City of Lake Worth Beach
Update on the Southern Palm Beach County Climate Change Vulnerability Assessment
Presentation Agenda

1. Coastal Resilience Partnership
2. Climate Change Vulnerability Assessment
3. Preliminary Flood Threat Results
   - Tidal Flooding
   - Storm Surge
   - Rainfall Induced Flooding
4. October 2020 Flooding
5. Regional Comparisons
Began meeting to discuss common climate threats and needs

PBC opened Office of Resilience, CRP decided to pursue joint CCVA

Inventoried GIS data, developed CCVA scope, Drafted ILA

Revised and executed ILA, prepared RFP

Hired consultants, conducted 3 workshops, completed Steps 1-2 of CCVA

CCVA Step 3: Vulnerability Assessment

Coastal Resiliency Partnership (CRP) Timeline
STUDY AREA

Study Area

This map shows the study area for the Climate Change Vulnerability Assessment (CCVA). The study area is inclusive of the utility service areas for every jurisdiction.

- Primary Study Area Extent
- Collective Utility Service Area

Participating Entity Boundaries

- City of Lake Worth Beach
- Town of Lantana
- City of Boynton Beach
- Town of Ocean Ridge
- City of Delray Beach
- Town of Highland Beach
- City of Boca Raton
- Palm Beach County

Note: Only assets belonging to a participating entity will be analyzed, including utility assets inside the service areas but outside the entity boundaries; assets of non-participating entities within the service area will not be analyzed.

CRP
Climate Change Vulnerability Assessment: The Process

1. Explore Climate Threats
2. Assemble Data on Community Systems
3. Assess Vulnerabilities and Risks
4. Investigate Potential Adaptation Strategies
5. Reporting and Tool Deployment
Top Dozen Threats

- High Winds
- Rainfall-Induced Flooding
- Harmful Algal Blooms
- Pest & Disease Outbreaks
- Extreme Heat
- Drought
- Wildfire
- Shoreline Recession
- Tidal Flooding
- Storm Surge
- Groundwater Inundation
- Saltwater Intrusion
Sea Level Rise is a Threat Multiplier

It is not a threat on its own.

- **Storm Surge**: SLR is a component that increases risk
- **Tidal Flooding**: SLR will increase frequency and severity until a threshold of persistent inundation could be reached
- **Groundwater/Saltwater Intrusion**: SLR is the primary cause of these threats
- **Rainfall-Induced Flooding**: SLR interacts as a compounding event in coastal areas
- **Shoreline Recession**: SLR accelerates the movement of shoreline
Tidal Flooding* *exacerbated by sea level rise

Indicates above normal high tide events, unrelated to a storm, where water levels flow over the tops of sea walls and onto streets or force water into stormwater outfalls.

**Analysis Type:** Spatial

**Climate Stressors:**
- Sea level rise

**Non-Climate Stressors:**
- Aging infrastructure
- Level of Service (LOS) requirements

**Data Sources:**
- SWMP
- Measured and Predicted Tides within Study Area
- Sea Level Rise Projections
- Digital Elevation Model (DEM)
- NOAA Studies and Reports

*Technical Lead: Steve Peene, PhD*
Storm Surge*  
*exacerbated by sea level rise

Coastal flooding caused by an abnormal rise in tide from a storm (e.g. hurricane) over and above the usual, astronomical tide.

Analysis Type: Spatial

Climate Stressors:
- Sea level rise
- More frequent, stronger storms

Non-Climate Stressors:
- Aging infrastructure
- Density of development in coastal risk areas
- Level of Service (LOS) requirements

Data Sources:
- South Florida Flood Insurance Study Reports
- FEMA Base Maps; Flood Zones with (BFE)
- Still Water Elevations (SWEL)
- ADCIRC Wave Projections
- WHAFIS Model Information
- Sea Level Rise (SLR) Projections
- 2016 Digital Elevation Model (DEM)
Tidal Flooding and Surge Flooding is a Regional Issue

Other Communities in the CRP Project Area Face Similar Challenges
Rainfall Induced Flooding

Flooding due to the accumulation of rainwater on normally dry land.

Analysis Type:
- Spatial

Climate Stressors:
- Changes in spatial and temporal variability of rainfall

Non-Climate Stressors:
- Increases in impervious surfaces
- Aging infrastructure
- Development & floodplain alteration
- Maintenance challenges related to stormwater infrastructure

Data Sources:
- Stormwater master plans
- H&H/stormwater Models
- FEMA Maps/"Riverine" Floodplain Mapping
- Problem area reports
- Inundation mapping
CRP Regional Modeling - Not High Resolution Locally

2012 Stormwater Master Plan (CDM-Smith) – 5 year Design Storm
CRP Regional Modeling - Not High Resolution Locally

2012 Stormwater Master Plan (CDM-Smith) – 10 year Design Storm
CRP Regional Modeling - Not High Resolution Locally

2012 Stormwater Master Plan (CDM-Smith) – 5 year Design Storm
CRP Regional Modeling - Not High Resolution Locally

2012 Stormwater Master Plan (CDM-Smith) – 5 year Design Storm
Recent Flooding (October 24-25) was a Regional Issue

Days of heavy rain flooded Boynton Beach neighborhood

Lantana neighborhood that flooded could get aid

Kimberly Miller
Palm Beach Post
kimberly.miller@palmbeachpost.com

Palm Beach County officials are hoping there may be some emergency money available to help a Lantana neighborhood that flooded last weekend after a week’s worth of rain.

