

# CITY OF NEW ORLEANS

# **Resilient City Water and Wastewater Systems**

# **Historic City on the Mississippi Delta**



# **Mississippi River Drainage Basin**



# New Orleans Founded in 1718



# New Orleans: A Shining City in a Bowl

Constructed to sit atop wetland and silt soil, cross-sectioned with canals to have water move through the city to drain into the lake; and have neighborhoods situated on top of it all.



# **New Orleans Water Systems**

#### **Orleans Parish Water Management**



# Drainage System Facts and Figures

- 150 Miles Covered Canals
- 100 Miles Open Canals
- 200 Miles Pipes > 36"
- 24 Drainage Pump Stations with 119 Pumps
- 51,000 CFS Capacity







System's pumping capacity is over 29 billion gallons per day, enough to empty a lake 10 square miles by 13.5 deep every 24 hours.

### Multi-Level Protection Internal Water Management



## Reliance Upon Pumps, Canals, Levees and Floodwalls



### Investing Towards a More Resilient Water System – Bolstering the Underground Network of Stormwater Canals

The Army Corps of Engineers and local New Orleans government is investing **nearly \$1 billion** to widen and fortify the city's network of underground canals.



# **Investing Towards a More Resilient Water System:** *Advanced Hurricane Risk Reduction*

The Army Corps of Engineers invested over \$14.6 billion to create the Greater New Orleans Hurricane & Storm Damage Risk Reduction System, which includes 133 miles of levees, floodwalls, floodgates and pump stations surrounding Greater New Orleans.





# New Orleans Landscape: Urban Line of Defense



# **Our Problems**

- > Sea Level Rise
- Coastal Erosion
- Flooding
- Subsidence

# **Our Opportunities**

- Improved Safety
- Economic Vitality
- Living with Water
- Enhanced Quality of Life



# **Sea level rise:** because we also face coastal subsidence, South Louisiana is facing the highest rate of relative sea level rise in the world.



Coastal land lost since 1932: 1,900 mi<sup>2</sup> (4,920 km<sup>2</sup>)

Projected land loss by 2060, without action: **1,806 mi<sup>2</sup> (4,677 km<sup>2</sup>)** 

### **Our Disappearing Coast**

Data Source:

Coastal Protection and Restoration Authority, 2012 Coastal Master Plan

MAP Future without action scenario

Land projected to be lost by 2060

## Disproportionate Risk: vulnerability to shocks correlated with race + income





#### **POPULATIONS OF COLOR**

#### + Flood Risk





(non-"White Alone", including Hispanic or Latino, by Census Block Group)



### Areas of higher flood risk

(based on FEMA 100-year and 500-year storm flood zones)

#### LOW INCOME COMMUNITIES

+ Flood Risk



Median Household Income

by Census Block Group



#### Areas of higher flood risk

(based on FEMA 100-year and 500-year storm flood zones)

# What We're Doing: New Orleans City Resilience Strategy Released August 2015



#### ADAPT TO THRIVE

# We are a city that embraces our changing environment.

### We will:

Advance coastal protection and restoration

**Invest** in comprehensive and innovative urban water management

Incentivize property owners to invest in risk reduction

**Create** a culture of environmental awareness at every stage of life

Commit to mitigating our climate impact

### **Resilience Dividend:** designing projects for multiple benefits



Reduced risk of flooding & subsidence



Neighborhood revitalization & economic development



Improved health & quality of life



Environmental education & workforce development

## Creating a One Water Solution for a More Sustainable and Resilient New Orleans

Complimenting ongoing water infrastructure investment, New Orleans is working to create waterbased community development:

- Aligning and streamlining water-related governance, policy, and funding.
- **Harnessing** public space to safely detain stormwater and recharge sinking soils.
- Leveraging water investment to spur economic and community growth.



#### **National Disaster Resilience Competition**

New Orleans was awarded \$141M to establish the first-ever Resilience District with several integrated initiatives that will turn Gentilly into a national model for retrofitting post-war suburban neighborhoods into resilient, safe, and equitable communities of opportunity.



## Gentilly Resilience District: Urban Water & Community Adaptation Activities





**Streets & Corridors** 





Parks & Playgrounds



**Vacant Lots** 



Home & Property Improvements

#### Mirabeau Water Garden



- **Project Scope:** 25-acre site of a former convent of the Sisters of Saint Joseph designed to store up to 10 million gallons of stormwater while also serving as a space for recreation and environmental learning
- Budget: \$12.5M HMGP; \$12M NDR
- Phase: 60% Design on HMGP; Scoping NDRC

#### **New Orleans Urban Water Projects Overview**

### • FEMA Hazard Mitigation Grant Program (HMGP)

- 8 Green Infrastructure and Drainage Improvement Projects Citywide
- Total Budget: **\$125M**
- Timeline: Construction complete August 2019

### • HUD National Disaster Resilience Competition (NDRC)

- 7 Urban Water Management Projects focused in Gentilly
- Total Budget: **\$98M** for Urban Water (\$141M total award)
- Timeline: Construction complete **2022**

# **Critical Infrastructure Risk Transfer**

#### **Transform City Systems**

Swiss Re and Veolia partnership to conduct a risk evaluation of Sewerage and Water Board of New Orleans' (SWBNO) critical infrastructure and identify opportunities to protect assets by prefunding catastrophic losses. SWBNO has completed study and is looking to implement recommendations. The City of New Orleans is interested in performing similar analyses for cityowned critical infrastructure.

- Combines risk modelling expertise of Swiss Re with urban systems management expertise of Veolia
- Takes latest climate change models into account
- Modelled based on strategic upgrades and infrastructure improvements to assets
- Recommends strategic mitigation efforts
- Partners:
  - Swiss Re
  - Veolia



## Continuing Challenges and Future Opportunities

**The Goal**: Aligning and streamlining water-related governance, policy, and funding.

**The Challenge:** Decades of deferred maintenance funding; inconsistent system-wide strategic planning; and multiple governmental entities managing aspects of a single water system.

**The Opportunity:** Approval of a framework for drainage service fee; enacted governance reform legislation; and first-time comprehensive stormwater management zoning and permitting regulations; Exploration of storm water fee.

