Integrated Approaches to Creating Community Resilience Designs

Integrate coastal storm surge and consequences modeling tools to:

- provide the resources to empower decision makers (EMs) to make better decisions concerning threats of loss during a disaster
- empower planners and policy makers into future planning decisions to reduce loss after storm events to reduce competitive loss

➢ Provide assistance in pre- and post storm decision making

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LSU
LOUISIANA STATE UNIVERSITY

Sea Grant
Louisiana

Project Overview

- ❖ Incorporate enhanced consequence modeling to a storm surge model to show how flood risks will impact people, industry, and coastal infrastructure
- ❖ Trusted outreach community to help communities incorporate guidance that mitigates risks

The work is innovative by our multi-discipline approach that combines

- ➢ disaster research & response (Stephenson Disaster Management Institute),
- ➢ coastal hazard modeling (Center for Computation & Technology),
- ➢ planning & design (Coastal Sustainability Studio),
- ➢ outreach (Sea Grant)

Our partners

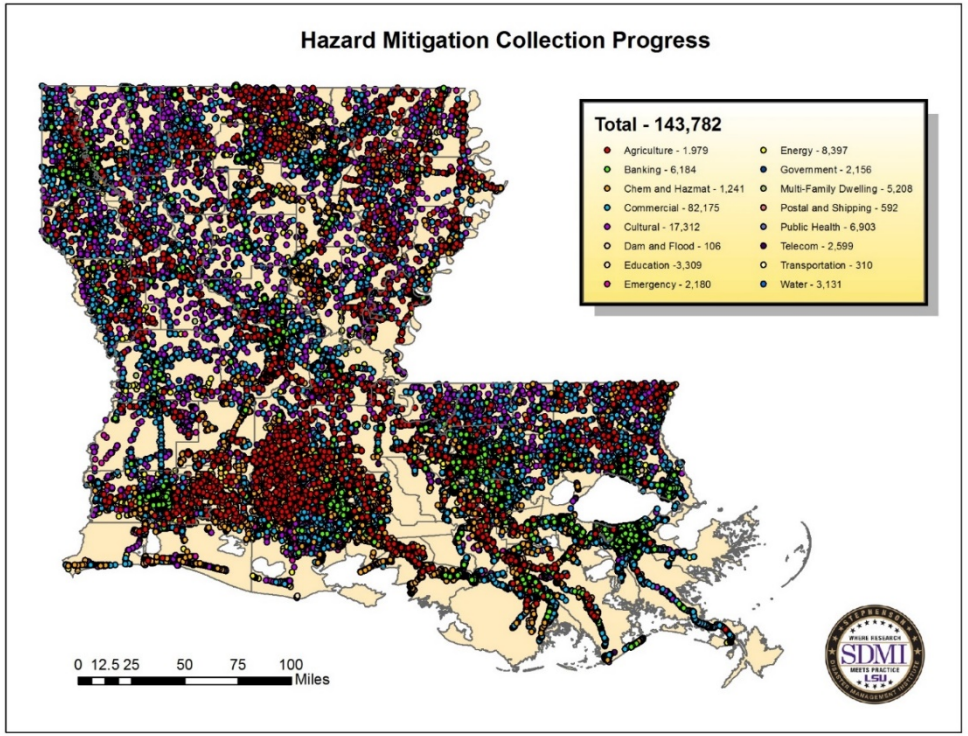
Pre- and post-disaster planning and design tools directed to federal, state, and local community planners

- National NOAA's Weather Service, Slidell LA
- Lower Mississippi River Forecast Center, Slidell LA
- USCG, New Orleans LA
- Director of Preparedness Division, FEMA Region 6
- Deputy Director for Operations, Governor's Office of Homeland Security (GOHSEP), LA
- Louisiana Sea Grant, Lake Charles LA
- Parish Administrator, Cameron Parish, LA

