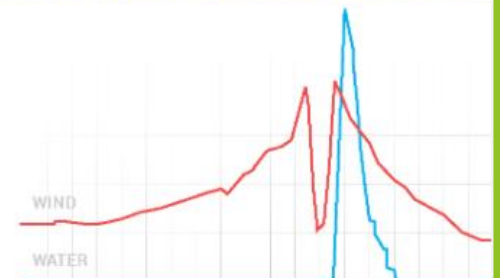


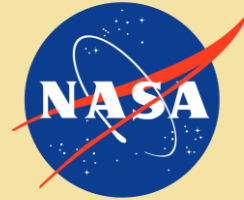
Location-Specific Storm Surge & Wind Data

Q-risq Analytics uses distributed geospatial analytics engines on big data to provide precise storm surge and wind risk analysis — before and after a storm.

- ▶ Q-risq Analytics patented process equips you with site specific **pre- and post-storm analysis**, so you know what could happen, how to assess damage, and how to recover faster.



US Small Business Innovation Research Program



DECEMBER 1, 2006 | PHYSICAL SCIENCES

Forecasting of Storm-Surge Floods Using ADCIRC and Optimized DEMs

Maximum water levels are mapped for Hurricanes Camille and Katrina.

Stennis Space Center, Mississippi

Increasing the accuracy of storm-surge flood forecasts is essential for improving preparedness for hurricanes and other severe storms and, in particular, for optimizing evacuation scenarios. An interactive database, developed by WorldWinds, Inc., contains atlases of storm-surge flood levels for the Louisiana/Mississippi gulf coast region. These atlases were developed to improve forecasting of flooding along the coastline and estuaries and in adjacent inland areas. Storm-surge heights depend on a complex interaction of several factors, including: storm size, central minimum pressure, forward speed of motion, bottom topography near the point of landfall, astronomical tides, and most importantly, maximum wind speed.

The information in the atlases was generated in over 100 computational simulations, partly by use of a parallel-processing version of the Advanced CIRCulation (ADCIRC) model. ADCIRC is a nonlinear computational model of hydrodynamics, developed by the U.S. Army Corps of Engineers and the US Navy, as a family of two- and three-dimensional finite-element-based codes. It affords a capability for simulating tidal circulation and storm-surge propagation over very large computational domains, while simultaneously providing high-resolution output in areas of complex shoreline and bathymetry. The ADCIRC finite-element grid for this project covered the Gulf of Mexico and contiguous basins, extending into the deep Atlantic Ocean with progressively higher resolution approaching the study area. The advantage of using ADCIRC over other storm-surge models, such as SLOSH, is that input conditions can include all or part of wind stress, tides, wave stress, and river discharge, which serve to make the model output more accurate.



[Login/Register](#)



Home

SBIR-STTR-Success: WorldWinds, Inc.

About ▾ Funding ▾ Reports ▾ Showcase ▾ Announcements ▾

Company Name:	Worldwinds, Inc.	Post Date:	April 20, 2018
Company Location:	1030 Gause Blvd Slidell, LA 70458	Agency:	DOC
Company Website:	http://www.worldwindsinc.com	Files:	SBA_SuccessStories_WorldWinds.pdf

WorldWinds, Inc.



SLIDELL
LA

IMPACT
\$5M
IN PHASE III REVENUE

WORLDWINDS, INC.
1030 Gause Blvd.
Slidell, LA 70458
www.worldwindsinc.com

When Hurricane Irma slammed Puerto Rico in 2017, there was a news story that made national headlines: A commercial aircraft managed to fly off the island despite category 5 hurricane winds, carrying 173 passengers to safety. The flight utilized a technology developed by WorldWinds, with the help of the federal SBIR program.

The project with NOAA focused on developing new products for the TV broadcast market based on NOAA and NASA data. It evolved into the company's SpaceRadar, which uses satellite information to simulate a land-based radar. This proved to be a perfect solution for aircraft, since radar is not available in the middle of oceans, and satellites provide the only option. Baron Weather Services distributes the data to support commercial aircraft operations in the United States.

With a history of partnering with FEMA, WorldWinds has become synonymous with providing the very best in remotely sensed weather data. Its post hurricane assessment model is set to debut this year, and it will help remedy the situation of long insurance claims. When Hurricane Katrina hit, people had to wait months for their money. Now, if somebody says, "I have three feet of water," an adjuster can look on the map and confirm the damage, getting money in people's hands faster.

A previous NASA SBIR project centered on high-resolution storm surge simulations and wind effects. WorldWinds' technology powers this map by running storm surge simulations for historical and real-time hurricanes. The data is still being used today by government agencies, commercial businesses, and private homeowners.

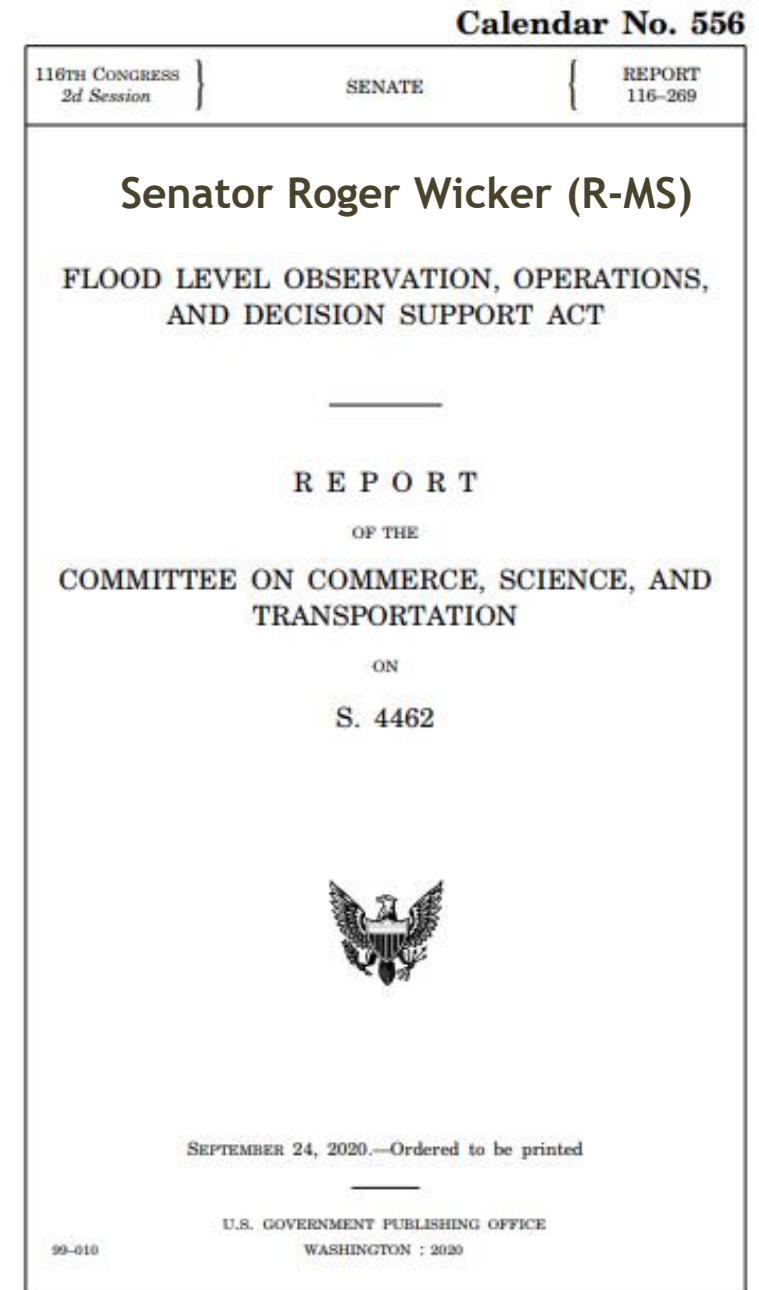
FLOODS Act

SEC. 104. HURRICANE FORECAST

IMPROVEMENT PROGRAM. (a) * * * (b) GOAL.—The goal of the project maintained under subsection (a) shall be to develop and extend accurate hurricane forecasts and warnings in order to reduce loss of life, injury, and damage to the economy, with a focus on—

- (1) improving the prediction of rapid intensification and track of hurricanes;
- (2) improving the forecast and communication of storm surges from hurricanes; and;**
- (3) incorporating risk communication research to create more effective watch and warning products;**

and VerDate Sep 11 2014 05:57 Sep 28, 2020 Jkt 099010 PO 00000 Frm 00015 Fmt 6659 Sfmt 6602 E:\HR\OC\SR269.XXX SR269 14 (4) evaluating and incorporating, as appropriate, innovative observations, including acoustic or infrasonic measurements.



