



WAVE: Waterway Information for Vessels

A project funded by LSU's Coastal Sustainability Studio to develop a smartphone app to improve emergency preparedness for commercial fishermen and other users of the waterway.

Project Team



Lauren Land
Sustainability Coordinator for the Louisiana Sea Grant College Program
As the WAVE Project Manager, Lauren facilitates conversations between LSU, Sea Grant, the app development team, commercial fishermen, and local and state agencies to further the operational capabilities of the WAVE app.



Danny Holmes:
PhD Candidate for LSU Center for Computation and Technology and Adjunct Professor of Music Technology and Music Theory at Southern University
As the WAVE lead developer, Danny leads the design (UI/UX) and development (programming and GIS integration) of WAVE.



Carola Kaiser:
IT Consultant and GIS Specialist from LSU CCT
Carola provided WAVE with data from the interactive storm surge and wave guidance system (CERA) and real-time precipitation data from NOAA.



Hal Needham:
Program Manager for NOAA Southern Climate Impacts Planning Program at LSU
Hal provided historical storm surge and high water marks from the world's premier storm surge database, SURGEDAT (<http://surge.scec.lsu.edu>); historical hourly position and intensity (from Dr. James Elsner and Dr. Thomas Jaffer at Florida State University); and historical hurricane size data, including area of hurricane force, tropical storm force, and wind (Demuth et al. 2006).



Marc Aubanel:
Director of Digital Media Arts & Engineering, LSU CCT
Marc contributed to programming, development team direction, and GIS research for WAVE. He also facilitated the procurement of CCT server space, equipment, and other resources.

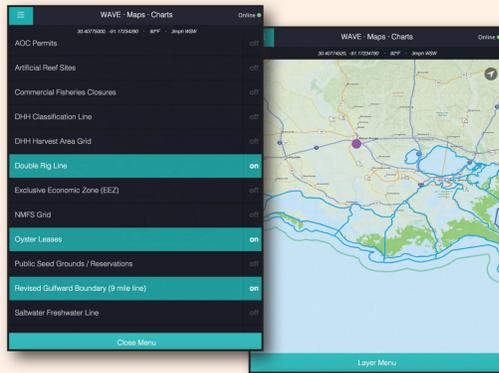


Alexa Andrews:
Project Manager, Center for Business Preparedness at Stephenson Disaster Management Institute
Alexa provided expertise from SDMI as it pertains to disasters and preparedness, specifically parish re-entry information.

Maps & Charts:

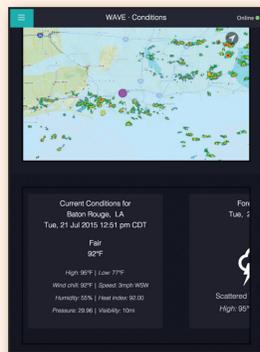
Users can view their location and toggle on and off from a selection of a variety of navigational charts and fishery-related data layers. NOAA layers include electronic navigational charts, raster navigational charts, and the Exclusive Economic Zone. Layers from the Louisiana Department of Wildlife and Fisheries (LDWF) include the following:

- Alternative Oyster Culture Permits
- Artificial Reef Sites
- Commercial Fishery Closures
- Department of Health and Hospitals Harvest Area Grid
- Double Rig Line
- National Marine Fisheries Service Grid
- Oyster Leases
- Public Seed Grounds
- Gulfward Boundary
- Saltwater-Freshwater Line
- Saltwater Marina Registry Locations
- Shrimp Zones
- Trip Ticket SubBasins

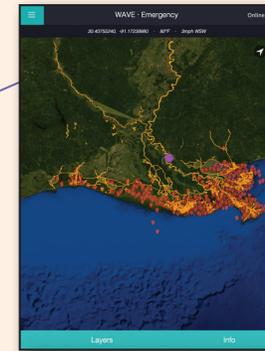
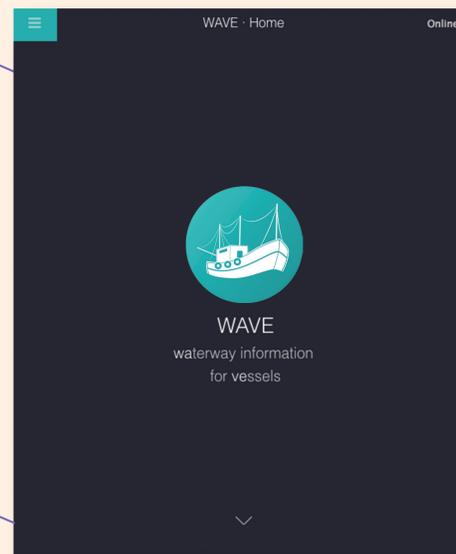


