Louisiana Local Coastal Programs' Outlook

April 2015
Volume 5, Issue 2

From the La. Department of Natural Resources (DNR)

From Assistant Secretary Keith Lovell
Office of Coastal Management

Local Coastal Management Program Managers, Parish Officials and Coastal Management Stakeholders:

In this issue of the Louisiana Local Coastal Program Outlook, my office is offering discussion about some of the information transfer meetings and classes the staff has recently organized for Louisiana's coastal parishes. This edition will also include mitigation coordination efforts, as well as, some recent Permits and Mitigation Program initiatives.

We also discuss the National Flood Insurance Program (NFIP), the Community Rating System (CRS), CRS User Groups, and some of the coastal resiliency programs and efforts like Harbors of Refuge, the Clean Marina and the Clean and Resilient Marina Program. OCM and partnership agencies are participating in these to assist coastal communities to manage the challenges of hazard protection and the associated rising costs and risks for coastal communities.

I thank you on behalf of the entire staff for your continued outstanding efforts in assisting in the good stewardship of our state's valuable coastal resources. As always, please contact the LCP staff with any questions, concerns, requests for assistance or future items you would like to see in your Louisiana coastal parish newsletter.

Sincerely,

Keith Lovell, Assistant Secretary
Louisiana Department of Natural Resources

Contents

Recent Coastal Parish Meetings and Classes

Submitted by Jon A. Truxillo, Local Coastal Programs Section Staff

The Local Coastal Programs (LCPs) Section of the Louisiana Department of Natural Resources' (LDNR) Office of Coastal Management (OCM) holds a number of coastal management education and regulatory information transfer meetings and special classes throughout the year for the benefit of Louisiana's coastal parishes and communities. Since the last Louisiana Local Coastal Program's Outlook was published, Louisiana Parishes Coastal Management Programs' second Quarterly Meeting for the fiscal period of 2014- 2015 was in September here in Baton Rouge in LDNR's LaSalle Building. The meetings are open to the public and a special invitation is extended to all 20 Louisiana Coastal Parishes' officials and stake holders.

At the September meeting, a presentation was given on the periodic review of Louisiana's state and federally approved Local Coastal Programs. OCM's rules and regulations require that the approved Local Coastal Programs be reviewed at least every two years to ensure that they are consistent with, and effective in achieving, the objectives of our state and local coastal resources programs (Louisiana Administrative Code 43:I.725.F). The time period for this last review was July 1, 2012 to June 30, 2014. All ten approved Local Coastal Programs were found to be consistent with the state program, their respective approved Local Coastal Program documents, and other enforceable polices. In addition, the approved Local Coastal Programs assist the OCM in its mission to prudently manage the state's natural coastal resources. Topics discussed with all parish programs included: recommendations made during the last periodic review; parish program administration; parish permit review processes; permitting protocols; parish specific permitting issues; parish coordination with other local, state and federal government agencies; future training opportunities and other current coastal management issues such as, coastal community resiliency, nonpoint source pollution control, clean and resilient marina programs, and coastal restoration projects. The final report is on-line on LDNR's web site here: http://data.dnr.la.gov/lcp/final_report_20142014.pdf

Also during the quarterly meeting, Kelley Templet and Sharon McCarthy-Pecquet gave a comprehensive overview of the proper mitigation process that all LCPS should follow to ensure consistency with the state coastal program's mitigation requirements. They also provided updates on the state's progress on various mitigation initiatives like the revised state mitigation regulations and the updated mitigation in-lieu fee program.

On January 27, OCM hosted the Building Resilient Communities Using Interactive Tools class at the LaSalle Building. The class instructor was Ms. Nicole Love of The Nature Conservancy (TNC). The objective of the class was to empower community decision makers with the data and mapping tools to engage in resiliency planning activities. Love offered hands on instruction in TNC's recently released Coastal Resiliency 2.0 suite of tools for coastal decision makers. To receive announcements of future meetings and classes, please contact, Jon Truxillo at jon.truxillo@la.gov or 225.342.3394.

LCP Mitigation Process

Assessment of Habitat Impacts through Site Visit

Approval of Needs, Alternatives, and Justification

Mitigation Requirement Letter sent by LCP

Wetland Value Assessment Completed

Mitigation Plan Review Completed

Mitigation Plan Review Notification Letter sent by LCP

Receipt of Approved Compensatory Mitigation Purchase Documentation

Issuance of Permit/Code Sheets Completed and Uploaded

Permits Program Releases Hydrologic Modification Impact Analysis Document

(Submitted by Christine Charrier, Permits Section Manager)

In September 2014, OCM released its recently developed "Hydrologic Modification Impact Analysis" (HMIA) document for use as a guide and directive in Coastal Use Permitting. The guide offers assistance in the development of hydrologic reports that may be required during processing of a Coastal Use Permit application. These hydrologic reports typically investigate the pre- and post-development surface water conditions at a site proposed for development and are used by OCM to determine if adverse impacts to adjacent lands and/or waterways will occur as a result of the proposed use.

