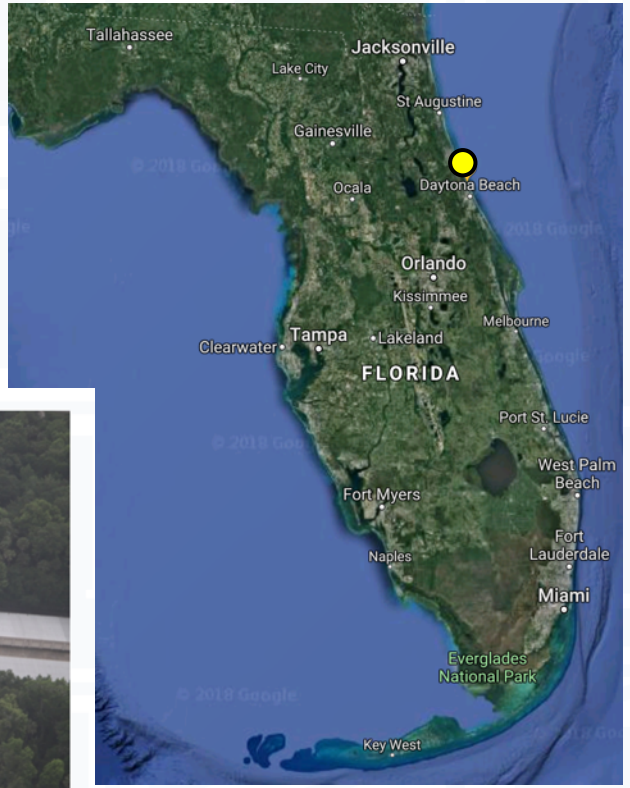
- Reduced Discharge Rate
- Reduced Water Elevations



Resiliency in Ormond Beach, FL

Plan, prepare, and absorb abrupt disturbances

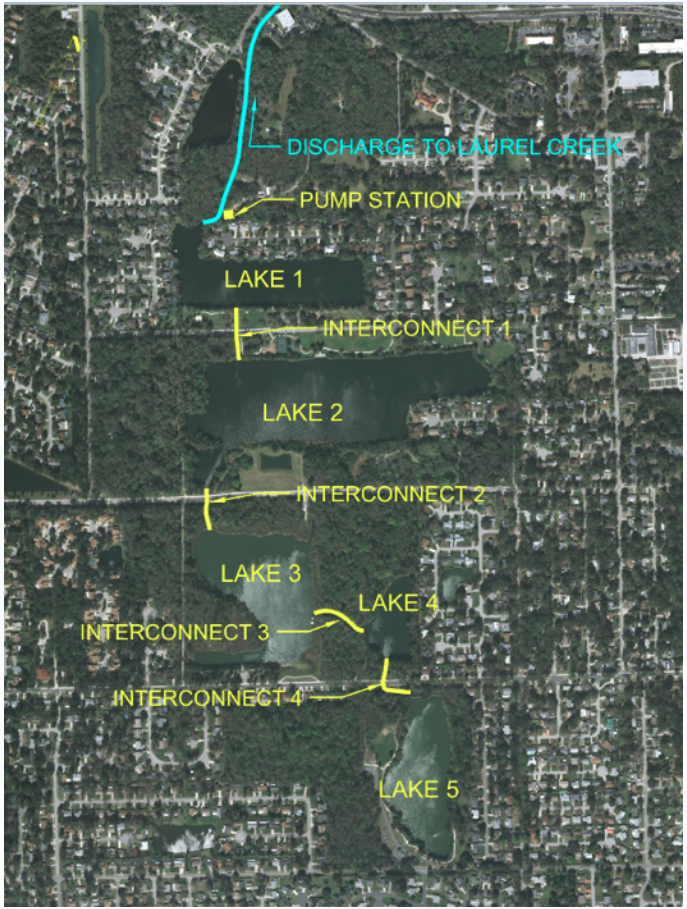
- Pre-conditions:
  - 2009 flood caused >$50 million in damages
  - Majority of City below 10 ft MSL



Source: The Daytona Beach News-Journal, October 2016

Resiliency in Ormond Beach, FL

- **Plan**: interconnect 5 existing lakes
  - Utilize existing pump station
  - $3.4 million project
  - 250 acre-ft of combined storage
  - 7,680 acre drainage basin
- Opti CMAC installed at pump station



