PUBLIC EVENING MEETING #2
December 19, 2019
Bayou Terrebonne Waterlife Museum
Presented by: Jennifer C. Gerbasi
I. Welcome and Introductions

II. Review of Process

III. Subcommittee Discussion Update

IV. Map Review

V. Coastal Master Plan Projects

VI. Strategy Discussion – FEMA Priorities

VII. Goals and Objectives Review and Revision

VIII. Project List

IX. Project Prioritization

X. Conclusion
III. PLANNING PROCESS

Review • Organize and Convene Community  
• Research and Review of Data

Revise • Update Risk Assessment  
• Assess the Potential Losses

Reset • Set Goals – Standard for Protection  
• Update Mitigation Strategy
III. PLANNING PROCESS (contd.)

**Write**
- Draft Updated Plan – Vet Publicly
- Submit to State and FEMA

**Ratify**
- Revise as Necessary
- Adopt through Council

**Revisit**
- Yearly Maintenance
What is Hazard Mitigation Planning?

Planning for any sustained action(s) taken to reduce or eliminate the long-term risk to human life and property from hazards.

Mitigation = Prevention

Pointe au Chenes outside the floodgates during Barry. Photos care of Chanel 4WWL CBS news.

Barry levee overtopping only at unfinished section in Dularge. Construction complete for future storms.
Eligibility for mitigation grant project funding
Progress made during the past five years to prevent or reduce future losses from natural hazards
Capture changes in hazard identification
Vulnerability analyses
Magnitude of risks associated with vulnerability
Local mitigation capabilities
Bayou Board of Realtors
Bayou Grace
Biloxi-Chitimacha Confederation of Muskogees
Biloxi-Chitimacha Island Road Band
Consolidated Waterworks District
GIS Engineering
Houma Chamber of Commerce
Louisiana Dept. of Health and Human Services
R.J. Shaw, Inc.
Restore or Retreat
South Central Industrial Association
South Louisiana Bank
Southeast LA Homebuilders Association
Terrebonne Parish School Board
Terrebonne Parish Assessor’s Office
United Houma Nation

City of Houma Fire Department
Houma Police Department
Terrebonne Sheriff’s Office
Terrebonne Levee and Conservation District
Terrebonne Parish Consolidated Government
Terrebonne Office of Homeland Security and Emergency Preparedness
Terrebonne Parish Sheriff’s Office
Terrebonne Regulatory Planning Commission
Terrebonne Parish Council
NFIP Coordinator
III. PLANNING PROCESS (contd.)
PRODUCTS - DELIVERABLES

- Repetitive Loss Risk Reduction Strategy
  - Repetitive Loss Area Analysis of Bayou Black
- Updated Risk Assessment and Strategy
- Updated Maps for Public Education
- Project List of Prioritized Activities
- Adopted Plan for Grant Eligibility
III. PLANNING PROCESS (contd.)

PARTICIPATION STRATEGY

• Steering Committee meetings on each step
  o Open to the public
  o Available on line for public access

• Public meetings in the evening to provide access
• Collection of documentation at Government Tower
• Website with all documentation posted
• Online comment form
• Considering any and all input in writing
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SUBSIDENCE
Coastal and in the Forced Drainage Areas

Subsidence Rates (ft/century)
- Stable
- Stable/Low
- Low 0 - 1'
- Low/Intermediate 0 - 2'
- Intermediate 1.1' - 2'
- High 2.1' - 3.5'
- Very High >3.5'
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CRITICAL FACILITY MAP UPDATES

Schools

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<tr>
<th>ID</th>
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<tr>
<td>1</td>
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<td>Arnaudville</td>
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<td>52</td>
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<td>Vanderbilt Catholic High</td>
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<td>Village East Elementary</td>
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<td>56</td>
<td>West Park Spec Ed &amp; Fed</td>
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</table>
CRITICAL FACILITY MAP UPDATES
Levee/Pump Station and Floodgates
CRITICAL FACILITY MAP UPDATES
Fire Stations
CRITICAL FACILITY MAP UPDATES
Police Stations