Most Active Atlantic Hurricane Seasons



Record Setting Activity:

1. 2020 - 30 storms
2. 2005 - 28 storms
3. 2021 - 20 storms



2020 Hurricane Laura
Lake Charles, LA



2005 Hurricane Katrina
New Orleans, LA



2021 Hurricane Ida
McComb, MS

Process Overview

National Hurricane Center - every 6 hours

- storm current position
- forecasted track & cone

USGS

- LiDAR ground elevation data

Q-Winds

- Patented Process
- Maximum Wind forecast
- Time of wind arrival at each address
- Post-storm 'hindcast' at each address

Q-Surge

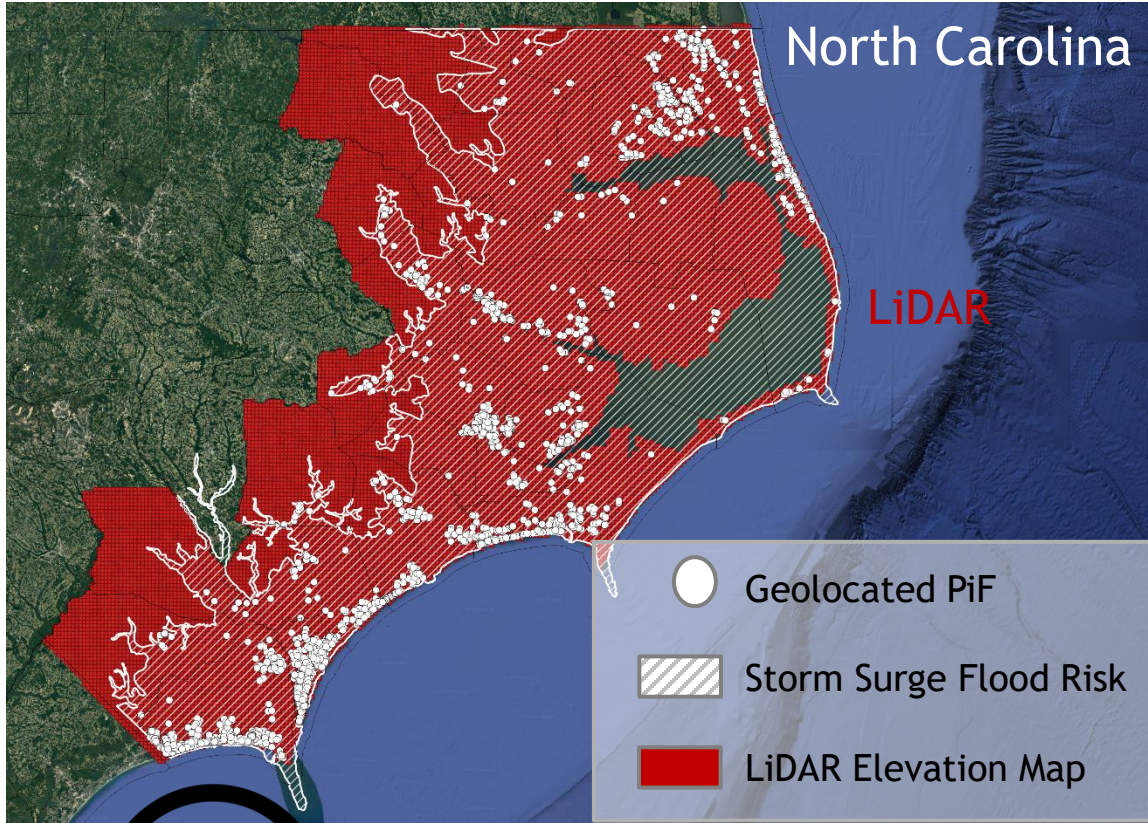
- Maximum Storm Surge forecast
- Time of arrival at each address
- Post-storm 'hindcast' at each address

Address Specific Hurricane Wind and Surge Information

Property Details	
Address	10045 JORDAN RIVER DR, Hancock, MS, 39520
Latitude	30.324299
Longitude	-89.388245
Ground Elevation	3.40 ft
Forecast Surge Risk	H [>3ft]
Forecast Sustained Wind Risk	Tropical Storm [39-73 mph]

LiDAR Elevations

to calculate surge above ground



Lat/Lon: 32.8308296; -80.0450516

2017 - LiDAR Data: 11.85 ft (3.61285591m)

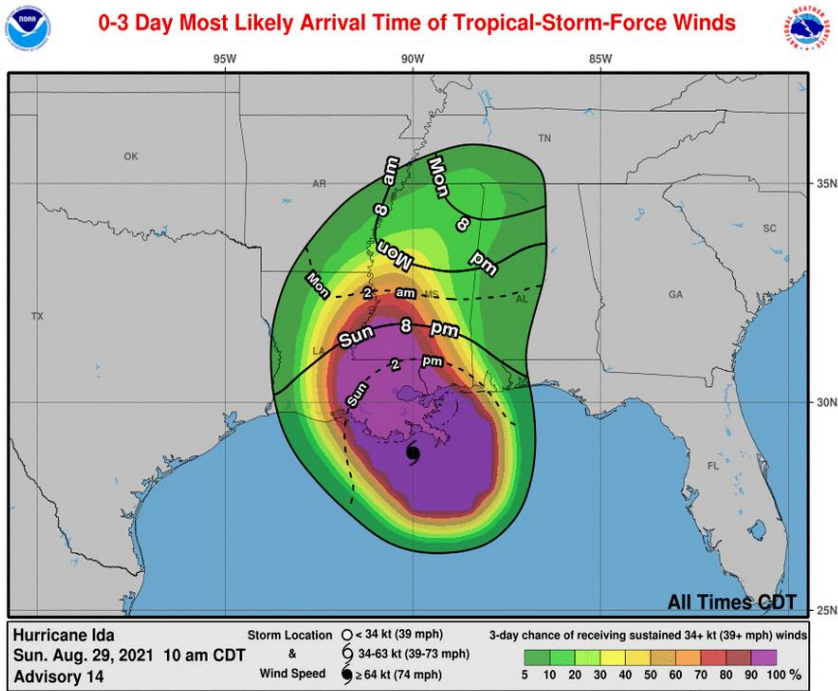


Q-Winds

Hurricane Ida Forecast - NHC Advisory 14

Max Sustained Winds

NOAA/ NHC provides arrival time of tropical storm force winds.



Qrisq builds on NHC data to provide proprietary maximum wind speeds at property specific addresses.



Wind PIFs

- Total Wind PIFs: 385545
- Minimal Wind: 161506
- Tropical Storm: 224039
- Category 1: 0
- Category 2: 0
- Category 3: 0
- Category 4: 0
- Category 5: 0

Legend

- Processed PIF Markers
- Category 5 Wind Risk
- Category 4 Wind Risk
- Category 3 Wind Risk
- Category 2 Wind Risk
- Category 1 Wind Risk
- Tropical Storm Wind Risk
- Minimal Wind Risk

Property Details	
Address	1530 N BEACH BLVD. Hancock, MS, 39520
Latitude	30.34241
Longitude	-89.34202
Ground Elevation	3.44 ft
Forecast Surge Risk	H (>3ft)
Forecast Sustained Wind Risk	Tropical Storm [39-73 mph]

Storm

Year: 2021

Storm: Ida

Advisory: 14-N

Advisory Time: 1000 AM CDT Sun Aug 29 2021

Time Stamp

Maximum Wind Forecast

Miles per hour

- 150 - Category 5 (> 156 mph)
- 140 - Category 4 (130-156 mph)
- 120 - Category 3 (111-129 mph)
- 100 - Category 2 (96-110 mph)
- 90 - Category 1 (74-95 mph)
- 80 - 39-73 mph
- 70 - 36-38 mph
- 60 - 31-35 mph
- 50 - 26-31 mph
- 40 - 21-26 mph
- 30 - 16-21 mph
- 20 - 11-16 mph
- 10 - 6-11 mph
- 0 - < 15 mph

Max Winds

Q-Winds

- Patented Process
- **Maximum Wind forecast**
- **Time of wind arrival at each address**
- **Post-storm 'hindcast' at each address**

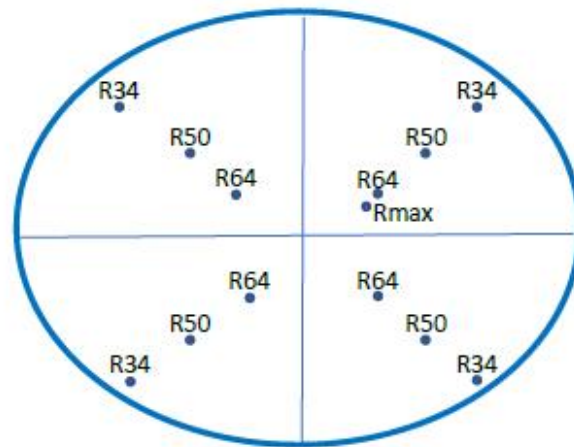
NHC Wind Field

When a tropical system forms, the National Hurricane Center analyzes satellite and surface wind data to create a wind field depiction, like the one shown in Figure 1. The NHC forecast estimates 13 data points: **Rmax** – maximum wind speed and its location, and the distance **64 knot, 50 knot, and 34 knot** winds are located from the center of the storm in each of the four quadrants.