Resiliency in Ormond Beach, FL

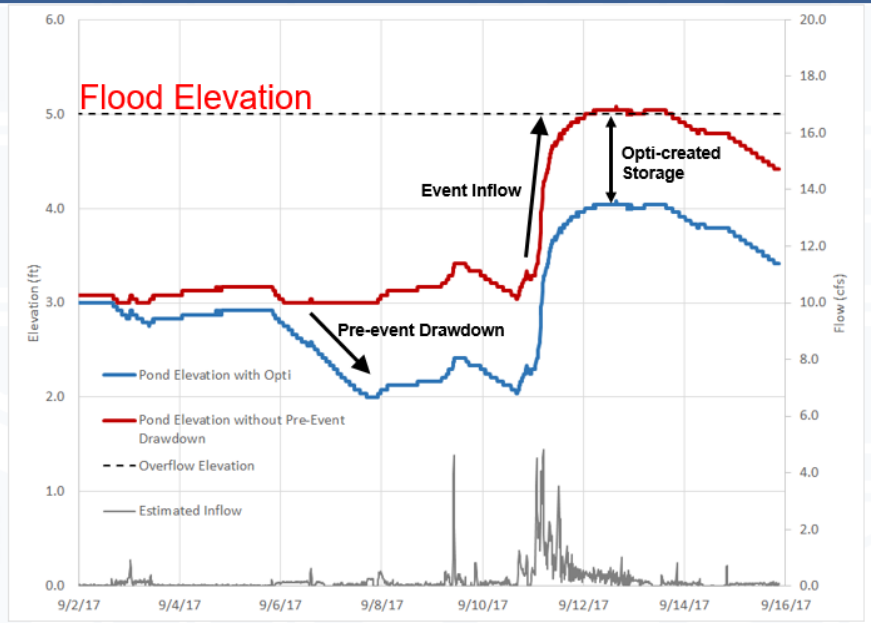
- **Prepare**: Hurricane Irma
- Opti CMAC performs pre-storm-event-drawdown
  - 70 acre-ft discharged in advance of Irma
- Automated pump fault alerting
  - Pumps failed 48 hours in advance of Irma, City repaired in advance of Irma

Source: NASA GOES Satellite

Resiliency in Ormond Beach, FL

- **Absorb:** Opti CMAC avoids flooding during Irma
- Real-time information to City's storm command center