Projects proposed in the coastal zone of Louisiana which may increase the potential for flooding should be avoided and minimized to the maximum extent practical. If a proposed use would, in OCM's opinion, modify existing hydrologic conditions, the modification must be reviewed to determine if adverse impacts will occur. Adverse impacts resulting from modified hydrology include, but are not limited to, an increase in drainage from or flooding to other properties or waterways and alteration of water quality that increases total suspended solids (TSS), point and non-point source discharge and biological oxygen demand (BOD); or changes in the salinity or temperature of surface waters in the project area.

You can view the recently released hydrologic guide here:
http://dnr.louisiana.gov/assets/OCM/permits/NAJ/HMIA_guide_r1_02_27_15.pdf

For questions or additional information, please contact, Christine Charrier at 225.342.7953 or by email at christine.charrier@la.gov

Israel Dupont in a marsh with baby alligators. LivingAmongAlligators.com. Photo: Ronald Dupont, Jr.

National Flood Insurance Program, Community Rating System and OCM and Partnering Agencies' Community Hazard Mitigation Enhancement Efforts

Submitted by Jon A. Truxillo Local Coastal Programs Section, Niki L. Pace, Mississippi-Alabama Sea Grant Law and Policy Program & Melissa Daigle, Louisiana Sea Grant Law and Policy Program

Louisiana is in an exceptionally vulnerable position in regard to flooding hazards. Located directly on the Gulf of Mexico, we are therefore highly susceptible to Hurricanes and Tropical Storms. Our coastline is a complex and dynamic estuary expanse of seasonally flooded lands, tidally influenced wetlands and frequently mutable salinity regimes. Coastal Louisiana is wet and flat, with an approximate low elevation of 0.75" above sea level and an approximate high elevation of less than 2' above sea level and we are experiencing some of the highest rates of relative sea level rise on Earth.

The National Flood Insurance Program (NFIP) plays a critical role in the overall resilience of coastal communities by providing federally backed flood insurance in exchange for communities adopting minimum floodplain management requirements. The NFIP is aimed at reducing the impact of flooding on private and public structures. This is achieved by providing affordable insurance for property owners in communities that adopt and enforce floodplain management regulations.

Most coastal residents are aware of the NFIP but they may know less about the Community Rating System (CRS). The NFIP administers the CRS which scores towns on their effectiveness in dealing with the mitigation of flood hazard events. Earning CRS points lowers flood insurance premiums for homeowners and businesses located in special flood hazard areas. Through CRS, communities participate in a variety of floodplain management actions that qualify their residents to receive discounts on flood insurance premiums. Many communities across the Gulf are in the CRS program; and as of May 2014, forty-two Louisiana communities were receiving flood insurance premium discounts through the CRS program.

The CRS awards points to a community for each supplemental activity it implements, as identified in the CRS manual. A community's CRS Class (1-10) depends on the number of points a community receives. For each CRS Class earned, a community receives a 5% reduction on flood insurance premiums in the Special Flood Hazard Area (SFHA). For example, a class 9 community receives a 5% reduction and a Class 1 community receives a 45% premium reduction on SFHA properties. As more points are earned a community's score lowers and their discounts increase.

What is a Community Rating System (CRS) User's Group?

The purpose of a CRS User's Group is to serve as a support and educational resource for the local communities who participate in the CRS. CRS User Groups are comprised of participating CRS communities that gather regionally on a regular basis to stay informed of programmatic changes while sharing best management practices and lessons learned. Additional benefits are that participating communities work together as neighbors to enhance the resilience of the region; foster coordination between municipalities; and make Louisiana safer, stronger, and more resilient.

Louisiana's Community Rating System User's Groups are:

New Orleans, LA CRS User Group: Louisiana: Flood Loss Outreach and Awareness (FLOAT)
Baton Rouge, LA CRS User Group: Capital Region Area Floodplain Task-force (CRAFT)
Jefferson Parish, LA CRS User Group: Jefferson United Mitigation Professionals (JUMP) and:

The Louisiana Southwest Informational Floodplain Team (SWIFT) is one of the newest Louisiana Community Rating System (CRS) users groups. SWIFT was established as a strategy out of the Coastal Community Resiliency Indexes that were facilitated by OCM and Louisiana and Mississippi/Alabama Sea Grant Law and Policy Programs and the Gulf Coast Resilient Communities Workshops. The group is composed of representatives from communities from Calcasieu, Cameron, Iberia and Vermilion parishes. OCM continues to assist coastal communities in these and other coastal resiliency efforts.