A rain gauge near the Sea Pines neighborhood in Lantana, west of Hypoluxo Road, recorded 5.5 inches in the week that ended Sunday, as tropical moisture was pushed into South Florida by the system that became Hurricane Delta.

Palm Beach County Emergency Management has identified the Sea Pines neighborhood near Hypoluxo Road as the most affected area. The county sent pumps into the Sea Pines to remove the water.

Lantana Town Manager Deborah Mann said that some of the homes in the neighborhood were not prepared for the heavy rains.

The county sent pumps into the Sea Pines to remove the water. Lantana Town Manager Deborah Mann said that some of the homes in the neighborhood were not prepared for the heavy rains.

After several days of rain in Palm Beach County,

A recent storm left many parts of Broward County flooded

Stormy Weekend Leaves Many Parts of Broward County Flooded

Published October 25, 2020 • Updated on October 26, 2020 at 9:27 am

Flooded Fort Lauderdale hit with 30% of annual rainfall in just one week

Several areas in Broward under water

FORT LAUDERDALE, Fla. — Streets are looking more like lakes in many areas of Broward County, making it hard for people to get in and out of their homes.

To give some perspective, officials with the City of Fort Lauderdale say 30% of the annual rainfall they were expecting in 2020 came down within the past week.
## Assets – What will we analyze?

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Primary Asset Categories</th>
<th>Asset Category Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Facilities</td>
<td>Public Safety</td>
<td>Emergency services including police and fire</td>
</tr>
<tr>
<td></td>
<td>Food, Water, Shelter</td>
<td>Food distribution centers, SNAP retailers, shelters</td>
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<tr>
<td></td>
<td>Health and Medical</td>
<td>Hospitals, clinics, extended care facilities, pharmacies</td>
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<tr>
<td></td>
<td>Energy and Communications</td>
<td>Electrical utilities, substations, radio/cell tower properties</td>
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<tr>
<td></td>
<td>Government Facilities</td>
<td>Schools (public and private), City/County buildings, and any other government-owned property (federal, state, municipal)</td>
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<tr>
<td>Water Infrastructure</td>
<td>Stormwater</td>
<td>Stormwater lines, BMPs, structures</td>
</tr>
<tr>
<td></td>
<td>Wastewater</td>
<td>Wastewater lines, treatment plants, structures, lift stations</td>
</tr>
<tr>
<td></td>
<td>Potable Water Supply</td>
<td>Water supply, lines, structures, treatment plants</td>
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<tr>
<td>Economic</td>
<td>Annual Sales Volume</td>
<td>Annual sales for businesses</td>
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<tr>
<td></td>
<td>Jobs/Employees</td>
<td>Number of employees for business locations</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>Beaches &amp; Coastal Areas</td>
<td>Beaches or natural coastal property</td>
</tr>
<tr>
<td></td>
<td>Natural Areas and Parks</td>
<td>Parks, greenways, waterbodies</td>
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<tr>
<td>People</td>
<td>Population/Social Vulnerability</td>
<td>Socioeconomics with a focus on sensitive or socially vulnerable populations, seasonal populations</td>
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<tr>
<td>Property</td>
<td>Commercial &amp; Industrial Property</td>
<td>Retail, offices, industrial or manufacturing,</td>
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<tr>
<td></td>
<td>Cultural Property</td>
<td>Religious or cultural property, landmarks, historical properties</td>
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<td></td>
<td>Residential Property</td>
<td>Any multi or single residence, group homes, public housing, apartments and condos</td>
</tr>
<tr>
<td>Transportation &amp; Mobility</td>
<td>Roads &amp; Transportation Systems</td>
<td>All major and minor roads, transportation facilities</td>
</tr>
</tbody>
</table>
Investigate Potential Mitigation Strategies:
- Infrastructure Recommendations
- Policy Recommendations

Reporting and Tool Development:
- AccelAdapt

CCVA – Next Steps
October 2020 Flooding

1. Tidal Conditions
2. Antecedent Conditions
3. Weekend Rainfall
Seasonal increases in tides diminish the capacity to discharge runoff by gravity.
WEST PALM BEACH AIRPORT:

Average Rainfall October = 5.6 inches
October 2020 Rainfall = 13.9 inches

Average Rainfall September = 7.5 inches
September 2020 Rainfall = 5.6 inches

Oct. 1 = 3.58 inches
Oct. 19 = 3.1 inches
**Daily Precipitation at S-155 / S-40 / S-41 September-October 2020**

**S-155 (SPILLWAY AT NORTHERN CITY LIMIT):**
- Average Rainfall October = 5.6 inches
- October 2020 Rainfall = 18.7+ inches

**Weekend of Oct 24-26**
- 6.4 inches at S-155
- 10y-3d Storm: 10 inches
Higher Tides + Higher Rainfall = Flooding in Low Lying Areas
QUESTIONS