Technical approach

SDMI Consequence Model

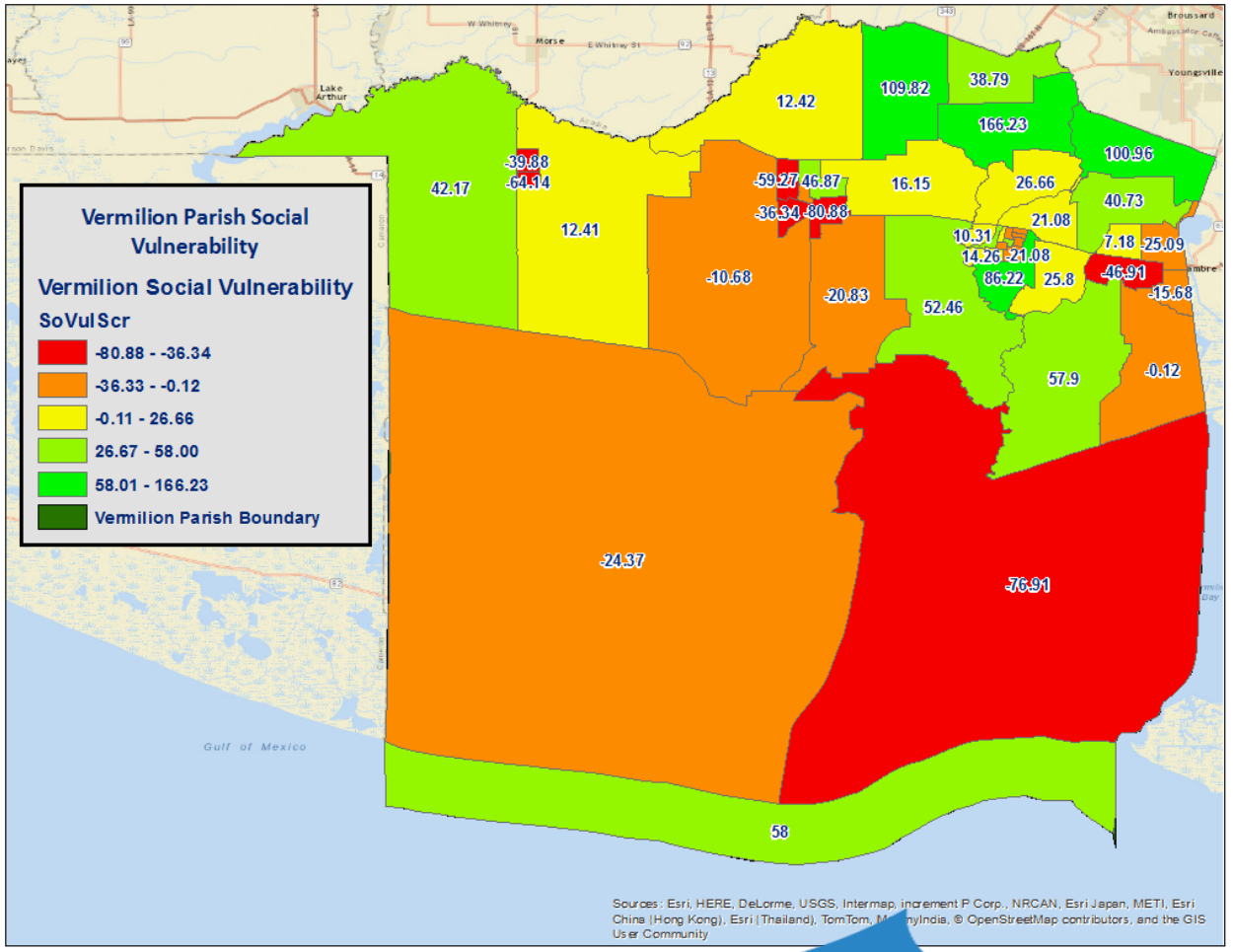
- Database: incorporates 143k locations organized by the 16 DHS CI/KR Sectors which are further categorized into 48 features sets



Technical approach

SDMI Consequence Model

- Integrates a social vulnerability index based on median income, home value, age, gender, and non-white populations to identify built up areas that are the most vulnerable.