For additional information or if you have any questions regarding NFIP, CRS, or CRS User Groups, please contact, Jon Truxillo at 225.342.3394 or by email at jon.truxillo@la.gov. OCM's Coastal Resiliency Web Page is also available at: http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=101

Southwest Informational Floodplain Team User's Group

Submitted by Laurie Cormier, Calcasieu LCP Administrator

SWIFT is the Chenier Plans acronym for a CRS (Community Rating System) User's Group. The acronym stands for (Louisiana) Southwest Informational Floodplain Team. This idea of the SWIFT user's group was the brainchild of the Chenier Plains, LA group that participated in several Coastal Community Resiliency Indexes and two Coastal Resiliency Conferences in New Orleans. The group was headed up by the following:

Carol Ponthieux - Mayor of the Town of Iowa, LA
Pam Mattingly – Assistant Director of Planning and Development for Calcasieu Parish Police Jury
Shannon Spell – President of the Calcasieu Parish Police Jury
Laurie T. Cormier – Assistant Planner and Coastal Zone Manager from Calcasieu Parish Police Jury
Ryan Bourriaque – Parish Administrator from Cameron Parish Police Jury
Rica Canik – Administrative Secretary from Cameron Parish Police Jury
Linda Duhon – Administrator and Floodplain Manager for Vermilion
Carolyn Bessard – Assistant Administrator from Vermilion Parish Police Jury
Brad Bebee -Director of Public Works for Iowa, LA
Angela Jouett- Director of the Calcasieu Parish Medical Reserves Corp
Sandi Miller – Chief, Iowa, LA Fire Department
Willie Thomas – Executive Officer, Iowa, LA Police Department
Jon Truxillo – Coastal Scientist, LA Office of Coastal Management

This group identified a need to make the case for planning, including long range resilience planning, community zoning and land use planning. The team took a regional and long-term approach to protect the heritage and the habitat of the region, including reducing losses from storm incursions/flooding events. They also investigated ways to include oral history of adaptive land use as an important component of their planning.

As SWIFT continues to develop, it will be a forum for community officials of the southwest region of Louisiana to discuss methods and practices of making communities stronger and safer when natural disasters strike. SWIFT will engage in discussion, share ideas, promote implementation of best field practices, promote citizen awareness and serves as a liaison when interacting with community officials.

Recent accomplishments of the SWIFT- CRS User Group include:

The parish planning, administration, floodplain and coastal management zone staff are integrating resilience initiatives through a variety of mechanisms, ranging from comprehensive planning to improving permitting processes. The parishes also partnered with local academic institutions to provide scientific data on observed and expected changes in local ecosystems due to land subsidence, storm surges, and development pressures to inform their resilience plans.

2015 SWIFT Project Goals:

Understanding and implementing new opportunities in the 2013 CRS Coordinator's Manual such as Developing a Program of Public Information (PPI), "the objective of CRS credit for a PPI is to provide additional credit for information programs that are designed to meet local needs and that are monitored, evaluated, and revised to improve their effectiveness, and strategically develop materials that best address the needs of participating communities, raising awareness of coastal flooding hazards and improving community resiliency, exporting products to other CRS User Groups, and placing emphasis on maximizing potential CRS points in the participating communities." Outreach activities that are part of a PPI earn more points than those conducted independently.

Vision Statement for SWIFT – "The mission of SWIFT is to serve as a forum for Southwest Louisiana to discuss methods and practices that will make our communities more resilient. We will engage in conversation, share ideas, and promote implementation of best field practices. SWIFT serves as a support and education resources of all communities in the Chenier Plain that participate now or are interested in joining the CRS, where members can exchange information, best practices, and lessons learned."

For more information on SWIFT, please contact, 'Laurie Cormier' lcormier@cppj.net

Sea Grant Continues Flood Insurance Outreach with Support from Environmental Protection Agency (EPA) Gulf of Mexico Program to Develop Program for Public Information

Submitted by Niki L. Pace, Mississippi-Alabama Sea Grant Law and Policy Program & Melissa Daigle, Louisiana Sea Grant Law and Policy Program

In the last few years, the National Flood Insurance Program (NFIP) and Community Rating System (CRS) have undergone several changes, including the adoption of the newest 2013 CRS Coordinator's Manual. This manual is important because it determines how participating communities are scored under the CRS program and what corresponding flood insurance discounts they may be qualify to recieve.