Characteristics:

- 13 data points
- 5 day forecast
- Days 1-3 forecast at 12 hour time step
- Days 3-5 forecast at 24 hour time step

Example of NHC Wind Field



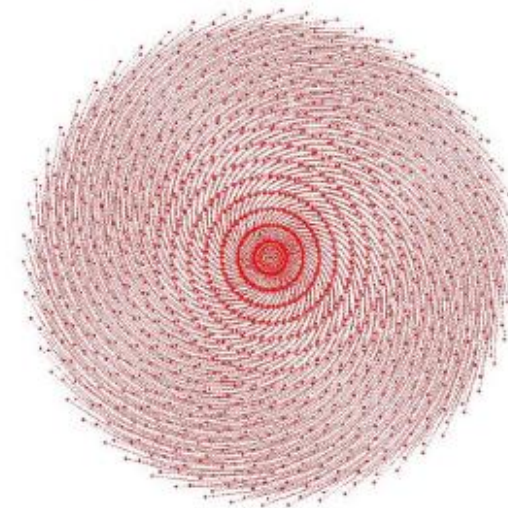
Qrisq Gridded Wind Field

Storm Surge model predictions are considerably sensitive to the wind forcing that drives the surge. Qwinds builds a comprehensive 2-D representation of the tropical system's wind structure, consisting of 600k of data points, by blending results from several hurricane wind models, for a 5-day forecast period with 15-minute time steps. A quality control algorithm ensures consistency with the NHC forecast.

Characteristics:

- 600k data points
- 5 day forecast
- 15 minute time step

Example of Qrisq Gridded Wind Field



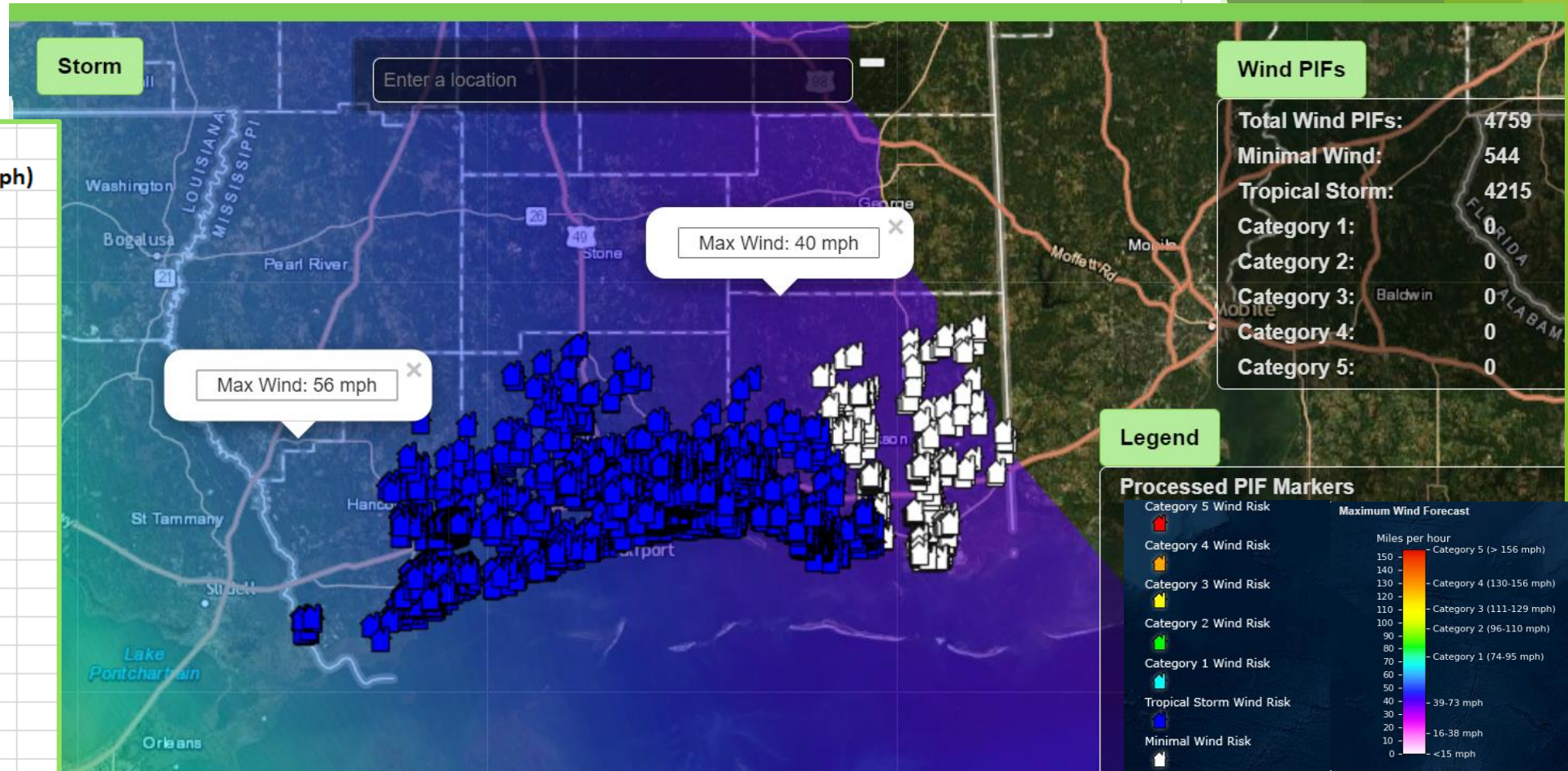
Hurricane Ida Forecast - NHC Advisory 14

Sunday, Aug 29 - 10AM (12 hours before landfall)

Max Sustained Wind Forecast (gusts up to 25% higher)