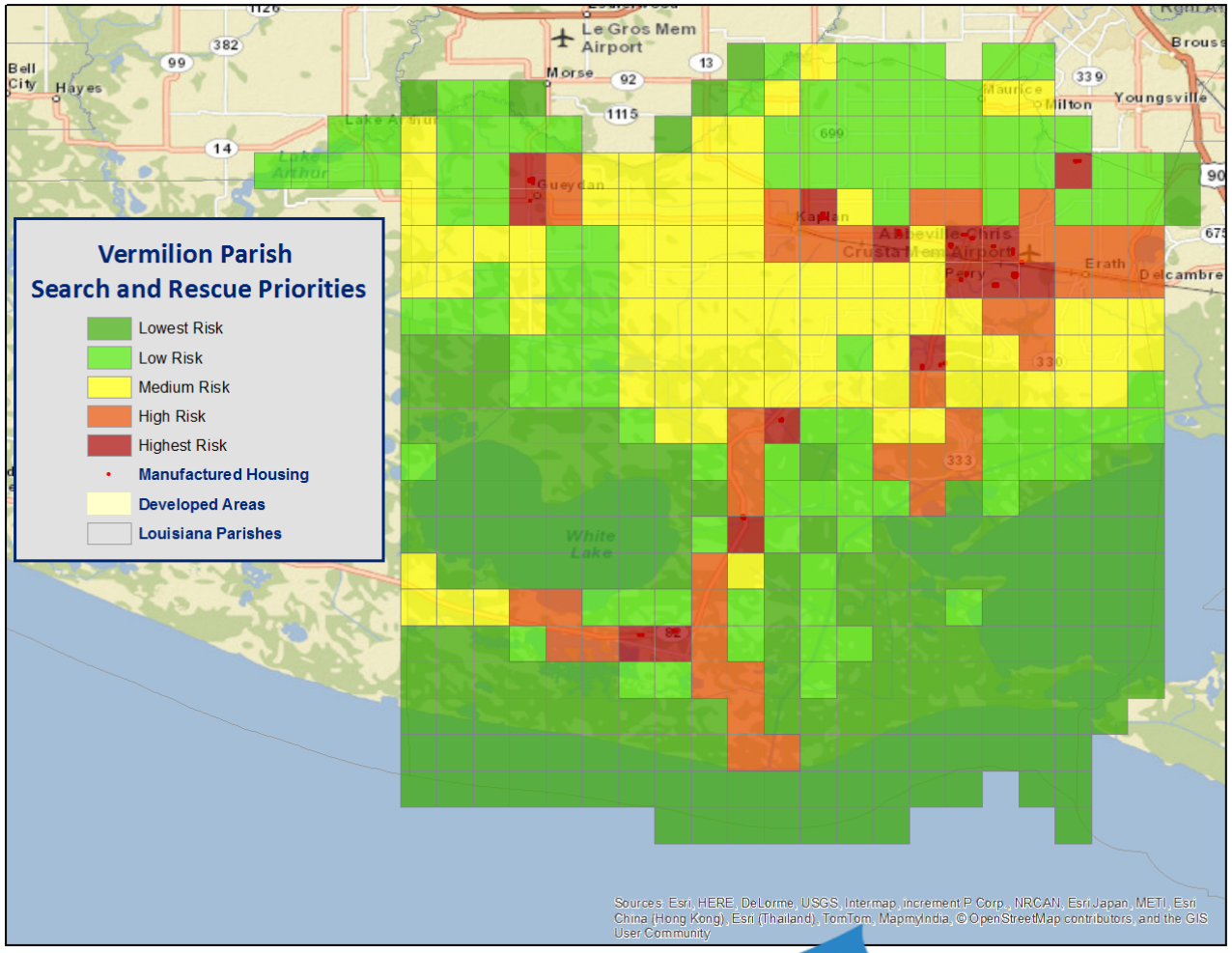


Technical approach

SDMI Consequence Model

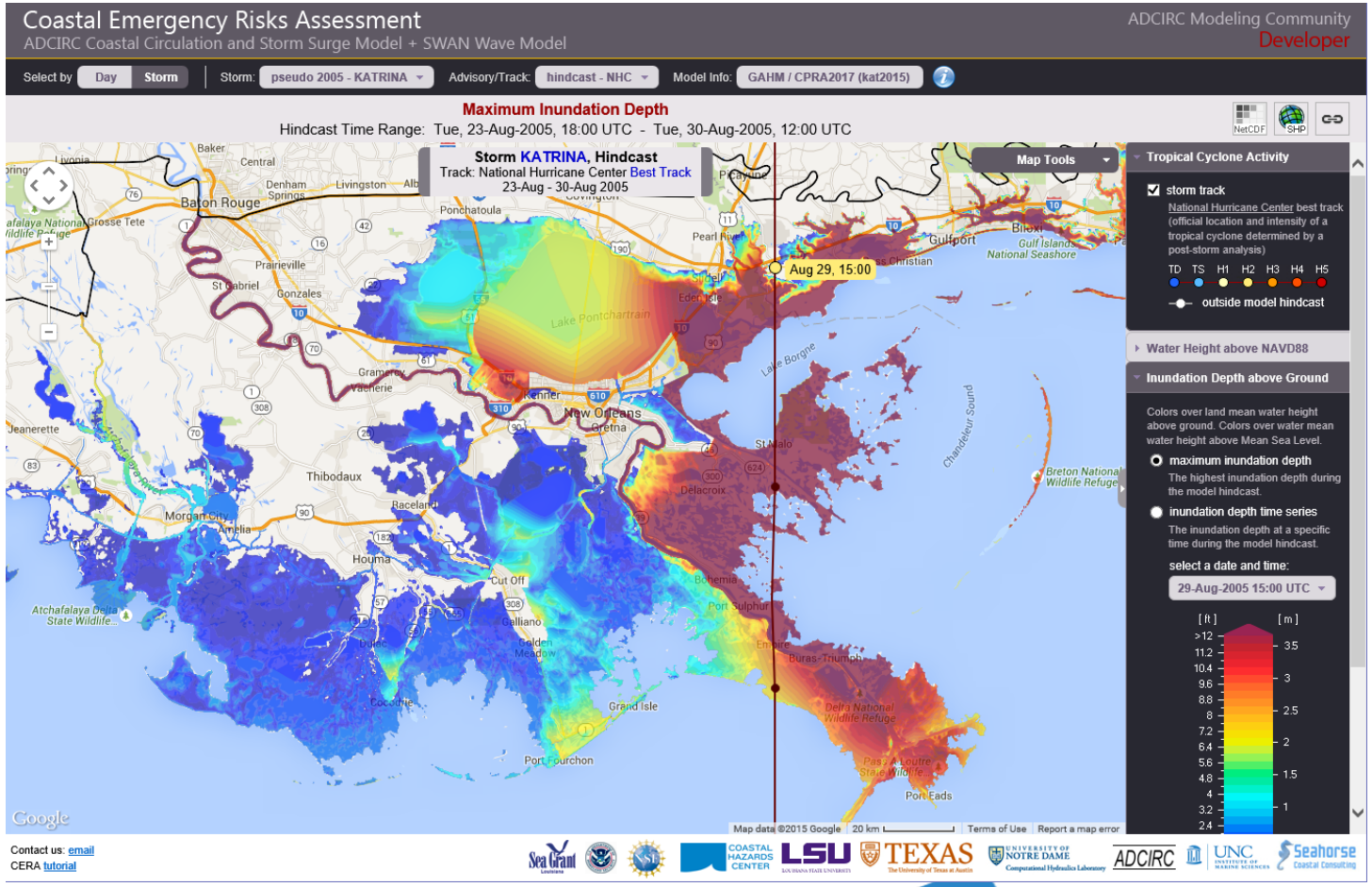
- The Tropical Cyclone Vulnerability Index (inland flooding, winds, and storm surge) can be used to identify areas that are more