Legend
- Police Station
- 100 Year Flood Zone

Places
- Community

Transportation
- US Highway
- State/Parish Highway
- Railroad

Map 2-11
1. Bayou Cane Police Station
2. Blackwell Police Station
3. East End Police Station
4. Blackwell Police Substation
5. Terrebonne Parish Sheriff
6. Terrebonne Parish Sheriff's Office

Hazard Mitigation Plan Update 2020
Levee Failure Map assumes total collapse of all levees/run as if they aren’t there. Don’t know that there is a need to revisit this, as it is not a realistic occurrence.
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2017 COASTAL MASTER PLAN

124 PROJECTS

FLOOD DAMAGE REDUCED BY $150B

802 SQUARE MILES OF LAND CREATED

Small scale hydrologic restoration and oyster reef/living shoreline projects are included programmatically in the 2017 Coastal Master Plan. Consistency of individual projects will be determined on a case-by-case basis.
WHAT’S IN THE 2017 COASTAL MASTER PLAN FOR TERREBONNE PARISH?

PROJECT TYPES

- Barrier Island Restoration
- Ridge Restoration
- Marsh Creation
- Sediment Diversion
- Shoreline Protection
- Hydrologic Restoration
- Nonstructural Protection
- Structural Protection

2017 MASTER PLAN PROJECTS

RISK REDUCTION PROJECTS: YEAR 1-30
- 03a.HP.02b: Morganza to the Gulf
- 03b.HP.13: Bayou Chene
- TER.01N: Lower Terrebonne Nonstructural Risk Reduction
- TER.02N: Houma Nonstructural Risk Reduction

RESTORATION PROJECTS: YEAR 1-10
- 03a.DI.05: Atchafalaya River Diversion
- 03b.DI.04: Increase Atchafalaya Flow to Terrebonne
- 03a.HR.02: Central Terrebonne Hydrologic Restoration
- 03a.MC.03p: Terrebonne Bay Rim Marsh Creation Study
- 03a.RC.04: Mauvais Bois Ridge Restoration
- 03a.RC.06: Bayou Pointe aux Chenes Ridge Restoration

RESTORATION PROJECTS: YEAR 11-30
- 03a.MC.09b: North Terrebonne Bay Marsh Creation- Comp B
- 03a.MC.100: South Terrebonne Marsh Creation
- 03a.MC.101: North Lake Mechant Marsh Creation
- 03a.RC.02: Bayou Dularge Ridge Restoration
- 03a.RC.05: Bayou Terrebonne Ridge Restoration
- 03a.SP.100: North Lake Boudreaux Shoreline Protection

RESTORATION PROJECTS: YEAR 31-50
- 03b.MC.09: Point Au Fer Island Marsh Creation

Note: Barrier islands and headlands will be addressed through CPRA’s Barrier Island Program.
• **Projects in Engineering and Design: 8**
  
  – Increase Atchafalaya Flow to Terrebonne - $415,215,000  
  – Houma Navigation Canal Lock Complex   - $357,784,732  
  – Island Road Marsh Creation and Nourishment - $40,435,267  
  – Terrebonne Basin Ridge and Marsh Creation  – Bayou Terrebonne Increment - $125,450,000  
  – Bayou DeCade Ridge and Marsh Creation - $34,400,000  
  – Pointe-aux-Chenes WMA Enhancements NRDA Rec Use - $5,000,000  
  – LaCache Pump Station  - $2,000,000  
  – Statewide Artificial Reefs  – NRDA Rec Use  – $6,000,000  

**Total Investment for 8 Projects in Engineering and Design: $986,284,999**
HNC Lock

- Largest Component of Morganza to the Gulf
- Ecosystem Restoration & Hurricane Protection
- E&D fully funded
- Construction $386M RESTORE
Projects in Construction: 3

- Morganza to the Gulf - Estimated Cost $391,600,000
- Terrebonne Basin Barrier Island and Beach Nourishment - Estimated Cost $159,974,156
- Island Road Fishing Piers NRDA Rec Use - Estimated Cost $3,000,000