Q-Winds

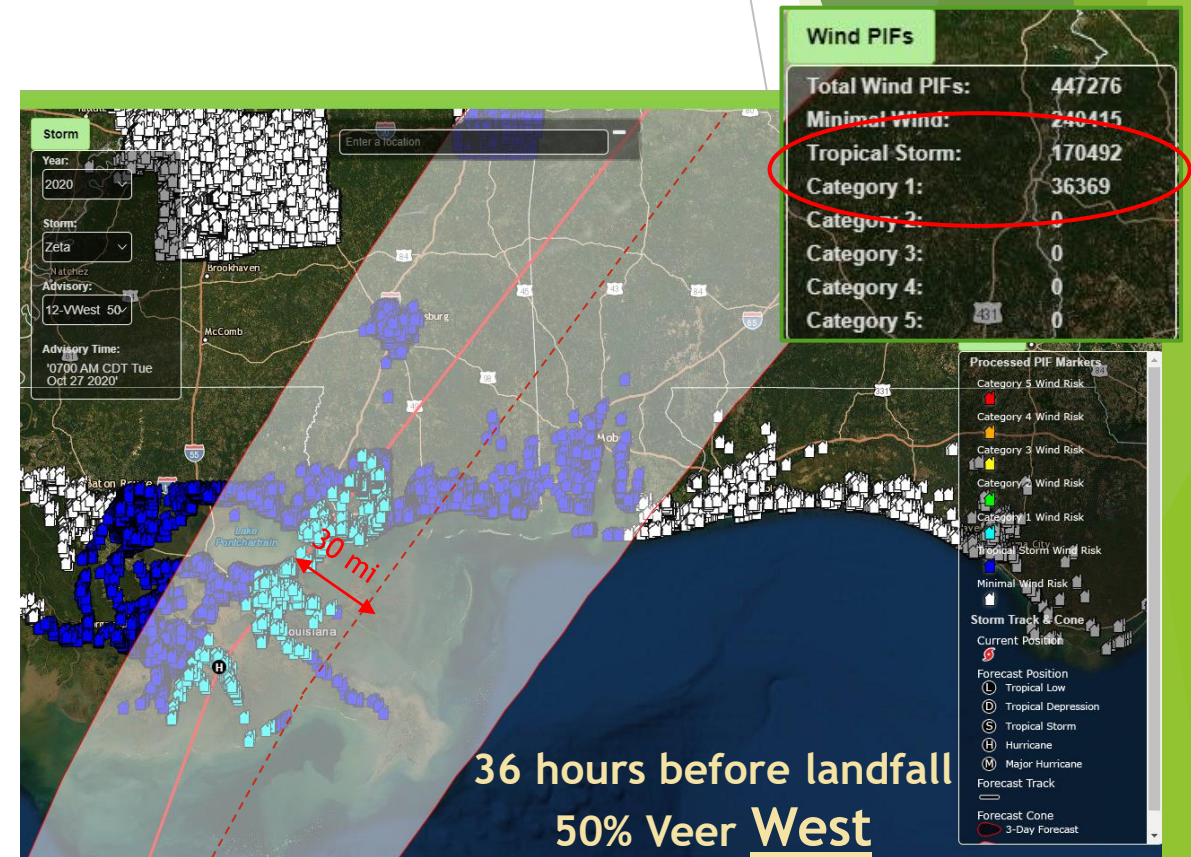
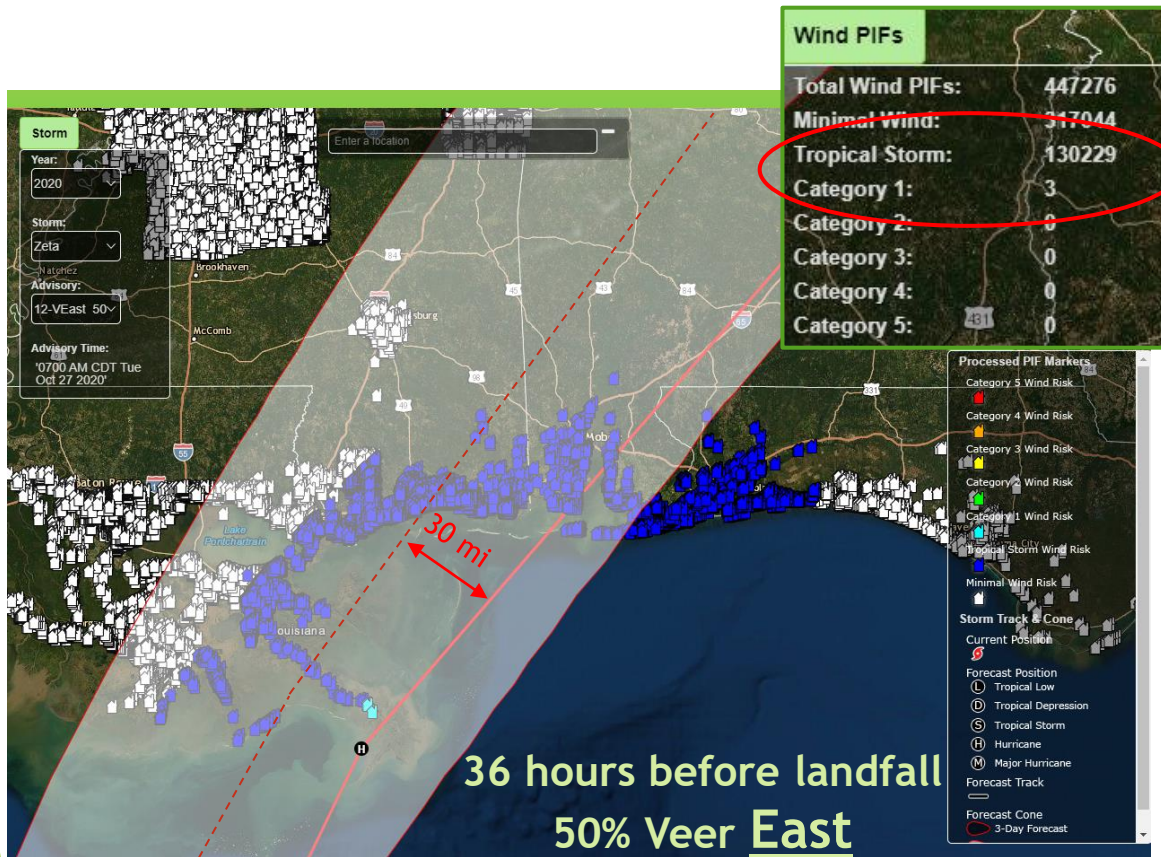
Hurricane Ida - ADV 14	
Tropical Storm Wind Risk (39- 74 mph)	
Zip Code	PIF Count
39565	75
39532	545
39556	63
39503	526
39574	52
39571	210
39520	395
39560	128
39564	809
39507	159
39525	465
39530	75
39501	77
39531	250
39576	127
39553	111
39540	127
39572	16
39567	1