naturally at risk – GARS search and rescue grid

- As part of this project, we plan on making this operational by using the outputs from ADCIRC.



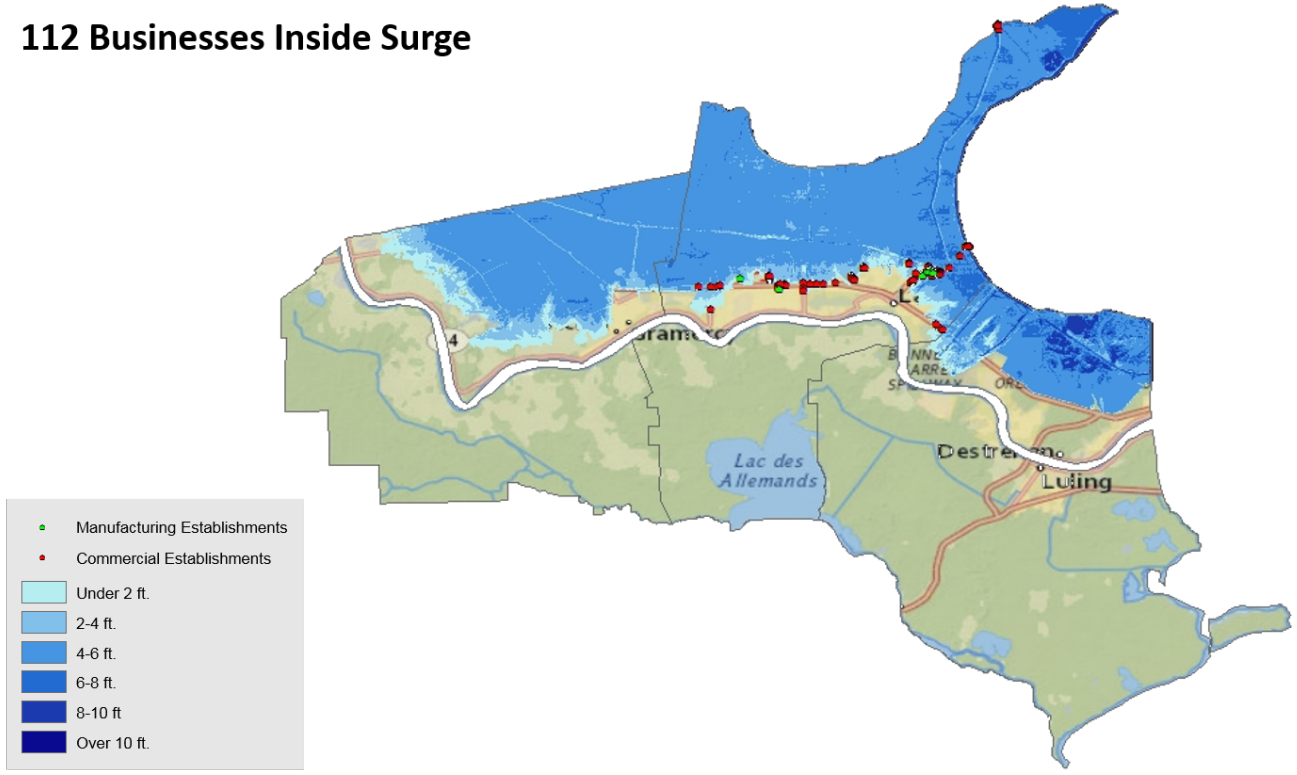
Technical approach – Coastal Emergency Risks Assessment (CERA)