Total Investment for 3 Projects in Construction: $554,574,156
RECENTLY COMPLETED PROJECTS

- Completed Projects: 5
  - Falgout Canal Road Levee - Total Cost $24,803,191
  - Lost Lake Marsh Creation and Hydrologic Restoration - Total Cost $37,119,324
  - NRDA Caillou Lake Headlands - Total Cost $118,340,766
  - HNC Deepening Section 2013 Study - Total Cost $686,725
  - Breach Management Plan - Total Cost $471,340

Total Investment for 5 Completed Projects: $181,421,346
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Direct Economic Losses For Buildings: 100 - year Event

November 12, 2019

All values are in thousands of dollars

<table>
<thead>
<tr>
<th></th>
<th>Capital Stock Losses</th>
<th>Income Losses</th>
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<tr>
<td></td>
<td>Cost Building Damage</td>
<td>Cost Contents Damage</td>
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<td>Louisiana</td>
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<td>Terrebonne</td>
<td>1,140,258</td>
<td>446,426</td>
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<tr>
<td>Total</td>
<td>1,140,258</td>
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<td>Study Region Total</td>
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### Property Loss

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<th>Hazard</th>
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<td>1% Flood Loss</td>
<td>$41,496,891</td>
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<tr>
<td>Wind Loss</td>
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<td>Expansive Soil</td>
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<td>Tornado</td>
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<td>Extreme Cold</td>
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<td>Lightning</td>
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<td>Hail</td>
<td>$22,020</td>
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<td>Sinkhole</td>
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<td>Wildfire</td>
<td>$172</td>
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### Crop Losses

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<tr>
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<td>$510,730</td>
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<tr>
<td>Extreme Cold</td>
<td>$4,035</td>
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<tr>
<td>Tornado</td>
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<td>Extreme Heat</td>
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<td>Hail</td>
<td>$693</td>
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<tr>
<td>Lightning</td>
<td>$41</td>
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**Property Loss**: $79,387,928

**Crop Losses**: $519,353
Risk Reduction Strategies
FEMA Strategic Plan

FEMA Mission: Helping people before, during, and after disasters.

I. BUILD A CULTURE OF PREPAREDNESS

1.1 Incentivize investments that reduce risk, including pre-disaster mitigation, and reduce disaster costs at all levels
1.2 Close the insurance gap
1.3 Help people prepare for disasters
1.4 Better learn from past disasters, improve continuously, and innovate

II. READY THE NATION FOR CATASTROPHIC DISASTERS

2.1 Organize the “BEST” (Build, Empower, Sustain, and Train) scalable and capable incident workforce
2.2 Enhance intergovernmental coordination through FEMA Integration Teams
2.3 Posture FEMA and the whole community to provide life-saving and life-sustaining commodities, equipment, and personnel from all available sources
2.4 Improve continuity and resilient communications capabilities

III. REDUCE THE COMPLEXITY OF FEMA

3.1 Streamline the disaster survivor and grantee experience
3.2 Mature the National Disaster Recovery Framework
3.3 Develop innovative systems and business processes that enable FEMA’s employees to rapidly and effectively deliver the Agency’s mission
3.4 Strengthen grants management, increase transparency, and improve data analytics
III. REDUCE THE COMPLEXITY OF FEMA

3.1 Streamline the disaster survivor and grantee experience

3.2 Mature the National Disaster Recovery Framework

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3.4 Strengthen grants management, increase transparency, and improve data analytics
Risk Reduction Strategies
Typical Federal Projects

- Property acquisition and structure demolition
- Structure elevation
- Mitigation reconstruction
- Dry floodproofing of historic residential structures
- **Dry floodproofing** of non-residential structures
- Localized flood risk reduction projects
- Non-localized flood risk reduction projects
- Structural retrofitting of existing buildings
- Nonstructural retrofitting of existing buildings/facilities
- Safe room construction
- Wind retrofit for one-and two-family residences
- Infrastructure retrofit
- Soil stabilization
- Wildfire mitigation
- Advance assistance
- Generators
A lifeline enables the continuous operation of **government functions and critical business**, and is **essential to human health and safety or economic security**.