Hurricane Zeta Forecast - NHC Advisory 12

Ensemble Wind Forecasting

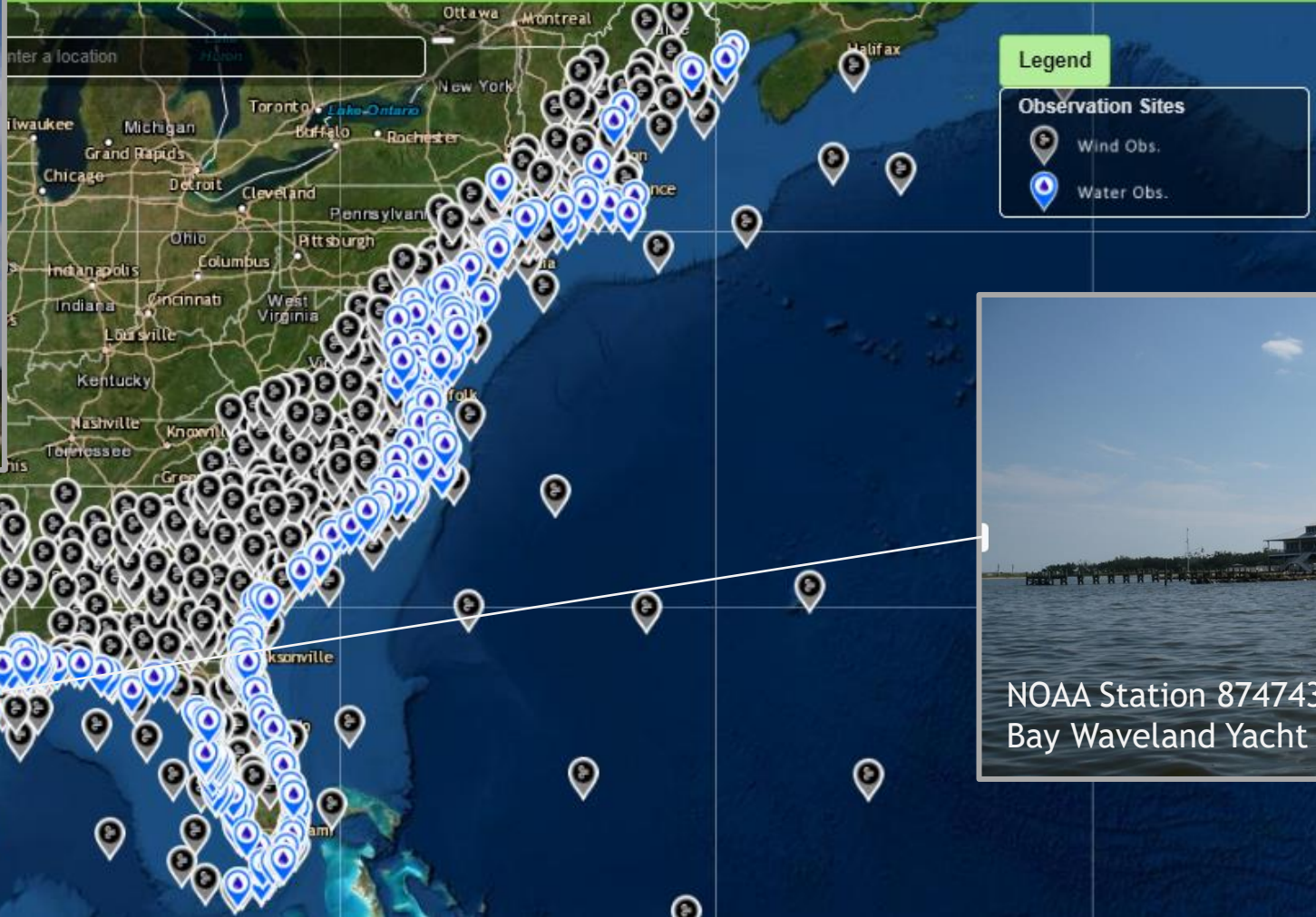
Q-Winds



Wind/ Water Observation Sites

1400 US Government Measurements

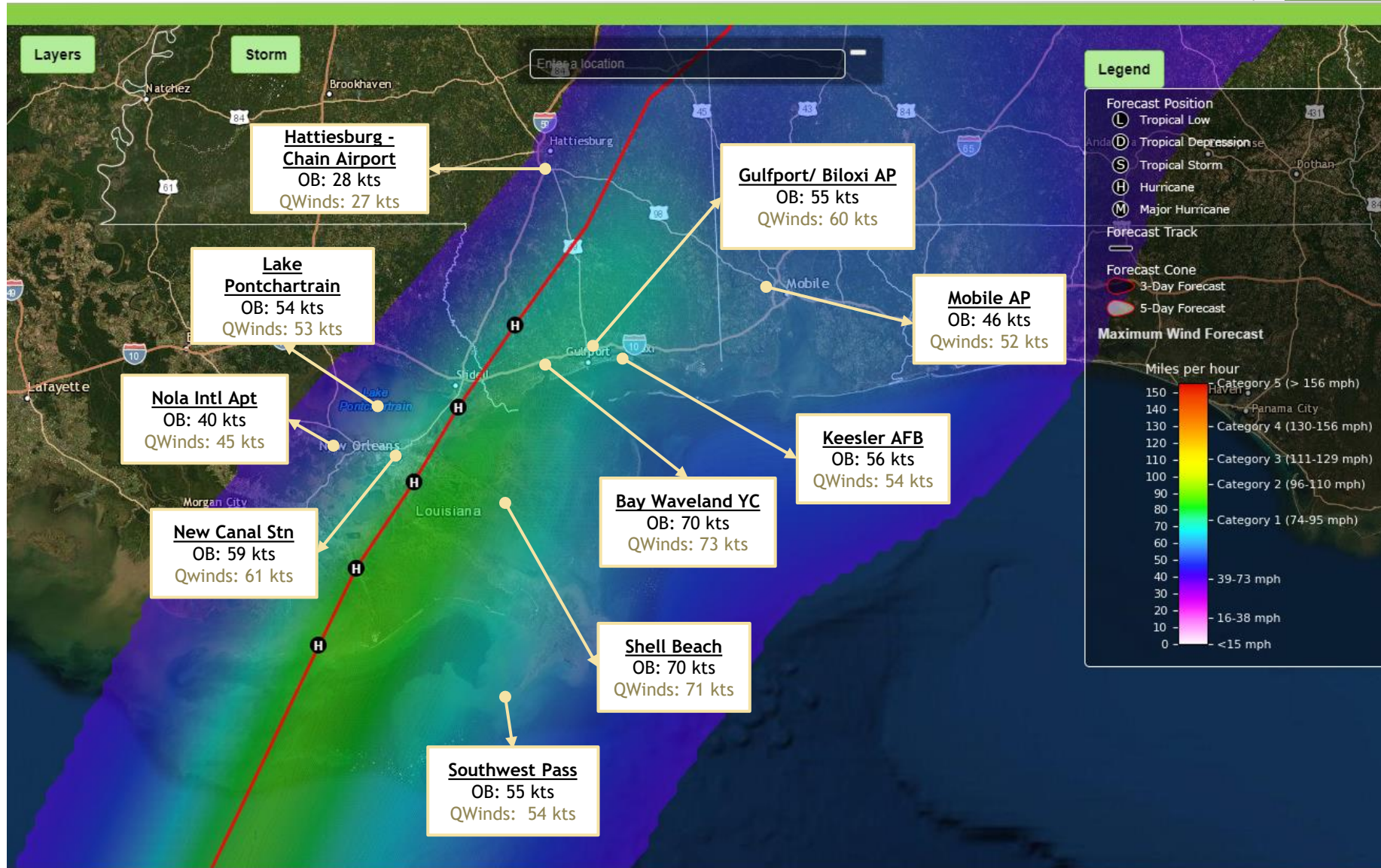
San Marcos Regional Airport, TX
KHYI



NOAA Station 8747437
Bay Waveland Yacht Club, MS

Hurricane Zeta

Q-Winds Post Storm Hindcast vs Observations



Post Storm Impact Report

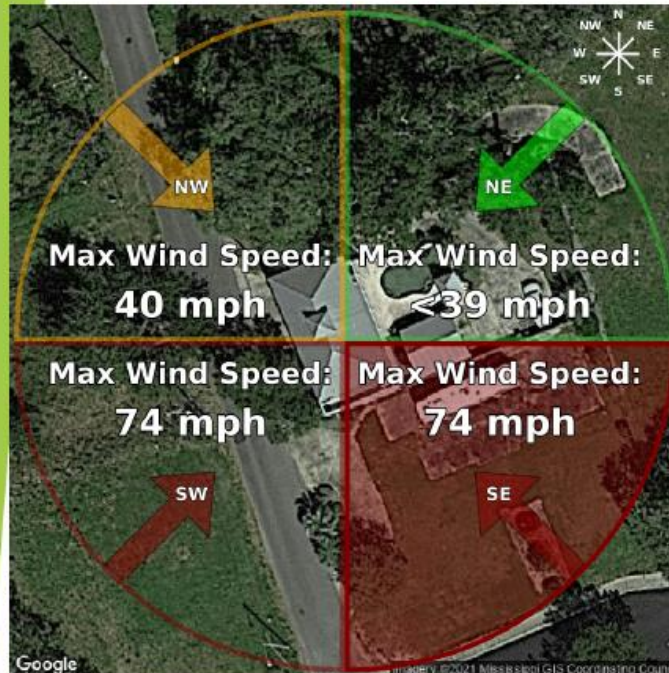
Impact Report



2020 Hurricane Zeta

470 Beach Blvd. West, Long Beach, MS, 39560

Lat/Lon 30.3420506, -89.1602325



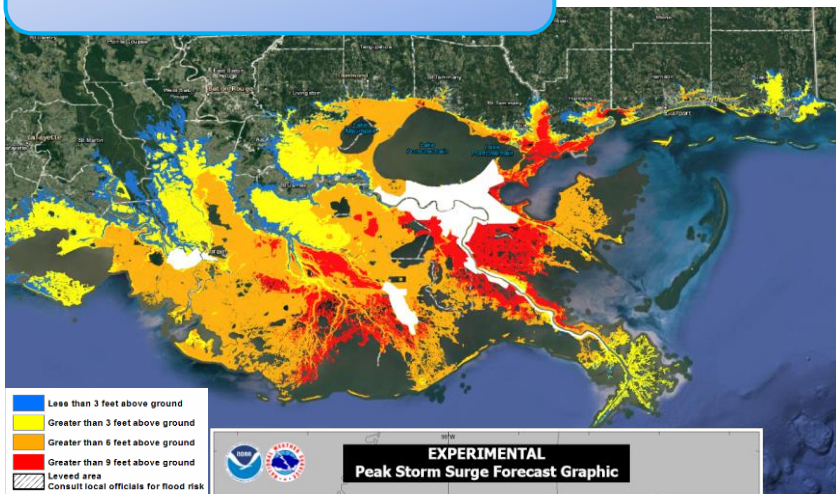
Property Wind Analysis			
Quadrant	Sustained Winds	Wind Gust	Duration
NE	<39 mph		
SE	39 - 74 mph	93 mph	4 h
SW	39 - 74 mph	92 mph	3 h
NW	39 - 40 mph	53 mph	1 h

Q-Surge

Hurricane Ida Forecast - NHC Advisory 14

Q-Surge

NOAA/ NHC provides generalized storm surge.



Less than 3 feet above ground
 Greater than 3 feet above ground
 Greater than 6 feet above ground
 Greater than 9 feet above ground
 Leveed area
 Consult local officials for flood risk



Hurricane Ida
 Sunday August 29, 2021
 10 AM CDT Advisory 14
 NWS National Hurricane Center

Patented QWinds data is used as input to the Army Corps of Engineer's ADCIRC storm surge model creating precise maximum storm surge forecasts.

Address Specific Storm Surge: (above LiDAR ground elevation)

- Jordan River Dr, Hancock: 3.6'
- Alden Circle, Biloxi: 4.9'
- Frederic St, Pascagoula: 0'

Storm

Year: 2021

Storm: Ida

Advisory: 14-N

Advisory Time: 1000 AM CDT Sun Aug 29 2021

Property Details

Address	10045 JORDAN RIVER DR, Hancock, MS, 39520
Latitude	30.324299
Longitude	-89.386245
Ground Elevation	3.40 ft
Forecast Surge Risk	H (>3ft)
Forecast Sustained Wind Risk	Tropical Storm (39-73 mph)

Property Details

Address	675 ALDEN CIR, Biloxi, MS, 39531
Latitude	30.426777
Longitude	-88.947764
Ground Elevation	0.48 ft
Forecast Surge Risk	H (>3ft)
Forecast Sustained Wind Risk	Tropical Storm (39-73 mph)

Property Details

Address	3514 Frederic St, Pascagoula, MS, 39563
Latitude	30.36924
Longitude	-88.56025
Ground Elevation	7.24 ft
Forecast Surge Risk	L (<1ft)
Forecast Sustained Wind Risk	Low Wind

Surge PIFs

Total Surge PIFs: 108159
 PIFs not at Risk: 93258
 PIFs at Low Risk: 11727
 PIFs at Moderate Risk: 2025
 PIFs at High Risk: 1149

Legend

Processed PIF Markers

- No Risk Assessed
- Low Risk Assessed
- Moderate Risk Assessed
- High Risk Assessed

Storm Surge Model

Water Depth (feet)