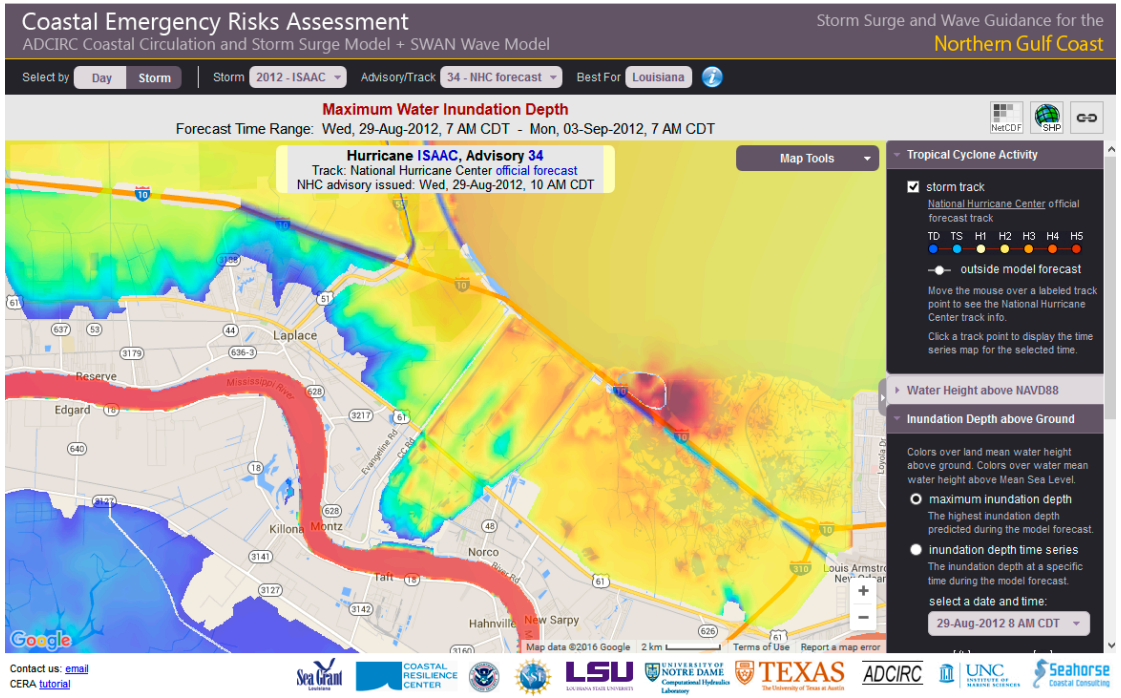
- real-time, automated software system to deliver predicted storm surge model results to emergency managers during extreme weather events and on a daily basis
- based on the ADCIRC Coastal Circulation and Storm Surge Model
- model results are presented on an interactive website
- successfully used by local, state, and federal emergency managers and U.S agencies during severe hurricane events