Conditions:

Users can find forecasts (e.g., 5-day weather forecasts; 72-hour precipitation forecasts) and weather warnings upon tap request for any global location monitored by The Weather Channel. Additionally, users can view observed and predicted water height time series graphs upon tap request for any location in the Gulf of Mexico. LSU's Coastal Emergency and Risks Assessment (CERA) Model provides this information. CERA pulls data from 120 monitoring stations that collect tide data from the U.S. Army Corps of Engineers, NOAA National Ocean Service, NOAA River Forecast Center, and U.S. Geological Survey. The CERA interactive website shows Gulf-wide surge forecasts up to five days out from hurricane landfall, using the Advanced Circulation and Storm Surge (ADCIRC) model to generate real-time surge forecasts.



WAVE HOME SCREEN



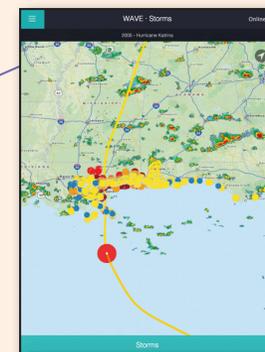
Emergency:

The Emergency Tab provides users with point-and-click data points for places of interest to fishermen (e.g., seafood docks, fuel docks, ice locations, and sites of emergency mooring) in addition to contact information relevant to emergency management. Contact information includes phone numbers for the following:

- U.S. Coast Guard
- Louisiana Department of Wildlife and Fisheries field offices
- Port districts
- Locks, Bridges, and Floodgates
- Offices of Emergency Preparedness
- National Weather Service Offices
- Louisiana Sheriff Offices and State Police Districts

Currently, this information is only available for Vermilion Bay but will be expanded to include the whole coastal zone of Louisiana.

The Emergency tab also provides access to Department of Natural Resources data layers, which include Fishermen's Gear Hang Points (self-reported obstructions to navigation), state-owned lands, and state-claimed water bodies.



Storms:

Here, users can view weather information relevant to current major storms as well as animations and data from past storms. The Storms Tab allows users to compare live and current data with observed data from past storms. LSU's SURGEDAT (Storm Surge Database) provides historical storm tracking and intensity, historical storm surge, and high water marks of significant hurricanes and storms.

How the App was developed:

Users of the waterway have needs for many types of information while out on their boats. The project team started with surveys and interviews of commercial fishermen to identify data needs and conducted several phases of beta-testing to improve WAVE format and functionality. Commercial fishermen use a variety of methods to receive weather and tide information, including radio communication with other fishermen and calls to shore to receive weather updates. Fishermen use their GPS and radar units for navigation, while official navigation maps are printed and stored somewhere on the vessel. The only way that commercial fishermen receive updates on fishery closures is by word-of-mouth or when they are inshore and can access the Internet. WAVE begins to address some of these issues by aggregating multiple sources of information and available datasets and bringing them to mobile platforms.

WAVE enables many publicly available tools and datasets to be available to mobile devices for the first time. All of the data and maps being incorporated into WAVE are free and publicly

available elsewhere, through other agencies and organizations. Instead of using proprietary maps, the project team is re-creating maps to embed in the App. In order to service as many devices as possible, the team built WAVE as a web app in html5 and javascript. The team compiled the web app to native app bundles using a service called CocoonJS. CesiumJS is a WebGL GIS API that handles the mapping and other GIS used in the app.

The advantage of WAVE is that it pulls all the data onto one platform that can be accessed from a mobile device. In addition, the maps within the app are being built so that they can be visible on a mobile device without Wi-Fi access. For weather and tide information, the app will continuously update while it has Wi-Fi access and will show the time of the most recent update when a fisherman accesses the map out of range of Internet. WAVE's design is adaptable and scalable and can be adjusted to incorporate other types of data.

Partners and Funding:

This project was made possible with support from the LSU Coastal Sustainability Studio 2014-2015 Small Projects Fund.

Throughout the course of the project, Louisiana Sea Grant at LSU facilitated conversations to expand partnerships and keep moving the project forward. Louisiana Sea Grant Extension Agents in the field were integral to communicating the data and information needs of commercial fishermen. In addition, Sea Grant Agents in the Vermilion Bay area helped create a geospatial dataset for points of interest to fishermen along the waterways. The Louisiana Sea Grant Law & Policy Program conducted legal research to put together the language for user agreements and legal disclaimers for WAVE.

An app of this kind is unique for many reasons, so reaching out to external partners has been a key component to the success of WAVE and the information that it provides. The Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Department of Natural Resources (LDNR) provided access to and technical help with several data layers.

The work on WAVE continues toward a point where WAVE is freely and publicly available for download through the Apple App Store. Look for it soon!