- Lifelines are designed to highlight priority areas and interdependencies, focus attention on actions being taken, communicate coordination efforts towards stabilization, and integrate information.
  - Each lifeline is comprised of multiple components and essential elements of information needed to stabilize the incident.
1. Safety and Security
   - Law Enforcement/Security
   - Search and Rescue
   - Fire Services
   - Government Service
   - Responder Safety
   - Imminent Hazard Mitigation

2. Food, Water, Sheltering
   - Evacuations
   - Food/Potable Water
   - Shelter
   - Durable Goods
   - Water Infrastructure
   - Agriculture

3. Health and Medical
   - Medical Care
   - Patient Movement
   - Public Health
   - Fatality Management

4. Energy
   - Power (Grid)
   - Temporary Power
   - Fuel

5. Communications
   - Infrastructure
   - Alerts, Warnings, Messages
   - 911 and Dispatch
   - Responder Communications
   - Financial Services

6. Transportation
   - Highway/Roadway
   - Mass Transit
   - Railway
   - Aviation
   - Maritime
   - Pipeline

Community Lifeline Projects
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1. Identify and pursue preventative measures that will reduce future damages from hazards.

2. Enhance public awareness, *public education*, and understanding of disaster preparedness.

3. Reduce repetitive flood losses in the parish.

4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.

5. *Set a uniform standard of protection incorporated into all activities.*
Goal 1: Identify and pursue preventative measures that will reduce future damages from hazards

- Objective 1.1: Ensure existing structures are structurally sound to endure hurricane-force winds
  - Action 1.1.1: Wind harden structures

- Objective 1.2: Ensure all citizens and employees of Terrebonne Parish are safe from high winds (hurricanes and tornado related)
  - Action 1.2.1: Construct safe rooms at critical facilities
  - Action 1.2.2: Expand the coverage and participation in the Parish’s hazard early warning system

- Objective 1.3: Ensure all first responders are adequately equipped to respond to a storm event
  - Action 1.3.1: Purchase or upgrade communication devices as necessary to ensure interoperability among first responders and develop recurring cost funding source.
  - Action 1.3.2: Purchase generators for critical facilities (see Attachment c3-1 for locations) to ensure operation during and after a hazard event
Goal 1: Identify and pursue preventative measures that will reduce future damages from hazards

- **Objective 1.4:** Protect citizens from saltwater intrusion
  - **Action 1.4.1:** Install gauges to test for salt content in marshes
  - **Action 1.4.2:** Increase freshwater diversions
  - **Action 1.4.3:** Continue to construct Morganza to the Gulf and internal lock system to reduce the effects of saltwater intrusion

- **Objective 1.5:** Reduce the effects of Land Subsidence (Discuss with subcommittee)
  - **Action 1.5.1:** Pursue approvals and funding for coastal restoration projects such as sediment diversions to reduce land subsidence in coastal areas and marshes.
  - **Action 1.5.2:** Ensure accurate survey points are located throughout the parish to monitor continued subsidence (may be redundant with LIDAR)
  - **Action 1.5.3:** Monitor agricultural activities and encourage smart farming practices to reduce soil compaction and acceleration of subsidence (NRCS)
  - **Action 1.5.4:** Study effects of forced drainage pumping on subsidence
Goal 1: Identify and pursue preventative measures that will reduce future damages from hazards

- **Objective 1.6:** Protect historic and cultural resources, such as cemeteries and gathering places from all hazards
  - *Action 1.6.1:* Identify vulnerable historic and cultural resources, and opportunities to protect and/or relocate historic assets threatened by sea level rise

- **Objective 1.7:** Protect critical facilities from lightning strikes
  - *Action 1.7.1:* Install lightning rods on all critical facilities (relevant/feasible/done?)
  - *Action 1.7.2:* Install and maintain surge protection on all critical electronic equipment (Sent to Ben/David/Ernest)

- **Objective 1.8:** Protect citizens from sinkholes 1 vote for removal
  - *Action 1.8.1:* Initiate study on salt domes to fill in data gaps and identify hazard effects
Objective 2.1: Increase public awareness of hazard areas and educate the public on mitigation through existing channels and organizations and their memberships.