The 2013 manual contains new activities for communities to consider, including the Program for Public Information (PPI). A PPI is a committee-based localized approach to community outreach on flood hazards and flood insurance under the CRS. The objective of the PPI is to provide communities with additional points for outreach that is (1) designed to meet local needs and (2) monitored, evaluated, and revised to improve effectiveness. In other words, outreach activities coordinated through a PPI gain more CRS points than stand-alone outreach activities.

Steps to Developing a PPI Program

- Establish a PPI Committee
- Assess the community's public information needs
- Formulate messages
- Identify outreach projects to convey the messages
- Examine other public information initiatives
- Prepare the PPI document
- Implement, monitor, and evaluate the program

Through funding from the EPA Gulf of Mexico Program, Louisiana Sea Grant and partners are working with Gulf coastal communities to provide technical guidance on forming a PPI. The team held its first training workshop on January 21, 2015 in LaCombe, Louisiana. The successful day-long workshop was led by CRS expert French Wetmore and attended by 17 communities from across Louisiana, Mississippi, and Alabama.

The project team includes Mississippi-Alabama Sea Grant, Louisiana Sea Grant, Grand Bay National Estuarine Research Reserve (NERR), and Blue Urchin working with local partners Mississippi Gulf Coast Coastal Hazard Outreach Strategy Team (C-HOST) and the Louisiana Southwest Informational Floodplain Team (SWIFT) to strategically develop materials that best address the needs of communities participating in the CRS. In Mississippi, C-HOST is a regional outreach team comprised of building officials, certified floodplain managers, NFIP CRS coordinators, and planning officials that serve the CRS communities along the Mississippi Gulf Coast.

Following the PPI workshop in January, the project team is working individually with targeted Mississippi and Louisiana communities to develop successful PPIs. OCM will be assisting in these efforts in Louisiana coastal communities. Materials developed through this project will serve as models for other coastal communities throughout the Gulf. For more information on the project, contact Melissa Daigle at mtrosc2@tigers.lsu.edu.

The View from the Coast

Submitted by Jeannette Dubinin, Center for Planning Excellence

The Center for Planning Excellence (CPEX) has published *The View from the Coast*, its report on flood risk reduction efforts and needs in Louisiana's coastal communities, part of a series providing model tools and policies towards greater resilience in coastal Louisiana. The report also supports the LA Coastal Protection and Restoration Authority (CPRA) nonstructural initiative from its 2012 Coastal Master Plan to develop and refine the Flood Risk & Resilience Program.

The View from the Coast contains research findings from interviews and a coastal resident poll as well as policy and program recommendations.

CPEX conducted detailed interviews with 57 participants in 16 parishes and five municipalities in Louisiana and worked with a pollster to conduct an 800-respondent strong poll about quality of life, risk perception, disaster preparedness, and coastal residents' plans to relocate.

The report highlights the findings from discussions on elevation, flood insurance, community development plans and standards, knowledge sharing, and the impacts of relocation and voluntary acquisition.

CPEX would like to thank all those who have contributed to this report, including the interview participants in the coastal communities and representatives from the state agencies. For additional information, contact, Jeannette Dubinin jdubinin@cpex.org. The report is available for download at http://www.coastal.cpex.org/resources/