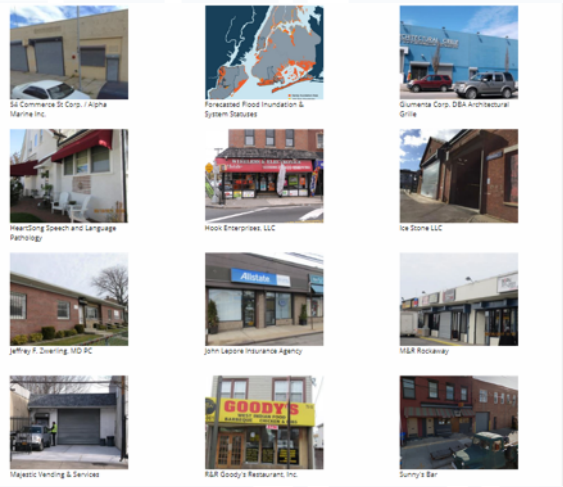
Pre-event drawdown prevented flooding

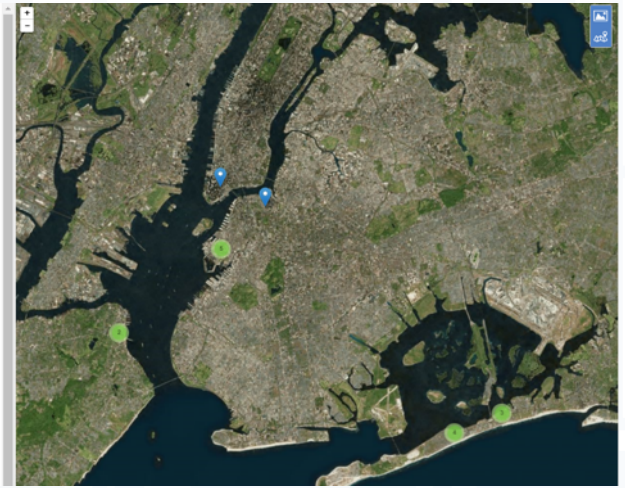


Resiliency in NYC

RISE:NYC
Resiliency Innovations for a Stronger Economy

Recovery and adaptation to Hurricane Sandy

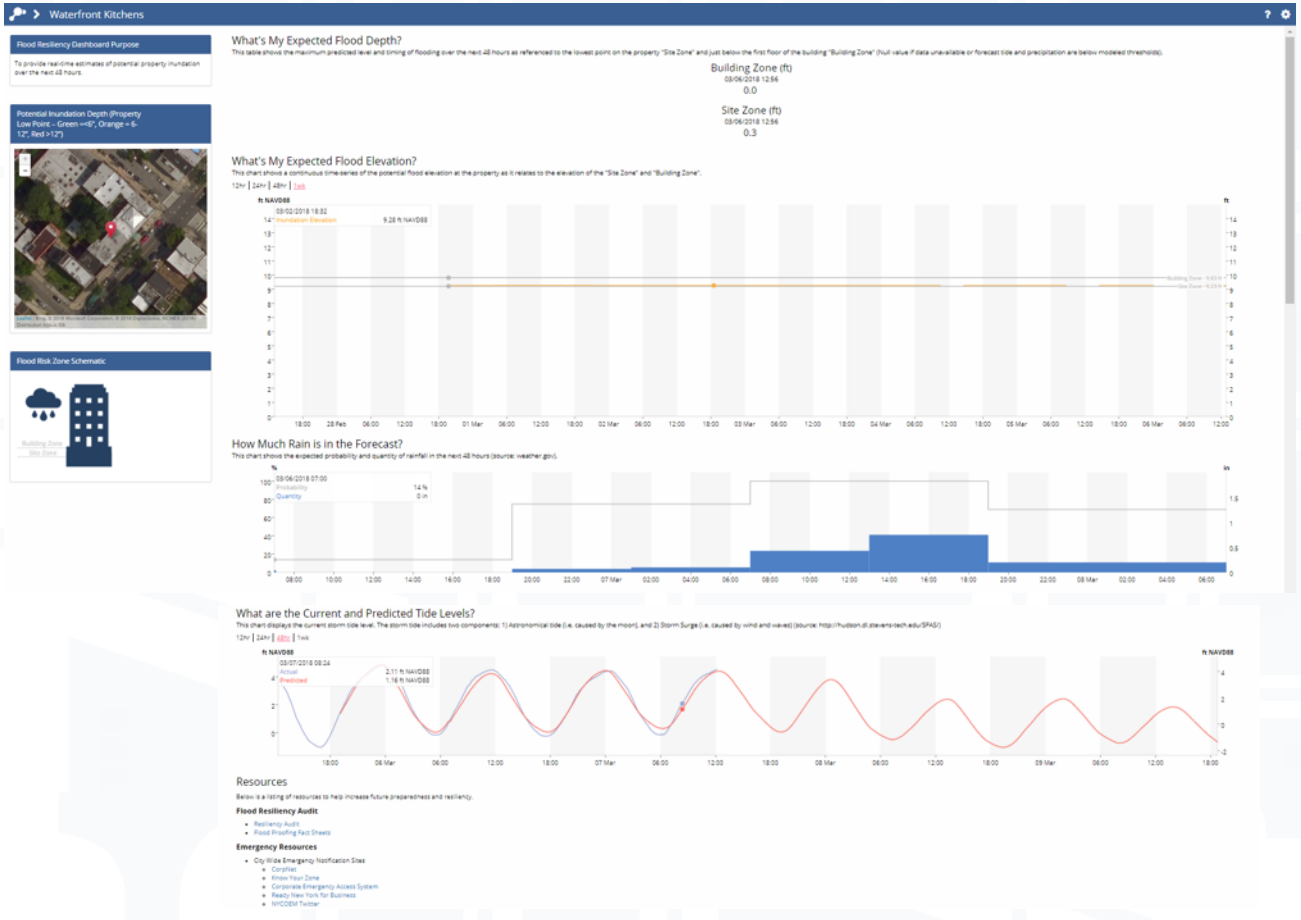




Collaboration with Geosyntec and Boomi Environmental

- **Purpose**: provide small business owners with actionable alerts to protect their property from flooding.

Resiliency in NYC

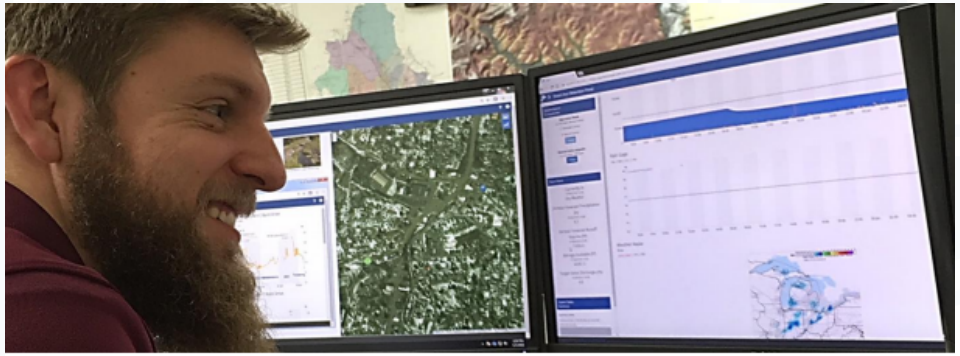


RISE:NYC
Resiliency Innovations for a Stronger Economy

- Model combines Weather and Tide forecasts to provide real-time inundation risk alerts
  - Alerts are specific to location, and actionable (forecast inundation depth, Site-Specific Risk Level)
- Beneficiaries get access to site-specific dashboards

Conclusions

- Tackling resiliency can look differently based on needs and context
- Data availability and format
  - Right place, right time
- Help with planning and absorption
  - Data collection
- Automatic processes where possible



Questions?

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