

#### **Comprehensive Planning** for the Peril of Flood

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## **CURRENT & FUTURE IMPACTS OF FLOODING**



- Tidal Flooding
- Saltwater Intrusion
- Failing Drainage
- Malfunctioning Canals
- Beach Erosion
- Habitat loss
- Reduced Groundwater Storage

#### FLORIDA'S 2000-2016 FLOODPLAIN POPULATION GAINS



SOURCE: Governing analysis of standardized Census tract data from IPUMS NHGIS, University of Minnesota; FEMA NFHL data. From an article in *Governing The States and Localities*, *Risky Waters*, *Everyone knows it's a bad idea to build new development on flood*prone land. So why do we keep doing it?, August, 2018

## **FUTURE PROJECTIONS OF SEA LEVEL RISE**



#### Section 163.7138(2)(f)1-6, Florida Statutes "Peril of Flood" Community Planning Requirements

The 2015 Florida Legislature directed jurisdictions that have a Coastal Management Element as a part of their comprehensive plan to include a redevelopment component with principles that must be used to eliminate inappropriate and unsafe development in the coastal areas - when opportunities arise.

DEO staff review these plan updates for compliance with the legislative requirements.

#### PERIL OF FLOOD: RELEVANT DATA & ANALYSIS

The component must include development and redevelopment principles, strategies and engineering solutions that reduce the flood risk in coastal areas that are the results of:

- High-tide events
  Storm surge
  Flash floods
- Stormwater runoff
- Related impacts of sea-level rise future projections

## **INUNDATION TYPES**

#### Not all are the same!

#### Short Term (Episodic):

- Storm Surge
- Tsunami
- Inland Flooding
- Shallow Coastal Flooding

#### Long Term (Chronic):

Relative Sea Level
 Change



## WHY MAP INUNDATION?

- Visualize flooding by showing the potential height and extent of the water.
- Better understand the consequences or potential impacts of flooding.
- Allow for long-term land use planning and adaptation to coastal risk.
- Promote public education and awareness.
- Allow for GIS analysis of impacted areas with other data for decision making.



From: Train the Trainers, SFRPC, Coastal Resiliency Initiative Grant, DEP, 2015

## **COMPREHENSIVE PLAN**

#### The "Peril of Flood" requirements group into two parts. The first part is outlined below:

1. Include development and redevelopment principles, strategies, and engineering solutions that **reduce the flood risk in coastal areas,** which result from high-tide events, storm surge, flash floods, stormwater runoff **and the related impacts of sea-level rise.** 

2. Encourage the use of best practices development and redevelopment principles, strategies and engineering solutions that will result in the **removal of coastal real property from flood zone designations** established by the Federal Emergency Management Agency (FEMA).

3. Identify site development techniques and best practices that may **reduce losses due to flooding** and claims made under flood insurance policies issued in Florida.

The strategies need to be identified **now** and included in the plan.

## **COMPREHENSIVE PLAN**

## The second part of the "Peril of Flood" requirements include the following:

4. Be consistent with, or more stringent than, the floodresistant construction requirements in the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.

5. Require that any construction activities seaward of the coastal construction control lines established **pursuant to section 161.053**, **F.S.**, **be consistent with chapter 161**.

6. Encourage local governments to participate in the National Flood Insurance Program Community Rating System administered by FEMA to achieve flood insurance premium discounts for their residents. Easily adoptable as policies into the plan reiterating these requirements.

## **PERIL OF FLOOD DATA & ANALYSIS**



Multiple data sets, when used together, provide useful information for identifying the jurisdiction's vulnerable areas, locations and facilities.

## **PERIL OF FLOOD DATA & ANALYSIS**

Data and analysis is used to define vulnerable areas.

#### **Example: Titusville**

Objective 2.1: The coastal storm area shall include the following areas:

- The Coastal High Hazard Area (CHHA) and
- Areas of the city projected to be inundated by sea-level rise as early as the year 2040 and through 2100 based on maps developed by the City using the University of Florida GeoPlan Center Sea Level Scenario Sketch Planning Tool.

The City used specific data taken from professionally accepted sources to define areas of concern.

## WHY AND HOW TO USE THESE TOOLS

- Evaluate SLR scenarios and impacts to assets/populations over time.
- Identify a broad timeline for tipping points (when do SLR impacts get really bad?).
- Match timing of impacts with planning horizons.
- Engage community in discussion.
- Utilize information to prioritize transportation improvements.
- Analyze evacuation routes for susceptibility to permanent inundation.
- Use base GIS layers of inundation for community vulnerability assessments.

Target Audience/ Users

MPOs, RPCs, counties and municipalities doing regional level community resilience planning.

From: Train the Trainers, SFRPC, Coastal Resiliency Initiative Grant, DEP, 2015

## **REDEVELOPMENT COMPONENT**

#### Goals, Objectives, Policies (GOPs) and Maps

While developing community flood protection planning strategies, GOPs and maps often fit into one of these five approaches:

- 1. Procedural Outreach and education, real estate disclosure.
- 1. Protection "Hard" and "soft" structurally defensive measures.
- **2.** Accommodation Altering the design and use of structures to handle flooding.
- 3. Strategic Relocation Incremental relocation development to safer areas.
- 4. Avoidance Directing new development away from vulnerable areas.