St Tammany Parish Digital Flood Insurance Rate Map (DFIRM) Appeal Status

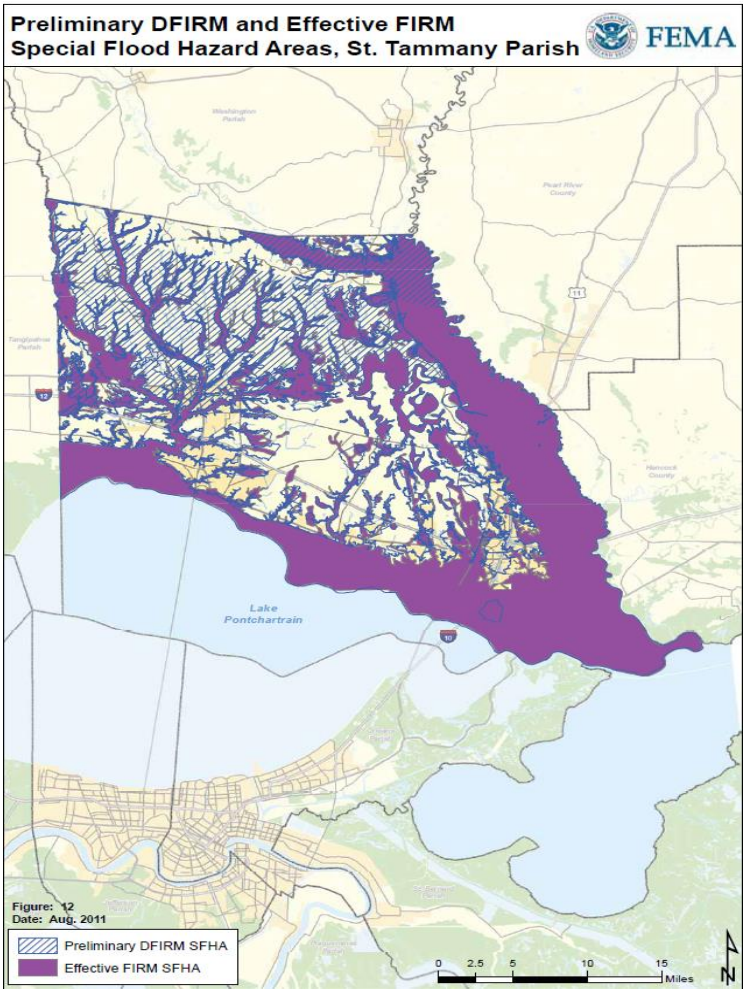
Submitted by E. deEtte Smythe, PhD
Department of Engineering
St. Tammany Parish

St. Tammany is the fastest growing parish in the state, growing approximately 10% per year since 1960 and 20% annually since 2000. This increased population has resulted in dense populations in the coastal and riverine areas, which tend to be flood prone. The increased numbers of coastal & riverine structures are especially vulnerable to flooding.

The Federal Emergency Management Agency's (FEMA) National Flood Insurance Program has two primary goals: 1) to provide an insurance mechanism for those at risk from flooding and 2) to reduce losses through promotion of sound floodplain management practices. To achieve these goals, FEMA produces and maintains Flood Insurance Rate Maps (FIRMs).

St Tammany Parish was presented with Preliminary Digital Flood Insurance Rate Maps (DFIRM) in August 2005, three weeks before Hurricane Katrina. Following the devastation of the Parish from Katrina, FEMA withdrew the DFIRMs in order to improve their coastal component.

The new draft Preliminary DFIRMS were reintroduced into St Tammany Parish in April 2008. There were significant changes to the designated flood zones and Base Flood Elevation (BFE) changes. The BFE changes resulted in the number of structures in the Special Flood Hazard Areas (SFHA) of the Parish to increase from 31% to 37%. This resulted in many Appeals and Protests from residents, engineers and the Parish and affected more than 35,000 people in St. Tammany.



The appeals included coastal transect areas and Base Flood Elevation (BFE) inconsistencies (numerous structures impacted), issues with assumed subsidence, affecting some 16,375 people, two levees being decertified affecting 5,150 persons, and individual residential protests affecting almost 1,000 people.

In order to understand the changes to the DFIRMs and to conduct the model reviews, the parish set out to acquire the data utilized in the analysis by FEMA. The data took over 18 months to receive, thus delaying the Appeals Resolution.

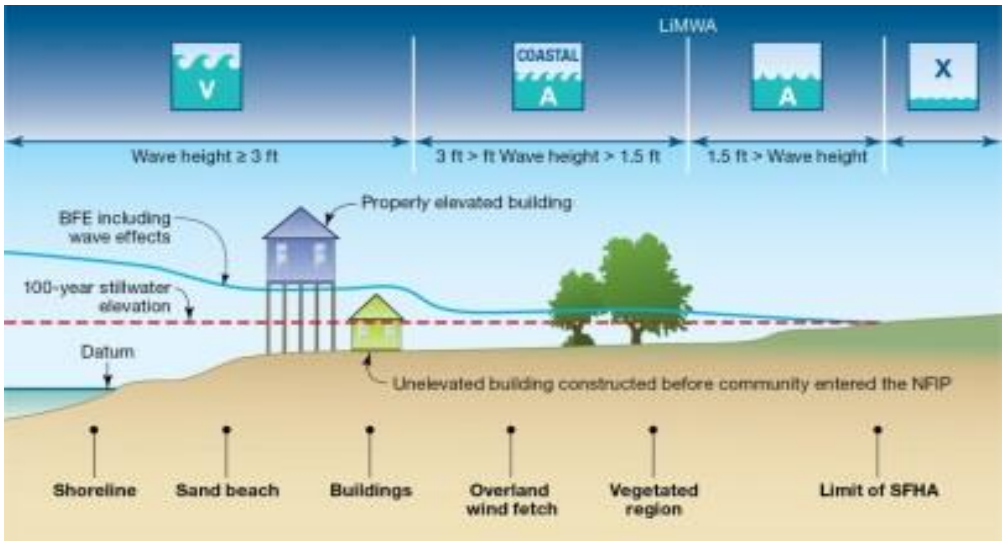
Model Types

Understanding the types of models that are utilized by FEMA to create the DFIRMs is very important to the review and Appeal Resolution processes.