- Action 2.1.1: Continue to advertise public meetings for hazard mitigation planning updates and yearly maintenance to spark engagement.

- Action 2.1.2: OEP will continue to attend public gatherings, provide yearly materials for preparedness, and updates to the registration system for people needing evacuation or other services in preparation for an event.

- Action 2.1.3: Continue web and email postings of mitigation programs available to reduce risks.

- Action 2.1.4: Develop or identify and place pamphlets in the libraries and the Parish Government Tower regarding the various hazards that can impact the parish.
Goal 2: Enhance public awareness, public education, and understanding of disaster preparedness

- **Action 2.1.5**: Increase social media to increase penetration of messaging

- **Action 2.1.6**: Increase education regarding Law and Ordinance and Flood Insurance Claims to assist in elevation or other code compliance.

- **Action 2.1.7**: Increase transparency on the website and links to useful material.

- **Action 2.1.8**: Provide age appropriate materials for schools to support physical and mental health through knowledge of natural hazard preparation and recovery.

- **Action 2.1.9**: Educate communities currently residing in at risk areas on the six (6) evacuation plans, access to shelter and transportation assistance as needed.

- **Action 2.1.10**: Promote increased participation in the NFIP and continued participation in the Community Ratings System.
Goal 2: Enhance public awareness, public education, and understanding of disaster preparedness

- **Action 2.1.11**: Better promote the Multijurisdictional Program for Public Information to educate population on risk reduction strategies, their responsibilities, and the Parish’s responsibility for enforcement.

- **Action 2.1.12**: Gather and present information on subsidence and climate change as models mature and understanding improves.

- **Action 2.2.13**: Increase understanding of public, real estate, banking and mortgage stakeholders regarding the value of flood and wind safety building alternatives.

- **Action 2.2.14:4.2.3**: Establish a public outreach campaign to ensure all homeowners in floodplains are aware of the various types of coverage options under the NFIP.

- **Action 2.2.154.2.4**: Establish homeowner education program on flood mitigation measures.
Goal 3: Reduce repetitive flood losses in the parish

- **Objective 3.1.** Eliminate threat of flood damage to structures in Terrebonne Parish including storm surge and levee failure
  - **Action 3.1.1:** Continue to upgrade current drainage infrastructure
  - **Action 3.1.2:** Construct new flood control structures and levees or elevate or harden as necessary.
  - **Action 3.1.3:** Elevate or acquire all RL and SRL structures in Terrebonne Parish
  - **Action 3.1.4:** Develop new and more accurate models to project the impact of various activities.
  - **Action 3.1.5:** Elevate equipment that is vulnerable to flood damage
  - **Action 3.1.6:** Flood proof all public buildings vulnerable to flood damage
Goal 3: Reduce repetitive flood losses in the parish

- **Action 3.1.8:** Collaborate with communities to design, evaluate, and implement Relocation Strategies for communities located outside the levee systems as needed

- **Action 3.1.9:** Ensure that current and future building elevations take the needs of those individuals with access and functional needs into account. This includes the incorporation of lifts.

- **Action 3.1.10:** Identify mechanisms to protect the Island Road from surge and tidal impacts. This might include engineered solutions to decrease wave impacts and/or erosion control mechanisms along the edges of the road. (Cost benefit?)