30
18'
12'
6'
3'
1' MSL

Time Stamp

Storm Surge

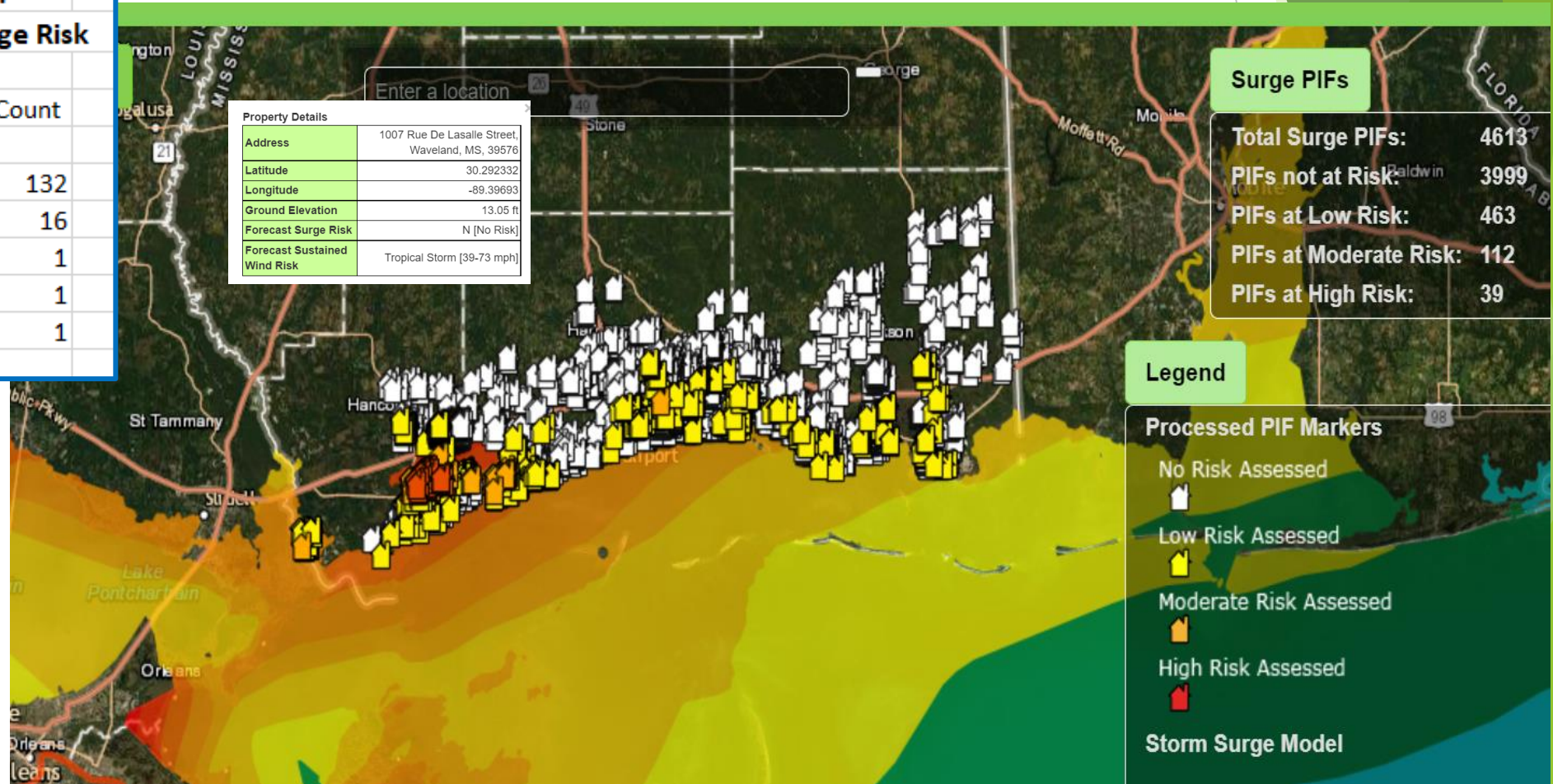
LiDAR ground elevations are combined with maximum storm surge to determine Surge above Ground at specific locations.

Hurricane Ida Forecast - NHC Advisory 14

(Sunday, Aug 29 - 10AM / 12 hours before landfall)

Q-Surge

Hurricane Ida - ADV 14	
High and Medium Surge Risk	
Zip Codes	PIF Count
39520	132
39571	16
39525	1
39532	1
39572	1



Hurricane Wind and Surge Exposure Forecast

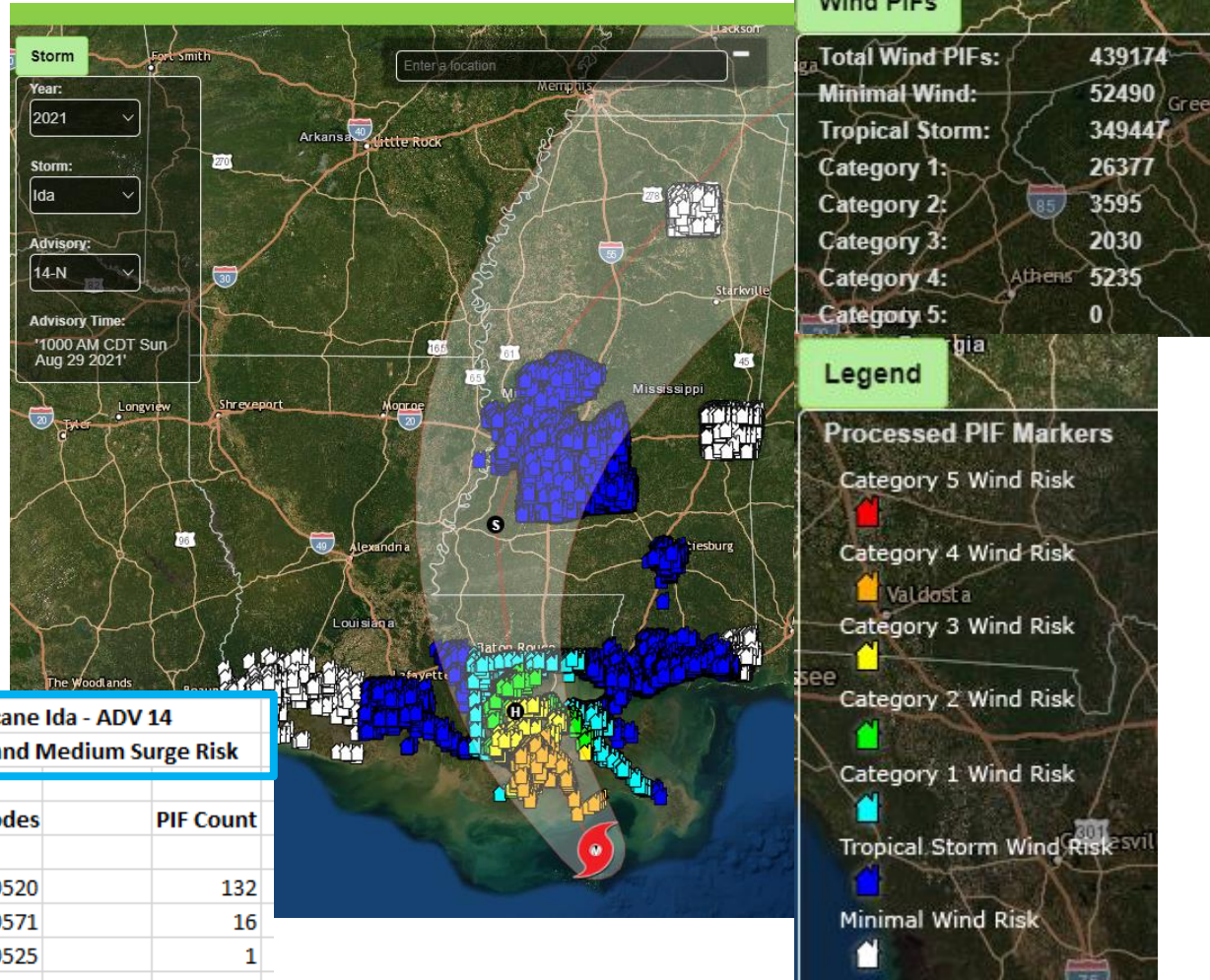
Asset Wind Exposure

Hurricane Ida - ADV 14 Tropical Storm Wind Risk

Zip Codes	PIF Count
39565	75
39532	545
39556	63
39503	526
39574	52
39571	210
39520	395
39560	128
39564	809
39507	159
39525	465
39530	75
39501	77
39531	250
39576	127
39553	111
39540	127
39572	16
39567	1