ADCIRC (Advanced Circulation) is a coastal surge model that determines Stillwater Elevations (SWEL). Wave Height Analysis for Flood Insurance Studies (WHAFIS) is a wave height model that computes wave crest elevations based upon SWEL output from ADCIRC. WHAFIS also determines the Flood Hazard Zone and Floodplain Map Elevations based upon Wave Heights.

St Tammany Parish Digital Flood Insurance Rate Map (DFIRM) Appeal Status (Continued)

The Figure below (from 2012 LA CPRA Coastal MP) shows the SWEL, Wave Heights, Flood Zones (FZ) and the structures that mitigate surge.



The St. Tammany Parish Department of Engineering's review of the data revealed the following data and model analysis disputes with FEMA:

Suspected wave height errors due to misrepresentation of topographic features (such as vegetation, elevation and land use) along coastal transects.

The results from the combined storm surge and wave modeling provide the 10-, 50-, 100-, and 500-year return period still water elevations (SWELs).

Laser Illuminated Detection and Ranging (LIDaR) misrepresented ground elevations in areas with dense canopy. LIDAR was utilized by FEMA in DFIRMs to estimate elevations. Surveys of specific areas resulted in significantly higher land elevations and roads than LIDAR estimated. Higher elevations result in lower BFE and fewer structures within the SFHA.

Predicted High Water Marks (HWM) compared with measured HWM were frequently over-estimated (as much as 4.5 feet difference)

Preliminary ADCIRC grid revealed major ridges, levees, manmade features and other topographic structures that were omitted from the model, as well as, misrepresented vegetation coverage. Correctly representing the vegetation in the WHAFIS model made substantial differences in predicted depths of flooding and thus, reduced BFEs.

The ADCIRC model also used straight-line winds rather than circular, pulsating winds and that resulted in an over-estimated worst-case scenario.

St Tammany Parish Digital Flood Insurance Rate Map (DFIRM) Appeal Status (Continued)

Current Status of the St. Tammany Parish DFIRM Appeals

FEMA has continued working with St. Tammany Parish to assist with new on the ground verification and re-modeling. The transition to Risk Mapping, Assessment, and Planning (Risk MAP in 2013 with FEMA's new contractor (URS/Dewberry) has produced a rewarding and more productive partnership between FEMA and St. Tammany Parish.

The new and improved partnership has resolved all outstanding appeals except the Coastal Transect Lines, and that concern is evolving productively.

The issue of decertified levees was resolved when FEMA, through a process called "Seclusion," which allowed the leveed areas to be placed on the new maps with the current risk

The coastal transect appeal may be resolved shortly when St. Tammany Parish submits coastal analysis remodeling of WHAFIS, (estimated by the end of March 2015). Upon favorable comments from FEMA to the revised WHAFIS Modeling, St. Tammany Parish's Administration may be ready to request that FEMA issue final DFIRM maps.

Louisiana Coastal Parishes Begin Process of Formal Multi-Parish Mutual Aid and Assistance Agreements

Submitted by Sara Krupa and Jon Truxillo, Local Coastal Programs Section

Cameron Parish joined with Terrebonne, Lafourche and St. James Parishes in adopting their own parish resolutions to join in the latest initiative to establish multi-parish mutual aid and assistance agreements. Jefferson Parish is also in the process of drafting its own resolution to adopt the agreement. Cameron Parish entered into mutual aid agreements with the Chenier Plain Alliance on behalf of Cameron Parish along with Calcasieu Parish, Vermillion Parish and three Southeast Texas counties, Chambers, Jefferson and Orange.

The mutual aid agreement states in part that "…in accordance with the provisions of Section 730A of Title 29 of the Louisiana Revised Statutes the Parishes of Jefferson, Orleans (City of New Orleans), Plaquemines, St. Bernard, St. Charles, St. John the Baptist, St. Tammany, Calcasieu, Cameron, Vermilion, St. Martin, Iberia, St. Mary, Ascension, St. James, Lafourche, Terrebonne, Assumption, Livingston, and Tangipahoa hereby agree to enter into this emergency mutual aid and assistance agreement to establish regional organization for homeland security and emergency preparedness…"