- **Action 3.1.11:** Develop and implement repetitive loss area analyses as damages are identified.
Goal 4: Facilitate sound development in the parish to reduce or eliminate potential impacts of hazards

- **Objective 4.1**: Promote and permit commercial and industrial development, including public critical facilities, outside of hazard areas to limit business interruption, property damage, and impairment to critical facilities in strict accordance with the parish zoning, flood management, and other applicable state and federal regulations.
  - **Action 4.1.1**: Ensure that future development does not increase hazard losses by enforcing building codes
  - **Action 4.1.2**: Guide future development away from hazard areas using zoning regulations while maintaining other parish goals such as economic development and improving the quality of life
  - **Action 4.1.3**: Provide safe locations for files, records, and computer equipment
  - **Action 4.1.4**: Examine current zoning regulations and determine what new regulations could be passed to reduce the effects of hazards on new buildings and infrastructure
Goal 4: Facilitate sound development in the parish to reduce or eliminate potential impacts of hazards

- **Objective 4.2:** Promote preservation and/or conservation of flood prone areas for parish parks, recreation areas, and general flood plain management
  - **Action 4.2.1:** Participate in existing programs at the state and federal levels oriented to environmental enhancement and conservation
  - **Action 4.2.5:** Work with land owners in flood prone areas, particularly outside of the levee systems, and other stakeholders to identify flood mitigation and climate adaptation measures to reduce flood risk and protect the levee, floodgate and lock system/s.
  - **Action 4.2.6:** Research partners and low tech or low cost alternatives for marsh, coastal or shoreline protection or restoration programs to reduce harm from all hazards.
Objective 5.1: Consider in all actions the resilience of all elements of the built environment and their influence on the existing assets.

– Action 5.1.1: Assess the costs associated with a requirement for all development to meet the standards for new buildings of a 100 year floodplain elevation.

– Action 5.1.2: Assess the costs associated with a requirement for all development to meet the standards for new buildings of a 50 year floodplain elevation.

– Action 5.1.3: Assess the costs and risks associated with building roads, culverts, to a standard less than the base flood elevation.

– Action 5.1.3: Assess the difference between the 500 year floodplain and the 100 year floodplain to better understand the cost differential of building at the higher standard.
RISK REDUCTION STRATEGIES
Existing Plans and Preventative Activities

- Comprehensive Plan
- Building Code
- Zoning Ordinance
- Floodplain Management Regulations
- Subdivision Ordinance
- Stormwater Management Regulations
- Increase Flood Insurance Coverage
  1. How tools can reduce losses
  2. Current community standards
  3. Additional plans/regulations?
RISK MITIGATION STRATEGIES

Project Type Priorities

- Levee Systems/Lock Complex
- Harden Government Structures
- Sediment Transfers
- Coastal Restoration/Protection Projects
- Public Education
- Higher Standards
  - Adjust building to account for subsidence
  - Build to a fortified standard
- Support Government Services
- Wind Retrofit
- Flood Risk Reduction
- Redundant Power
- Public Education
- Community Preservation
- Coastal Preservation
- Structural Flood Reduction
- Pump Station/Accessory
- Transportation
- Floodplain Restoration
- Saltwater Intrusion Demonstration
- Communication
- Public Safety
- Energy
- Health
- Equipment
The number of claims on an individual property help to demonstrate the frequency of repeat flooding. A total of 45% of the 34,121 repetitive loss properties in Louisiana had only two claims. Therefore, many of the properties on the repetitive loss list do not have chronic repetitive flood problems.

Number of Claims on Repetitive Loss Properties
I. Welcome and Introductions
II. Review of Process
III. Subcommittee Discussion Update
IV. Map Review
V. Coastal Master Plan Projects
VI. Strategy Discussion – FEMA Priorities
VII. Goals and Objectives Review and Revision
VIII. Project List
IX. Project Prioritization
X. Conclusion
The disaster risk management (DRM) cycle: Looking at the time element of resilience

- **Preparedness**: The precautionary actions taken prior to hazard events.
- **Prospective Risk Reduction**: The actions taken to avoid the build-up of new or increased risks.
- **Disaster**: The actions taken during and immediately after a disaster to contain or mitigate disaster impacts.
- **Corrective Risk Reduction**: The actions taken to reduce risk to already at-risk assets.
- **Recovery**: The actions taken after a disaster (either in the short- or long-term) to help people cope with disaster impacts.
Efforts to Reduce Vulnerabilities
Projects Submitted