Example study

112 Businesses Inside Surge



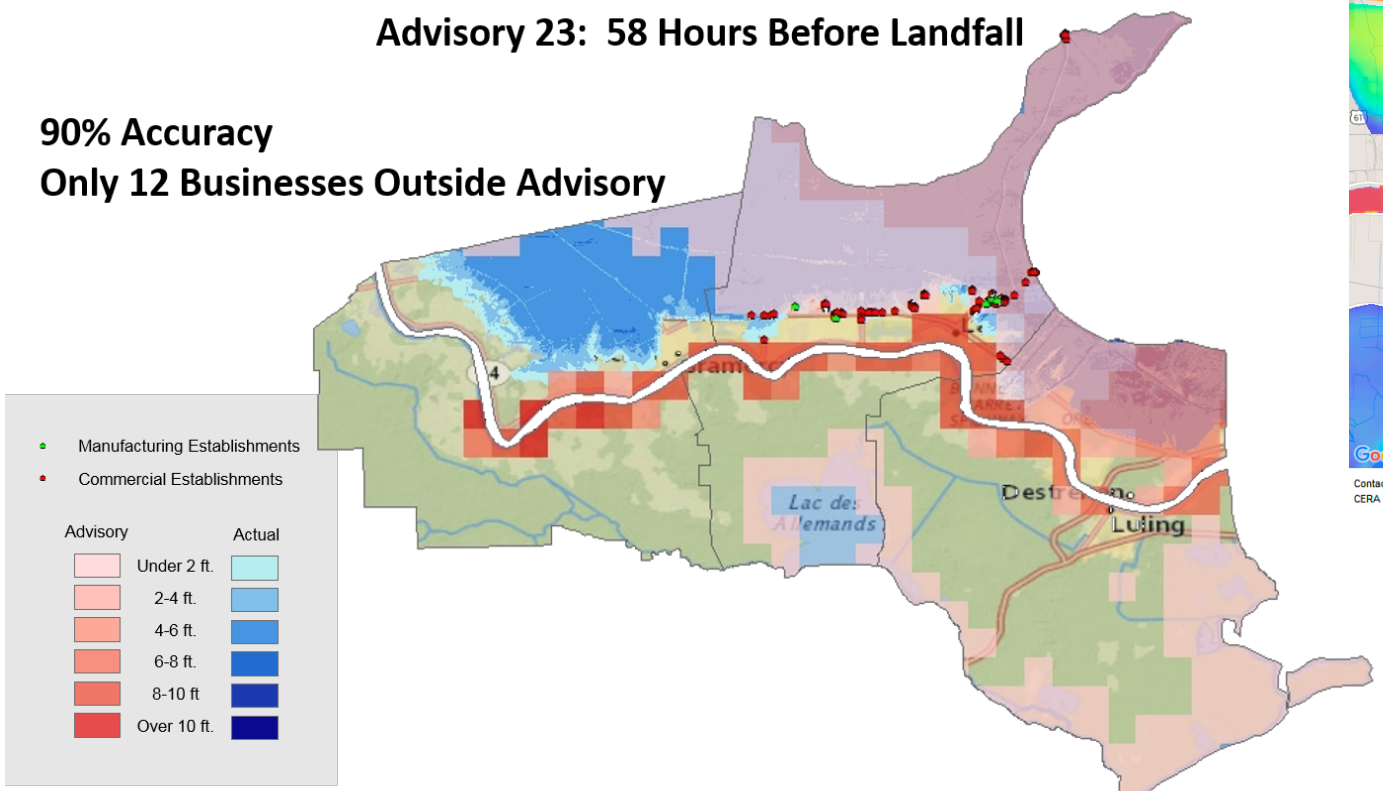


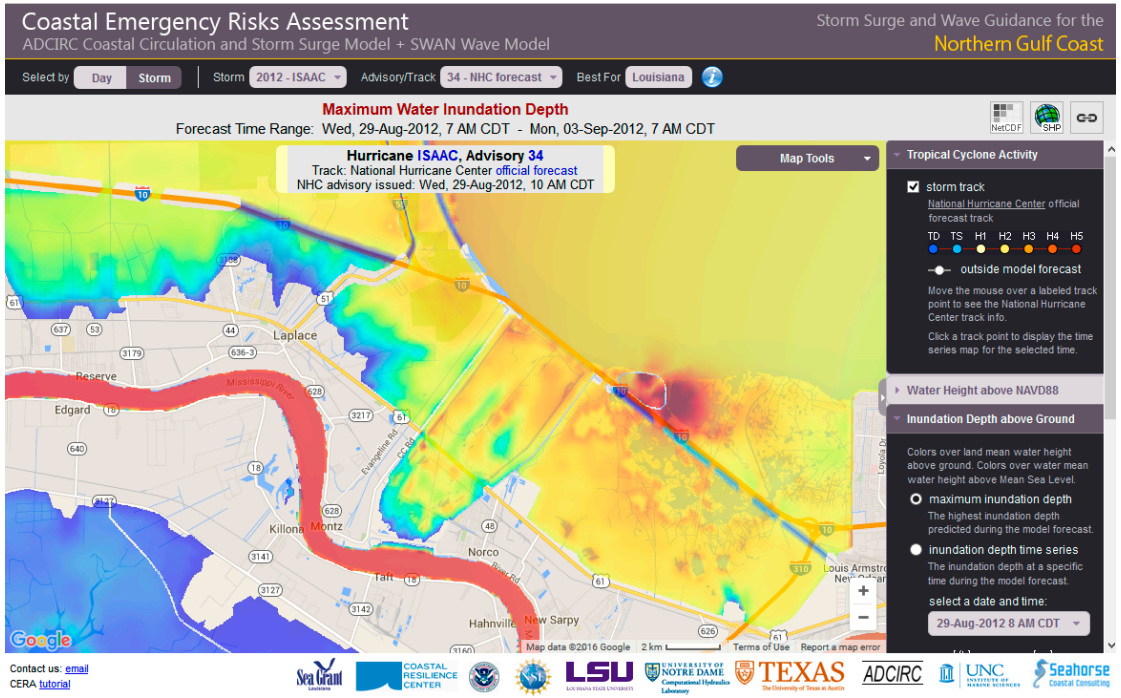
Population: ~ 30,000
7,000 homes flooded
3,000 people had to be evacuated