The agreement was deemed necessary by the coastal parishes for the same motives that Louisiana formed the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP): "…because of the existing possibility of the occurrence of emergencies and disasters of unprecedented size and destructiveness resulting from terrorist events, enemy attack, sabotage, or other hostile action, or from fire, flood, earthquake, or other natural or man-made causes, and in order to ensure that preparations of the state of Louisiana will be adequate to deal with such emergencies or disasters, and in order to detect, prevent, prepare for, investigate, respond to, or recover from these events, and generally to preserve the lives and property of the people of the state of Louisiana…"

The idea for the resolution was the result of Louisiana Parishes Against Coastal Erosion (LAPACE) meetings. LAPACE is an organization of the 20 Louisiana Coastal Parishes and their leaders designated to specifically address the erosion problems in the coastal parishes and has become an active partner in the 'America's Wetland' campaign to save coastal Louisiana. LAPACE is a coalition of Louisiana parish presidents created in late 2013, to improve the existing dialogue between the parishes, build citizen awareness of the issues associated with coastal wetland loss, and develop local government strategies and actions, particularly in regards to flood safety and air quality.

Commercial Fishing Boats on the Gulf Inter-coastal Water Way, Photo: Lauren Land

Sustainability and Harbor of Refuge Updates from Louisiana Sea Grant

Submitted by Lauren Land Louisiana Sea Grant Law and Policy Program

Louisiana Sea Grant is participating in several activities related to waterfront community resiliency and seeks to provide information and facilitate conversations to build resilience along the Louisiana and the entire Gulf Coast.

Commercial fishermen and local and state agencies remember the problems associated with grounded and derelict vessels after the 2005 and 2008 hurricanes. A commercial fishing vessel is defined as a vessel with a commercial fishing license (either state or federal) whose purpose is harvesting a seafood commodity from Louisiana saltwater areas. Commercial fishing vessels range in size from smaller crab boats to large, offshore shrimp boats. While Hurricane Rita was heading toward southwest Louisiana in September of 2005, the commercial fishing fleet in Intracoastal City was unsure of where to go. Some vessels traveled up the Vermilion River, tied to trees along the bank and lashed two or three boats together for stability. A large number of shrimpers stayed on their boats during the event to "ride out the storm" at local shrimp docks. With engines at full throttle, most were able to hold position and keep the vessel in place, even during the height of the storm. Captains who left their vessels and evacuated came back after the storm to find their boats stranded on land. Eighteen shrimp boats were stranded.

In the Vermilion Bay region of coastal Louisiana, no plan existed for commercial fishermen to seek protection from storm damage and to prevent their vessels from becoming water-borne debris during a storm. Methods of tying to old oak trees on the banks of the Vermilion River or tying to other boats may break the lines. As a result, storm tides carried fishing vessels onto private property, and when the tides recede, the boats stay grounded on private property. In the aftermath of Hurricane Rita, the U.S. Federal Emergency Management Agency (FEMA), the U.S. Coast Guard and the U.S. Navy contracted with salvage companies to refloat stranded boats that were still seaworthy or dispose of those that were not. That process took years and millions of dollars to accomplish. The total cost for vessel and debris removal for Katrina and Rita was approximately $294 million.

Seeking Solutions: The "Harbor of Refuge" Master Plan Project

Louisiana Sea Grant works with local and state stakeholders to develop a solution for harbor of refuge for commercial fishermen. To begin to address the issue of mooring locations for commercial fishing vessels, the Port of Delcambre, in conjunction with Louisiana Sea Grant, received funding through FEMA's Community Resilience Innovation Challenge. One of the early steps was to create a safer harbor master plan by quantifying how many vessels need safer harbor spaces, evaluating local waterway capacity to accommodate vessels in the short term, and producing maps of suggested locations to install moorings and pilings in the long term. In partnership with the Port of Delcambre, Sea Grant published a document to quantify the costs and benefits of harbor of refuge and to earn a place for it in two parish hazard mitigation plan updates for both Iberia and Vermilion parishes.

The harbor of refuge project contributes to community resilience because it seeks to organize a plan for vessels to moor during a storm, ensuring that those vessels sustain little damage and remain operational. The advantages of providing storm anchorage to the commercial fishing fleet are obvious. Of primary concern is the safety and well-being of the fishermen themselves and the protection of their vessels. In addition, a harbor of refuge plan will protect employment and commerce in the region. When fishing vessels sustain damage during a storm, the economic impacts ripple through the community by impacting other businesses and industries through fishing, seafood processing, wholesale distributing, and retail stores and restaurants. Loose vessels also create destructive barriers on roadways and bridges, disrupting re-entry, travel and commerce. A harbor of refuge plan minimizes damage to infrastructure and equipment and disruption to employment, thereby increasing community resilience.