- Funding for Elevators
- Flood Insurance Support
- Increase Availability of Affordable Housing
- Increase number of Housing Choice Vouchers Available
- Homeless Services Evacuation
- Shelter Hardening Evacuation
- Shelter Generators
- HNC/Bayou Grand Caillou By-pass Canal
- Freshwater Introduction into the Lake Boudreaux Basin
- Phase 2 of the Bayou Terrebonne Freshwater Introduction Project
- Redundant Protection for PAC LA
- Hwy 55 Road Ramp/ Floodgate
Efforts to Reduce Vulnerabilities
Projects Submitted

- Safe Harbor pilings
- Lower Bayou Side Drive Levee Lower
- Shrimpers Row flood control improvements
- Brady Road (Lower Dularge) flood control
- Fortify Levees Where 90 deg turns to avoid runup and erosion.

- Increase flow into the Atchafalaya and Sediment through Pipeline
- Install two communications towers for Public Safety
- Increase volunteer training
- Include mental health and stress reduction in shelter plan
- Broadcast messages on the radio/TV in more languages.
Managing stormwater runoff can dramatically decrease flooding during large rain events.

**CURRENT MEASURE:**
Parish requires guidelines for stormwater management for developments 1 acre or greater.

**RECOMMENDATIONS:**
Require runoff reduction for:
- All development \( \frac{1}{2} \) acre or greater except for single family residences;
  OR
- All development \( \frac{1}{2} \) acre or greater.

Data and research provided by CSRS
Frequent flooding occurs during storm events because there is inadequate space available for storage of runoff.

**CURRENT MEASURE:**
Development must be designed not to increase runoff for a 25-year event which is defined as about 11.5” of rain per 24 hour period.

**RECOMMENDATIONS:**
Require no increase in runoff for:
- 50-year event or about 12” per 24 hour period.
  
  OR

- 100-year event or about 13.5” per 24 hour period.

Data and research provided by CSRS
FLOODPLAIN FILL RESTRICTIONS

Construction fill reduces the amount of storage available for stormwater runoff, which may flood neighboring properties.

Data and research provided by CSRS
CURRENT MEASURE:
No current code or measure.

RECOMMENDATIONS:
For new development, make a retention pond on the property to hold the extra water that is expected to flow off the property;

OR

Prohibit fill in the special flood hazard area*.

• Required for full credit for freeboard

Data and research provided by CSRS
Drainage systems cannot properly function if clogged with construction debris and sediment.

**CURRENT MEASURE:**
The Parish requires erosion control plans on all new development over 1 acre or greater.

**RECOMMENDATIONS:**
Require erosion and sediment control measures for:
- Medium Construction Sites (1/2 acre or greater);
- Small Construction Sites (over 1,000 square feet)

Data and research provided by CSRS
Structures elevated to the base flood elevation do not take into account anything under the floor like electrical lines, duct work, plumbing, and support beams.

Data and research provided by CSRS
CURRENT MEASURE:
Parish requires the top of the lowest floor of new construction to be elevated at or above the base flood elevation.

RECOMMENDATIONS:
Requires lowest floor built to:
- 1 foot above the BFE; OR
- 2 feet above the BFE; OR
- Change measurement to require all ductwork, plumbing and electric to be above the flood risk level.

Data and research provided by CSRS
## Monthly Cost of Freeboard

<table>
<thead>
<tr>
<th>Home at minimum legal height</th>
<th>Home with 3’ of freeboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly mortgage payments</td>
<td>Monthly mortgage payments</td>
</tr>
<tr>
<td>$1,580.17</td>
<td>$1,599.13 (+$18.96)</td>
</tr>
<tr>
<td>Monthly flood insurance</td>
<td>Monthly flood insurance</td>
</tr>
<tr>
<td>$458.25</td>
<td>$173.67 (-$284.58)</td>
</tr>
<tr>
<td>Total monthly cost</td>
<td>Total monthly cost</td>
</tr>
<tr>
<td>$2,038.42</td>
<td>$1,772.80 (-$265.62)</td>
</tr>
</tbody>
</table>

Data and research provided by CSRS
The Coastal A Zone is subject to as much as 3 feet of coastal wave action and erosion during storm events.