Example study

Advisory 23: 58 Hours Before Landfall

90% Accuracy
Only 12 Businesses Outside Advisory



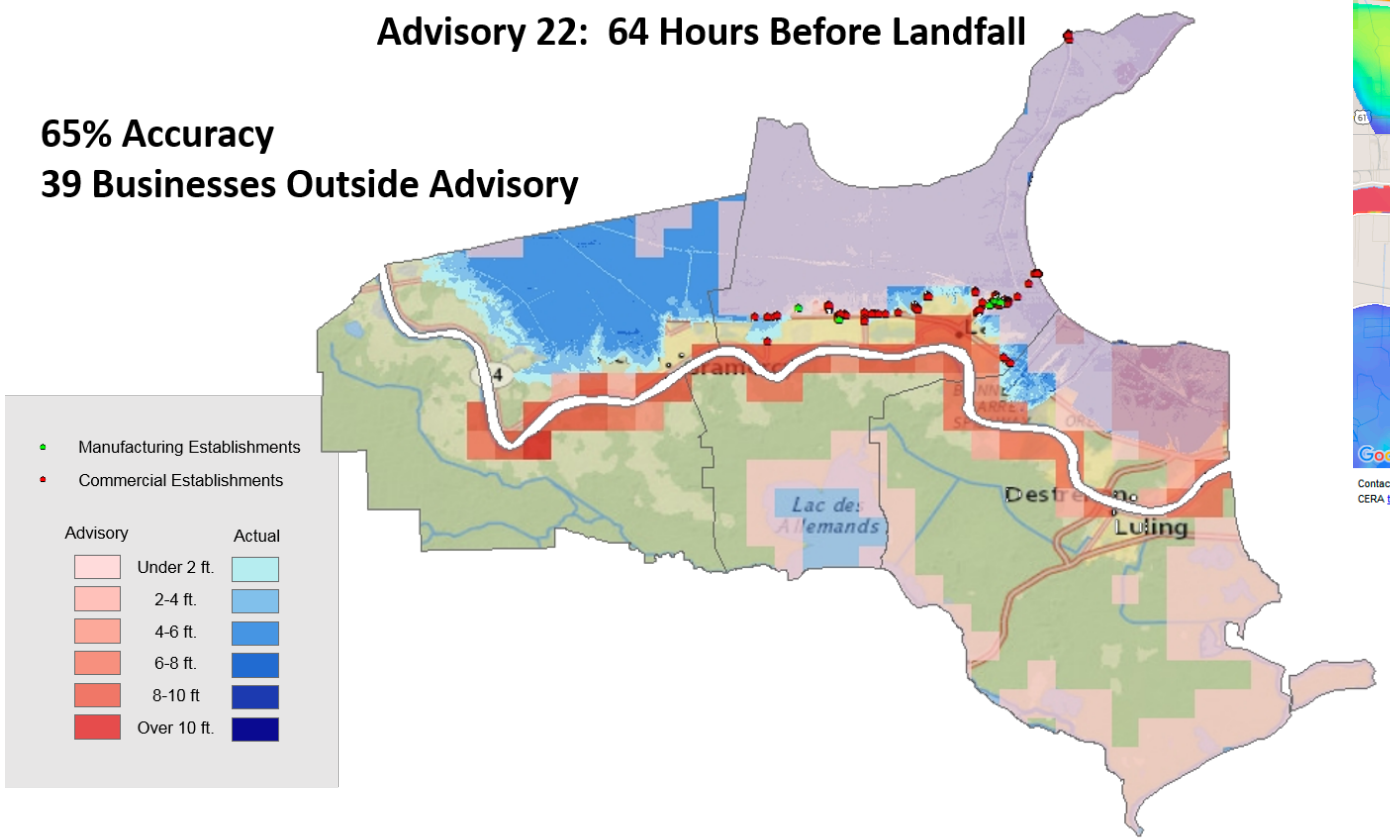


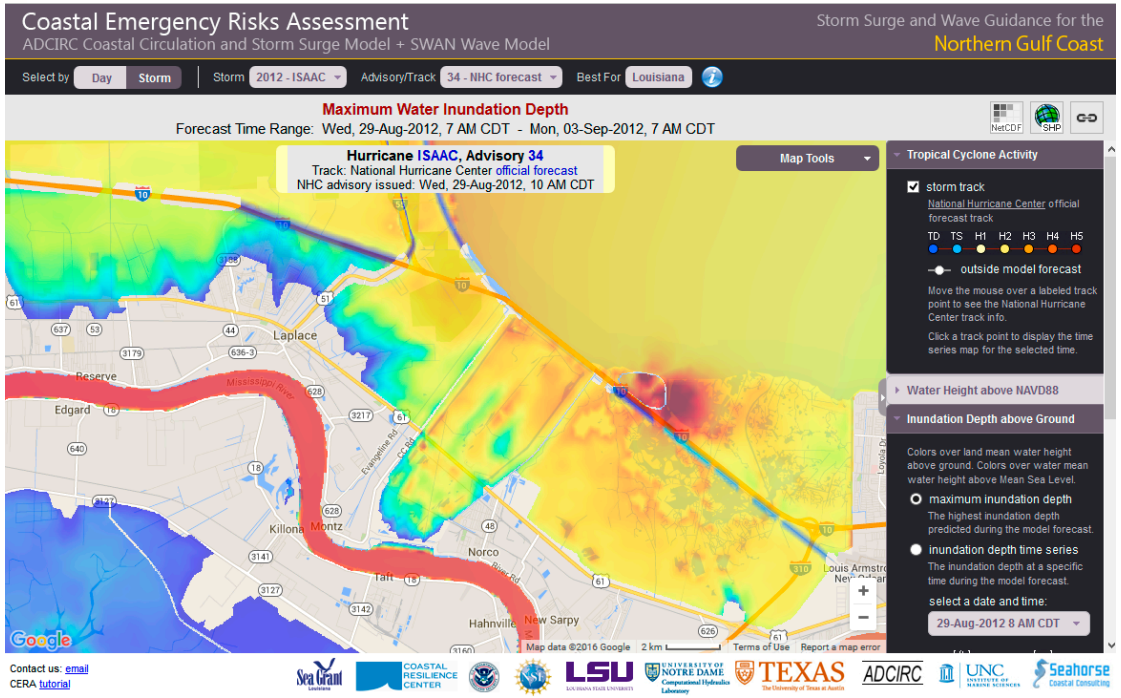
Population: ~ 30,000
7,000 homes flooded
3,000 people had to be evacuated

Example study

Advisory 22: 64 Hours Before Landfall

65% Accuracy
39 Businesses Outside Advisory





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Planning/Emergency Preparedness Outreach

Focus groups and end user engagement

- engage emergency managers and land use planners in focus groups at the annual Louisiana Emergency Preparedness Association (LEPA) 2016 conference to identify real-time data needs to assist pre- and post-disaster planning.
- work with technical team to incorporate needs into models and develop decision-maker interface
- test the decision support tool with emergency managers and land use planners again at the LEPA 2017 conference.
- work with technical team to roll out decision support tool and train end users.

potential LEPA panelists representing the land use planning realm:

- ✓ (Planning Director Terrebonne Parish)
- ✓ (Planning Director Orleans Parish)
- ✓ (Planning Professor and Director of the Institute for Sustainable Coastal Communities at TAMU)

Results & Milestones

June 2016

- Use the CERA technology to run a NHC mock hurricane and other storm scenarios
- Identify data to develop Consequence Model linked to CERA as step to improve Social Vulnerability Index
- Develop focus groups and determine data that are not already available
- With assistance of focus group, determine sectors not already involved in process and engage in model and planning process development

Year 2

- Develop integrated CERA Consequence Model
- Conduct model usability testing with identified stakeholders

Translation Activities and End Users

- CERA (over 100 subscribers)
- Coastal Sustainability Studio (has worked with more than 30 communities to develop the LA Resiliency Assistance Program - LRAP)
- Sea Grant (connections to all parishes across the coast of LA with focus on coastal resiliency programs)

- Workshops
  - Louisiana Emergency Preparedness Association (LEPA)
  - 3 LA Parish Emergency Managers CERA workshop – hurricane event exercise, this April

- SUMREX
  - We are offering a student summer intern position at the CSS at LSU, 6 weeks, 40hrs