Progress of the Project: The Harbor of Refuge project involves many team members and many stakeholders (Sea Grant Extension Agents, Vermilion Area Port Districts, Offices of Emergency Preparedness and State Parks. DNR's OCM has been particularly helpful in explaining the steps of the Coastal Use Permit application process and what procedures still need to fall into place to install infrastructure for the harbor of refuge. Sites that have been suggested for Vermilion Bay harbors of refuge include stretches of the Vermilion River adjacent to Palmetto Island State Park and space along the Delcambre Canal, just south of the new Bayou Carlin Cove. Anticipated milestones in the near future include developing a harbor of refuge "shopping list" with drawings and renderings of mooring infrastructure and cost estimates of installation.

Sustainability and Harbor of Refuge Updates from Louisiana Sea Grant (Continued)

To expand on the harbor of refuge effort, Louisiana Sea Grant is also currently leading a team of researchers from Louisiana State University (LSU) to develop a smartphone app for commercial fishermen. With funding through LSU's Coastal Sustainability Studio, partners including: LSU's Center for Computation and Technology, the Southern Climate Impacts Planning Program, and the Stephenson Disaster Management Institute. The smartphone app, WA|VE: Waterway Information for Vessels will bring currently existing data into one viewing platform to provide information for commercial fishermen that will enhance their storm preparedness practices and fishery awareness. Datasets include National Oceanic and Atmospheric Administration (NOAA) navigational charts; observed and predicted storm tide data; historical storm surge simulations; and fishery-related data from Louisiana Department of Wildlife and Fisheries (LDWF). While focused on Vermilion Bay, the app is being developed with scalability for the entire Gulf Coast.

For Ports and harbors, Louisiana Sea Grant has partnered with the Gulf of Mexico Alliance (GOMA) to develop a resilience index for the Ports and Harbors industry. Similar to the Community Resilience Index, the Ports and Harbors Index will provide a self-assessment tool for Port management to determine the Port's ability to return to an acceptable level of functioning after a hazardous event. The checklist for the index is currently being developed with input from a Gulf-wide expert committee of Port representatives and maritime industry specialists. If you have any questions or would like more information on any of these projects, please contact, Lauren E. Land, Sustainability Coordinator, Louisiana Sea Grant College Program, lland1@lsu.edu. You can also contact, jon.truxillo@la.gov with OCM to receive assistance with harbors of refuge.

Louisiana's Clean Marina and GOMA's Clean and Resilient Marina Programs

Submitted by Jon A. Truxillo, Local Coastal Programs Section

The Louisiana Clean Marina Program promotes and celebrates adoption of best management practices (BMPs) to assist marinas and recreational boaters in protecting Louisiana's waters. Designated "Louisiana Clean Marinas" are recognized as environmentally responsible businesses and enjoy the positive goodwill and economic benefits of being able to promote their business as A LOUISIANA CLEAN MARINA.

The Gulf of Mexico's five states Alliance (GOMA)'s Clean and Resilient Marina Program complements Clean Marina practices already in place in the Gulf States and provides additional recommendations to strengthen the local marinas' ability to withstand natural and man-made disasters. OCM staff assisted with GOMA's Coastal Community Resilience Priority Issue Team as part of the Resilient Marina Task Force in the development of the GOMA Clean and Resilient Marina Program. Louisiana's Clean Marina Program has an Emergency Planning Resiliency Component that was one of the building blocks of the GOMA Clean and Resilient Marina Program.

As all of the Louisiana Clean Marinas have been introduced to the GOMA Clean and Resilient Marina Program's Certification and Checklist's requirements qualifications of selected marinas is in preparation. OCM anticipates Louisiana first Clean and Resilient Marinas will be certified in the near future.

Louisiana's 19 Certified Louisiana Clean Marinas:

Houma Downtown Marina	**Houma**
Ashland Marina	**Houma**
South Houma Marina	**Houma**
Bob's Bayou Black Marina	**Gibson**
Four Point Landing	**Dulac**
T-Irv's	**Dulac**
Texas Gulf Road Marina	**Bourg**
Chamale Marina	**Slidell**
Marina Beau Chêne	**Mandeville**
Marina Del Ray	**Slidell**
Rigolets Marina	**New Orleans**
Orleans Marina	**New Orleans**
South Shore Harbor Marina	**New Orleans**
SeaBrook Harbor	**New Orleans**
Myrtle Grove Marina	**Port Sulphur**
The Delta Marina	**Empire**
Venice Marina	**Venice**
Moran's Marina	**Golden Meadow**
Bowtie Marina	**Lake Charles**

Louisiana Department of Natural Resources

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