Data and research provided by CSRS
CURRENT MEASURE: No current code or measure.

RECOMMENDATIONS:

• Building on piles and columns/ Fill can’t be used for structural support;
• Require BFE height like the V Zone measuring the lowest horizontal structural member instead of the top of the bottom floor;
• New construction and improvements over 30% of the value of the structure would eliminate most enclosures
• All of the above (Regulate like a V Zone)

Data and research provided by CSRS
Potential buyers are not always made aware of a property’s flood history. If substantially damaged, a buyer may have to elevate prior to repairing or remodeling.

Previous mitigation funding may require flood insurance even if there is no mortgage.

Data and research provided by CSRS
CURRENT MEASURE: No current code or measure

RECOMMENDATIONS:

• Require real estate agents/sellers to-
  – Disclose known flood history;
  – Notify potential buyers that a property is located in the Special Flood Hazard Area;
  – Provide brochures advising potential buyers to investigate property flood history and associated insurance requirements;

• Require substantial damage and completion of mitigation letters be recorded with property records for the title search.

Note: Proof of disclosure documents could be FEMA closeout/certification or insurance company statement of losses.

Data and research provided by CSRS
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X. Conclusion
- Community Buy-in
- People to do the work
- Raw materials available
- Land available
- Funding available
- Political Capital
§ Project costs v. Benefits

– Cost of the Project
– Cost of Maintenance
– Opportunity Cost
  • Other projects
  • Reallocated Taxes
  • Loss of natural connections/habitat
– Reduction in Losses
– Investment Security
– Reduction in Flood Insurance Premiums (increase disposable income)
• BCRs for Mitigation Strategies Studied
  o Adopting Model Codes Saves $11 per $1 Spent
  o Federal Mitigation Grants Save $6 per $1 Spent
  o Exceeding Codes Saves $4 per $1 Spent
  o Mitigating Infrastructure Saves $4 per $1 Spent

- BCR of 11:1 for adopting the 2018 IRC and IBC, versus codes represented by 1990-era design
- Designing new buildings to exceed the 2015 IRC and IBC would result in 87,000 new, long-term jobs
- Communities that consistently meet the latest editions of commonly adopted code requirements, culminating in the 2018 IRC and IBC, have added 30,000 new jobs to the construction-materials industry
<table>
<thead>
<tr>
<th>Natural Hazard Mitigation Saves: 2018 Interim Report Summary</th>
</tr>
</thead>
</table>

Table 1. Benefit-Cost Ratio by Hazard and Mitigation Measure.
## Natural Hazard Mitigation Saves: 2018 Interim Report Summary

<table>
<thead>
<tr>
<th>Peril</th>
<th>Mitigation Measure</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>Building elevation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Land use planning</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Buyout</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Wet flood proofing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Dry flood proofing of commercial buildings</td>
<td>3</td>
</tr>
<tr>
<td>Wind</td>
<td>Manufactured housing engineered tie-down system (ETS)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>IBHS FORTIFIED Home-Hurricane for existing homes</td>
<td>1</td>
</tr>
<tr>
<td>Project</td>
<td>Level of Priority of Seeking Funding</td>
<td>Approximate Cost</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Funding for Elevators</td>
<td>medium</td>
<td>$300,000</td>
</tr>
<tr>
<td>Flood Insurance Support</td>
<td>high</td>
<td>$200,000</td>
</tr>
<tr>
<td>Increase Availability of Affordable Housing</td>
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<tr>
<td>Homeless Services</td>
<td>high</td>
<td></td>
</tr>
<tr>
<td>Evacuation Shelter Hardening</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Evacuation Shelter Generators</td>
<td>medium</td>
<td></td>
</tr>
</tbody>
</table>
I. Draft Document available next week
II. All materials available at tpcg.org\hmpu
III. Adjourn
CONTACT INFORMATION

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Recovery Assistance and Mitigation Planning
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