Hurricane Ida - ADV 14 High and Medium Surge Risk

Zip Codes	PIF Count
39520	132
39571	16
39525	1
39532	1
39572	1



Zip Codes	Cat 1	Tropical Storm	Dwelling
39520	420	0	\$95,454,712
39525	415	0	\$83,303,863
39576	318	0	\$67,867,366
39571	151	131	\$67,326,451
39556	55	0	\$10,869,816
39574	35	2	\$6,626,362
39503	25	594	\$111,379,366
39572	12	0	\$1,644,500
39466	2	13	\$2,442,500
39573	2	0	\$435,000
39561	1	2	\$416,000
39532	0	262	\$54,605,581
39564	0	464	\$94,054,155
39581	0	35	\$6,398,000
39530	0	88	\$16,644,289
39567	0	66	\$13,531,411
39507	0	308	\$64,200,872
39560	0	298	\$56,320,270
39540	0	62	\$12,077,887
39562	0	41	\$7,411,260
39553	0	117	\$20,289,127
39501	0	153	\$29,988,958
39452	0	12	\$1,767,200
39531	0	186	\$38,915,110
39565	0	54	\$10,647,500
39563	0	16	\$2,978,437
39577	0	3	\$441,000
39451	0	2	\$430,000
39367	0	4	\$774,300
39426	0	5	\$922,858
39476	0	5	\$744,600
39425	0	1	\$145,000
			\$927,899,277

Hurricane Ida Forecast - NHC Advisory 14

Max Wind and Storm Surge Timeseries

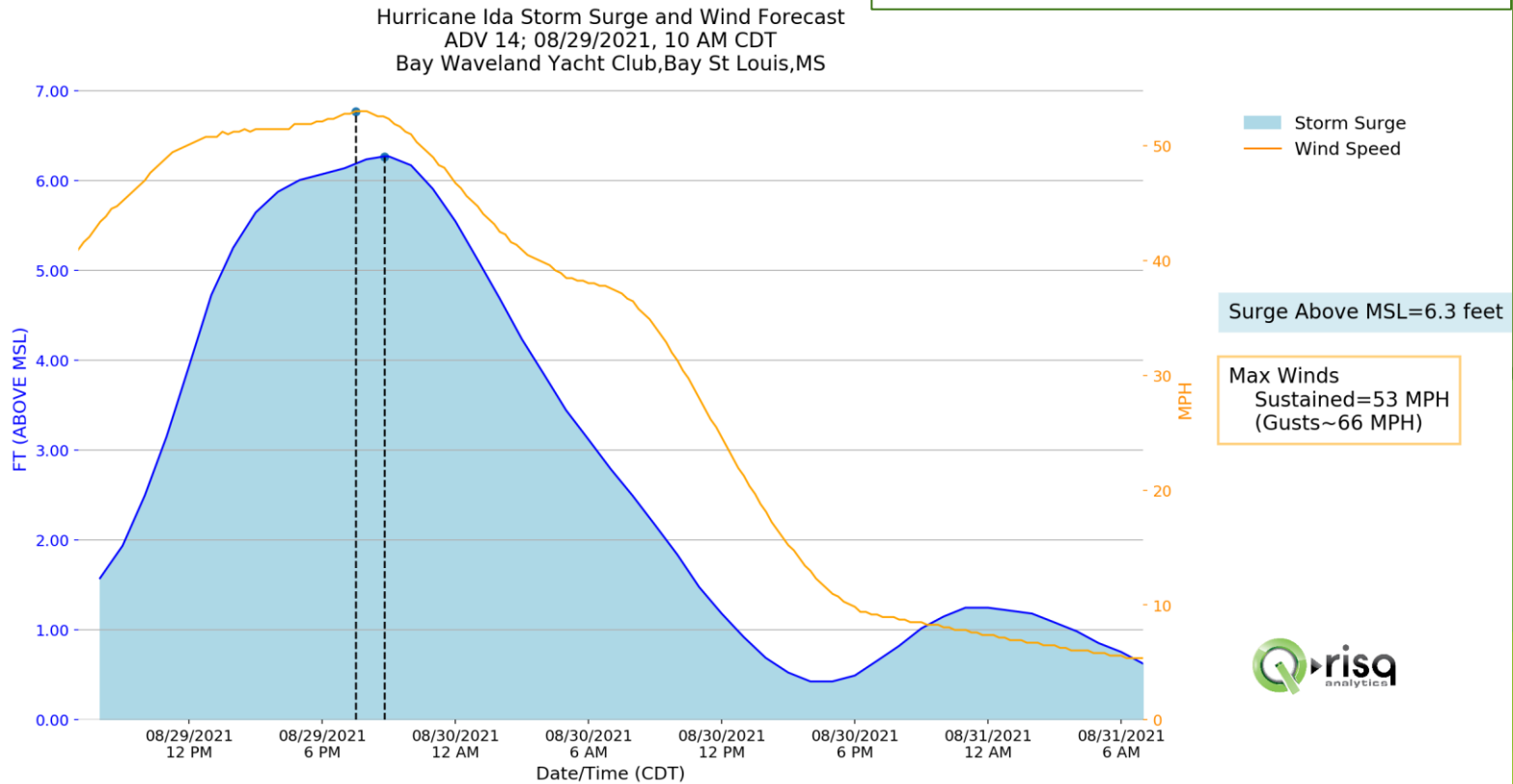
Qrisq Forecast Max Winds and Storm Surge Timeseries graphs give specific information on the timing of hurricane wind and water.

Bay St. Louis Yacht Club

Peak Storm Surge -
6.5 ft @ August 30, 9pm

Peak Winds -
54 mph (gusts ~ 67 mph) @ August 30, 8pm

NOAA/ NHC does not provide location specific timeseries information.

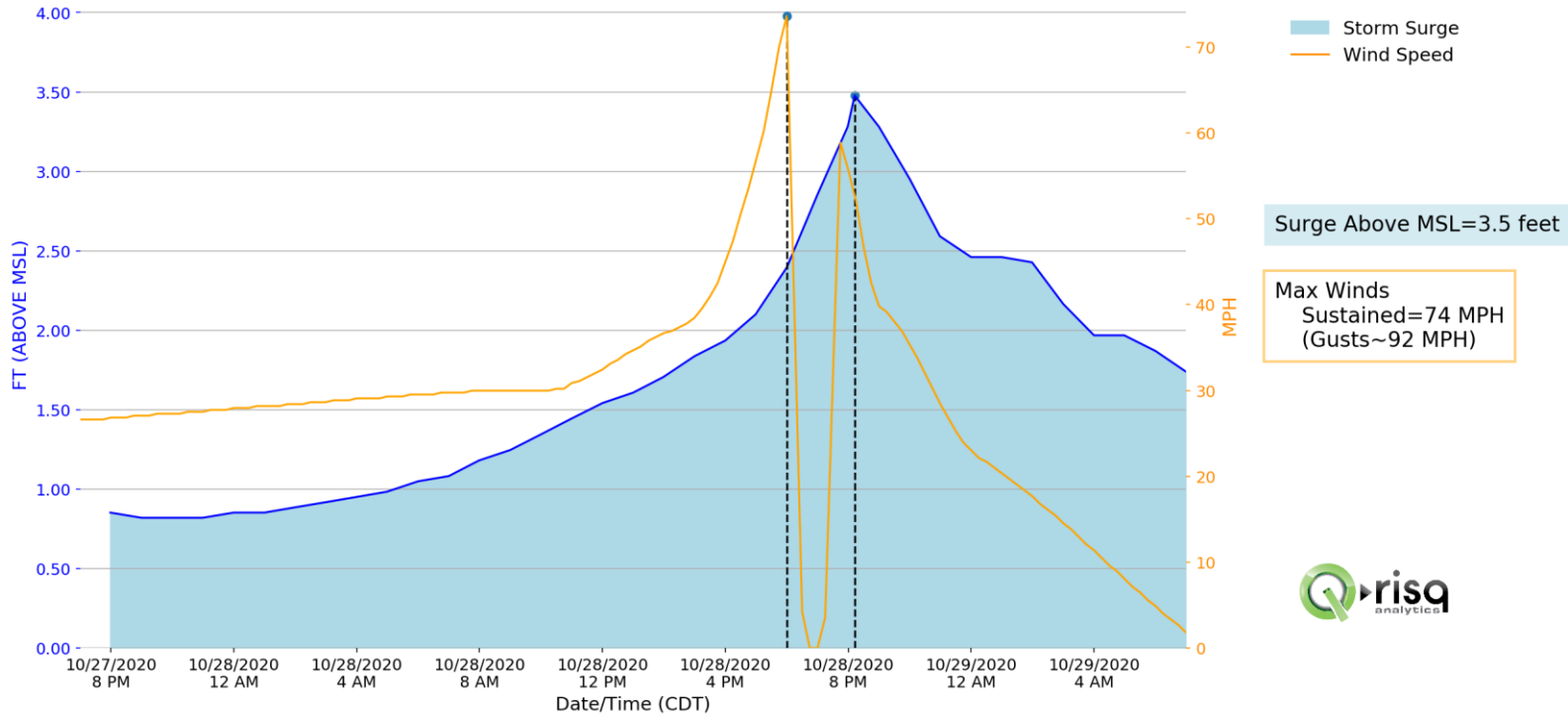


Hurricane Zeta

Wind and Storm Surge Forecast Time Series

Adv 14 (t-18)

Tropical Storm Zeta Storm Surge and Wind Forecast
ADV 14; 10/28/2020, 10 PM CDT
The Rigolets, Slidell, LA



PIF Final Report

Address Specific

Impact Report



Page 1 of 2
Created: 10/28/2021

2019 Hurricane Dorian
290 SUNSET DR, OCRACOKE, NC, 27960
Lat/Lon 35.1136055, -75.9723587

Hurricane Laura was a destructive Category 4 hurricane (Winds: 130-156 mph) that is tied the 1856 Last Island hurricane as the strongest storm on record to make landfall in Louisiana, as measured by maximum sustained winds.