## **REDEVELOPMENT COMPONENT**

GOPs and mapping can direct the elimination of inappropriate and unsafe development when opportunities arise. Opportunities may include:

- The local planning agency and land development code review committees.
- Comprehensive plan amendments.
- Comprehensive Plan, Evaluation and Appraisal Review updates.
- Infrastructure project proposals and capital improvement budgeting.
- Grant proposals and mitigative funding sources (e.g., BP Oil funds).
- Post-disaster redevelopment funding and actions.
- The local mitigation strategy (LMS) plan participation and plan updates.

#### **Example: Boynton Beach**

**Policy 7.7.3** "The floodplain administrator/building official shall review all permit applications to determine whether proposed development sites will be reasonably safe from flooding. If a proposed development site is in a flood hazard area, all site development activities, ... all new construction and substantial improvements shall be designed and constructed with methods, practices and materials that minimize flood damage and that are in accordance with the City Flood Prevention Code."

#### **Example: Titusville**

**Policy 2.1.2:** "The City shall prohibit the location of new hospitals, nursing homes and assisted living facilities in the Coastal Storm Area and the area inundated by a Category 2 hurricane as depicted by the SLOSH model, as reflected in the Sea Level Rise Vulnerability Assessment prepared by the East Central Florida Regional Planning Council."

#### **Objective and Policy Set: Titusville Example**

Objective 3.2: The City's shoreline includes natural resources which shall be preserved from encroachment and development.

Policy 3.2.2: The City shall minimize the disturbance of natural shorelines, which provide stabilization and protect landward areas from storm impacts, where feasible.

Policy 3.2.4: The City will maintain shoreline protection and erosion control by:

- Facilitating the installation and maintenance of native shoreline vegetation along appropriate areas of beach and
- Considering hard structures, such as seawalls, only when alternative options are unavailable.

Note: The City is identifying the preferred use of natural system components to form a defense against storm impacts.

#### **CITY OF PORT ORANGE**

#### Post Disaster Opportunity - Strategic Relocation



The community used FEMA funds for buyouts.

## **ADAPTATION ACTION AREA(s) (AAAs)**

A designation that identifies an area that experiences coastal flooding due to extreme high tides and storm surge and that is vulnerable to the related impacts of rising sea levels.

AAAs assist with the prioritization of funding for infrastructure needs and adaptation planning.



Exhibit CC-1. Adaptation Action Areas

## **EFFECTIVE ADAPTATION STRATEGIES**

- 1) Land-use regulations & building codes.
- 2) Limits on insurance subsidies.
- 3) Redesign and retrofitting of structures.
- 4) Updates for drainage, flood control, and water supply infrastructure.
- 5) Increased coastal protection.

From: Train the Trainers, SFRPC, Coastal Resiliency Initiative Grant, DEP, 2015

## **ACCOMODATION AND PROTECTION**



# A green infrastructure approach turns a floodable area into a community asset.

Photo source: City of Tallahassee

## **NFIP COMMUNITY RATING SYSTEM (CRS)**

#### CRS credits lower flood insurance rates.

NOAA's Coastal Flood Exposure Mapper is particularly useful for Floodplain Management Planning (Activity 510), Element 512.a

- Credit for mapping areas of future flooding due to sea level rise
- Credit for notifying property buyers of sea level rise
- Credit for regulatory map based on future conditions
- Class 4 rating or higher requires minimized increases in future flooding
- Class 1 rating requires flood elevations that reflect future conditions



Organizing adaptation options

Source: W. Thomas Hawkins, UF College of Law, 2016 http://www.tbrpc.org/onebay/obwg/060316/Hawkins\_UF\_CRS\_ClimateAdapt\_06032016.pdf

## **PERIL OF FLOOD DATA & ANALYSIS**

#### Available Data and Mapping Resources:

- NOAA Coastal Flood Exposure Mapper
   <u>https://coast.noaa.gov/digitalcoast/tools/flood-exposure</u>
- NOAA, Sea Level Rise Viewer <a href="https://coast.noaa.gov/digitalcoast/tools/slr">https://coast.noaa.gov/digitalcoast/tools/slr</a>
- NOAA Sea Level Rise Data Download <a href="https://coast.noaa.gov/slrdata/">https://coast.noaa.gov/slrdata/</a>
- UF GeoPlan Center, Sea Level Scenario Sketch Planning Tool <u>http://sls.geoplan.ufl.edu</u>
- Climate Central <u>http://www.climatecentral.org/</u>
- Florida Division of Emergency Management (DEM) Regional Evacuation Studies <u>https://www.floridadisaster.org/res</u>
- Florida DEM Storm Surge Zone Atlases <u>https://www.floridadisaster.org/planprepare/disaster-preparedness-maps/</u>

### **QUESTIONS**







# Thank You.

If you have questions or comments about this presentation or need to discuss a future project, please contact me.



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