Early on August 27, Laura made landfall near Cameron, Louisiana creating over 20-foot-high storm surge near Grand Chenier, LA. Numerous parishes had severe storm surge flooding and extreme wind damage to homes and buildings. Progressing inland across southwestern Louisiana, Laura produced destructive winds over a wide area, although the storm rapidly weakened as it moved inland. Steady disappearance of its eyewall ensued throughout the day until Laura weakened to a tropical storm about 50 miles east-southeast of Shreveport, LA. The storm caused 33 deaths in Louisiana alone; Texas and Arkansas were struck notably hard as well. Overall, Laura caused more than \$19.1 billion in damage and 77 deaths.

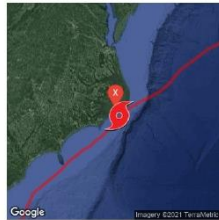
Property Analysis: 290 SUNSET DR, OCRACOKE, NC, 27960

Max Wind Speed: 83 mph

Surge Above Ground: 5.5 ft

Wind Gusts: 104 mph

Cumulative Rainfall: 8 "



Property and Storm Track



Property Satellite Image



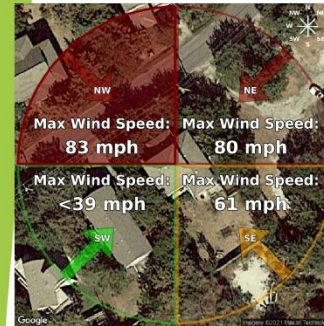
Property Street View

Impact Report



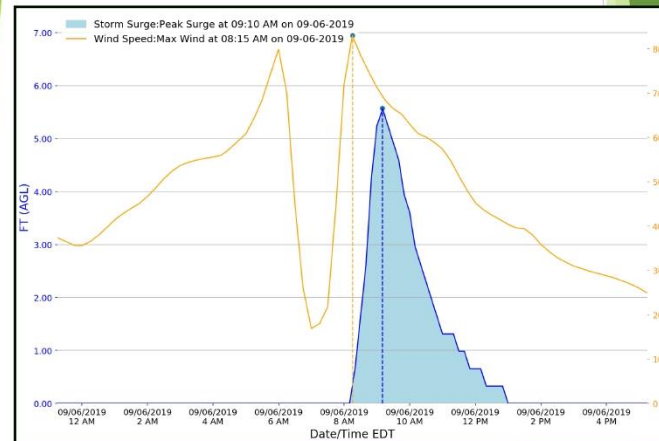
Page 2 of 2
Created: 10/28/2021

2019 Hurricane Dorian
290 SUNSET DR, OCRACOKE, NC, 27960
Lat/Lon 35.1136055, -75.9723587



Property Wind Analysis			
Quadrant	Sustained Winds	Wind Gust	Duration
NE	39 - 80 mph	100 mph	1 h
SE	39 - 61 mph	76 mph	4 h
SW	<39 mph		
NW	39 - 83 mph	104 mph	6 h

Time Series of Sustained Wind Speed and Storm Surge Above Ground



PIF Final Report

Address Specific

Impact Report

2020 Hurricane Zeta
470 Beach Blvd. West, Long Beach, MS, 39560
Lat/Lon 30.3420506, -89.1602325

Hurricane Laura was a destructive Category 4 hurricane (Winds: 130-156 mph) that is tied the 1856 Last Island hurricane as the strongest storm on record to make landfall in Louisiana, as measured by maximum sustained winds.

Early on August 27, Laura made landfall near Cameron, Louisiana creating over 20-foot-high storm surge near Grand Chenier, LA. Numerous parishes had severe storm surge flooding and extreme wind damage to homes and buildings. Progressing inland across southwestern Louisiana, Laura produced destructive winds over a wide area, although the storm rapidly weakened as it moved inland. Steady disappearance of its eyewall ensued throughout the day until Laura weakened to a tropical storm about 50 miles east-southeast of Shreveport, LA. The storm caused 33 deaths in Louisiana alone; Texas and Arkansas were struck notably hard as well. Overall, Laura caused more than \$19.1 billion in damage and 77 deaths.

Page 1 of 2
Created: 10/28/2021

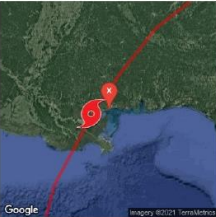


Property Analysis: 470 Beach Blvd. West, Long Beach, MS, 39560

Max Wind Speed: 74 mph

Surge Above Ground: 0.0 ft

Wind Gusts: 93 mph

Cumulative Rainfall: 2 "

Property and Storm Track

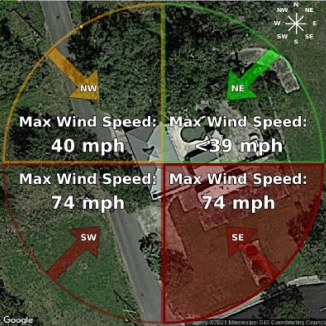
Property Satellite Image

Property Street View

Impact Report

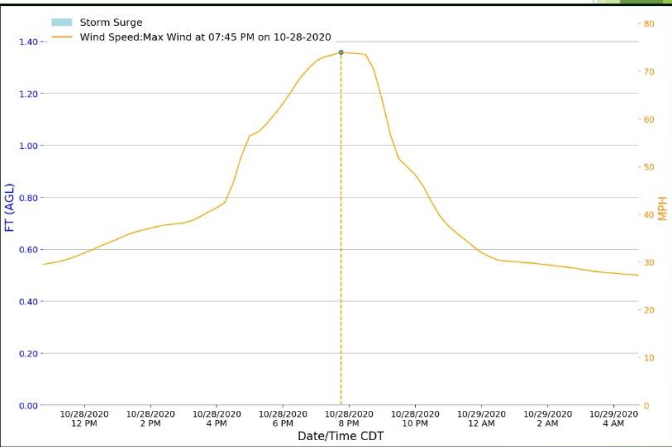
2020 Hurricane Zeta
470 Beach Blvd. West, Long Beach, MS, 39560
Lat/Lon 30.3420506, -89.1602325

Page 2 of 2
Created: 10/28/2021



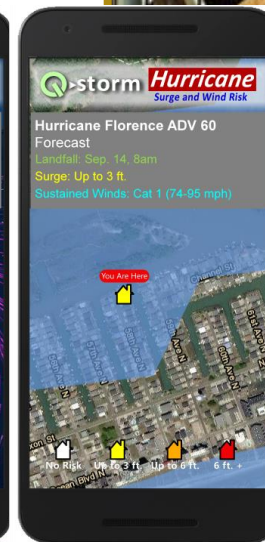
Property Wind Analysis			
Quadrant	Sustained Winds	Wind Gust	Duration
NE	<39 mph		
SE	39 - 74 mph	93 mph	4 h
SW	39 - 74 mph	92 mph	3 h
NW	39 - 40 mph	53 mph	1 h

Time Series of Sustained Wind Speed and Storm Surge Above Ground



We've got an App for that!

What if you could connect with property owners before the storm, communicating wind and storm surge risk at their address?



METADATA	KEYWORDS
f/2.8	1/600
AWB	ISO 80
677 x 552	364 KB 72 ppi
Dimensions (in inches)	9.4" x 7.7"
Resolution	72 ppi
Bit Depth	8
Color Mode	RGB
Color Profile	sRGB IEC61966-2.1
IPTC Core	
Camera Data (Exif)	
Exposure Mode	Auto
Brightness Value	8.33
Focal Length	3.9 mm
Flash	Did not fire, compulsory mode
Metering Mode	Pattern
Subject Area	1295; 967; 699; 696
White Balance	Auto
Scene Capture Type	Standard
Sharpness	Hard
Sensing Method	One-chip sensor
Make	Apple
Model	iPhone 4
GPS	
Latitude	37.58,26N
Longitude	122.31,17W
Altitude	4.47 m
Time Stamp	7/11/12, 5:33:31 PM
Image Direction Ref	T
Image Direction	110533/554



Contact Information

www.qrisq.com

Scott Bolton, President

sbolton@qrisq.com

(228) 242-0026

Elizabeth Valenti, Lead Engineer

evalenti@qrisq.com

(985) 641-8661 x6