

# **Data Needs in Natural Hazard Risk Assessments**

## **Flood Risk Workshop**

**NASA/CSDMS**

**October 2, 2018**

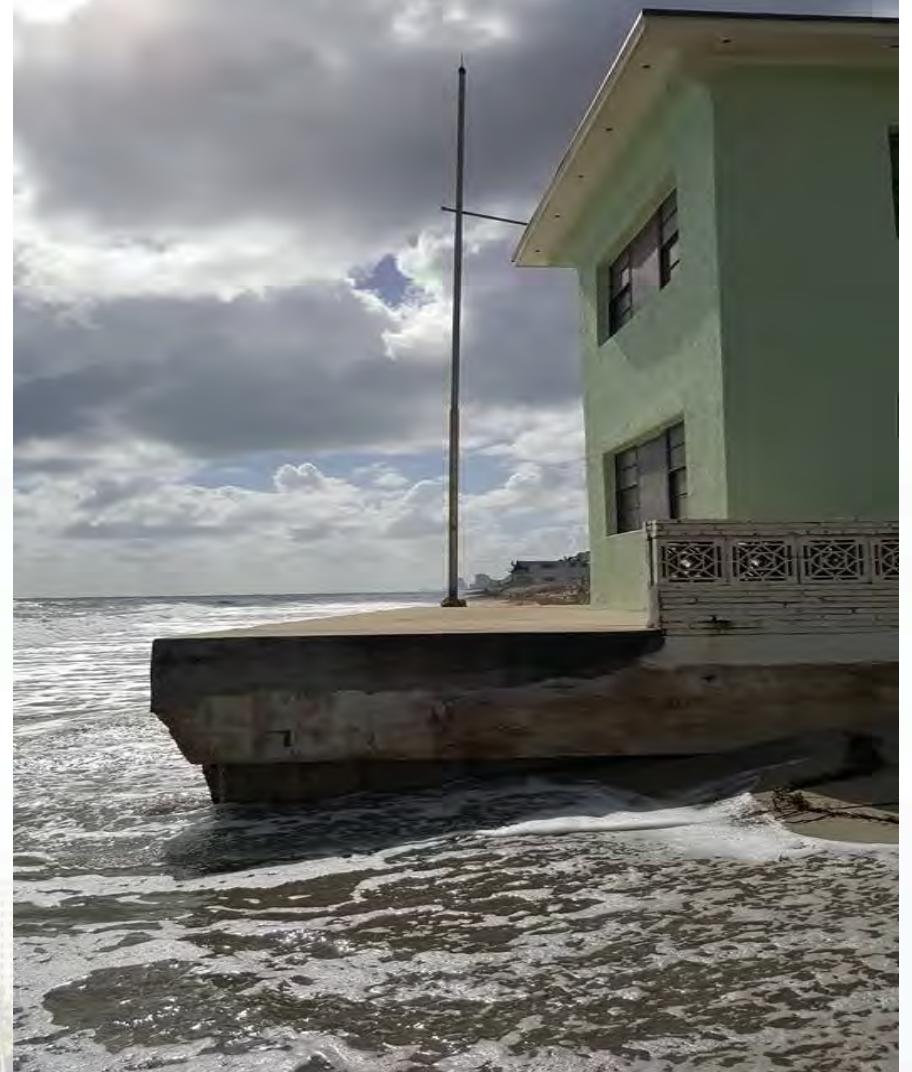


**COASTAL RISK CONSULTING**



# Introduction to Presentation

1. What's the mission? Save lives and protect property – increase resilience;
2. Describe what Coastal Risk does in the US and what data sets we rely on;
3. Discuss challenges to taking our system global;
4. Discuss how new technologies, like IoT, AI and real-time all benefit from pre-event modeling.



# “Bad News” is Not Good Enough

- If your goal is saving lives, protecting property and greater resilience, then, “bad news” isn’t good enough;
- Even the “best bad news” alone won’t accelerate “bottom up” resilience investments, without access to capital and hands-on guidance.
- Premise that “top down” (governments) will save everybody from floods and storms is false and actually slows down resilience and adaptation investments and success.

USACE Sea Level Change Curve Calculator (2017.55)

Project Name:

Select Gauge:

Scenarios Source:

Output Units:  Feet  Meters

Critical Elevation #1 (ft):

Critical Elevation #2 (ft):

SLC Rate [?](#) NOAA 2006 Rates

FEMA BFE (ft): [?](#) [Information](#)  (NAVD88) [Search for BFE here](#)

Project Start Year:

Interval Year:

Project End Year:

Output Datum:  LMSL  (NAVD88)

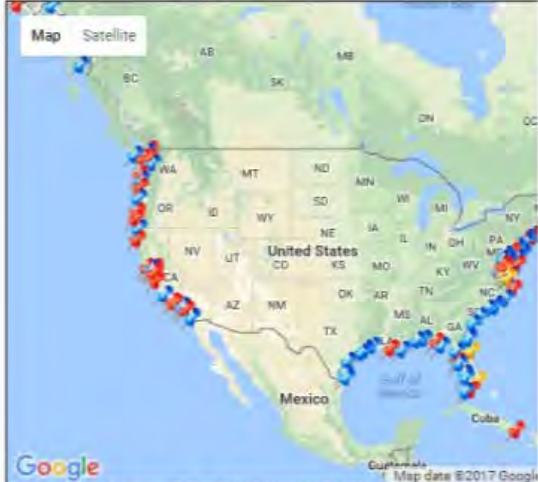
User's Index (ft):  Description:

Datum Shift to MSL:

EWL Type:  Highs  Lows

EWL Source:  NOAA (GEV)  USACE (Percentile)




Plot EWL/BFE/Tides:  Select Curve:



Map Satellite

Click on project area. The nearest gauge/grid point will be used to determine the selected Scenario Source

\*\*\* note - there may be factors other than proximity to consider when \*\*\*

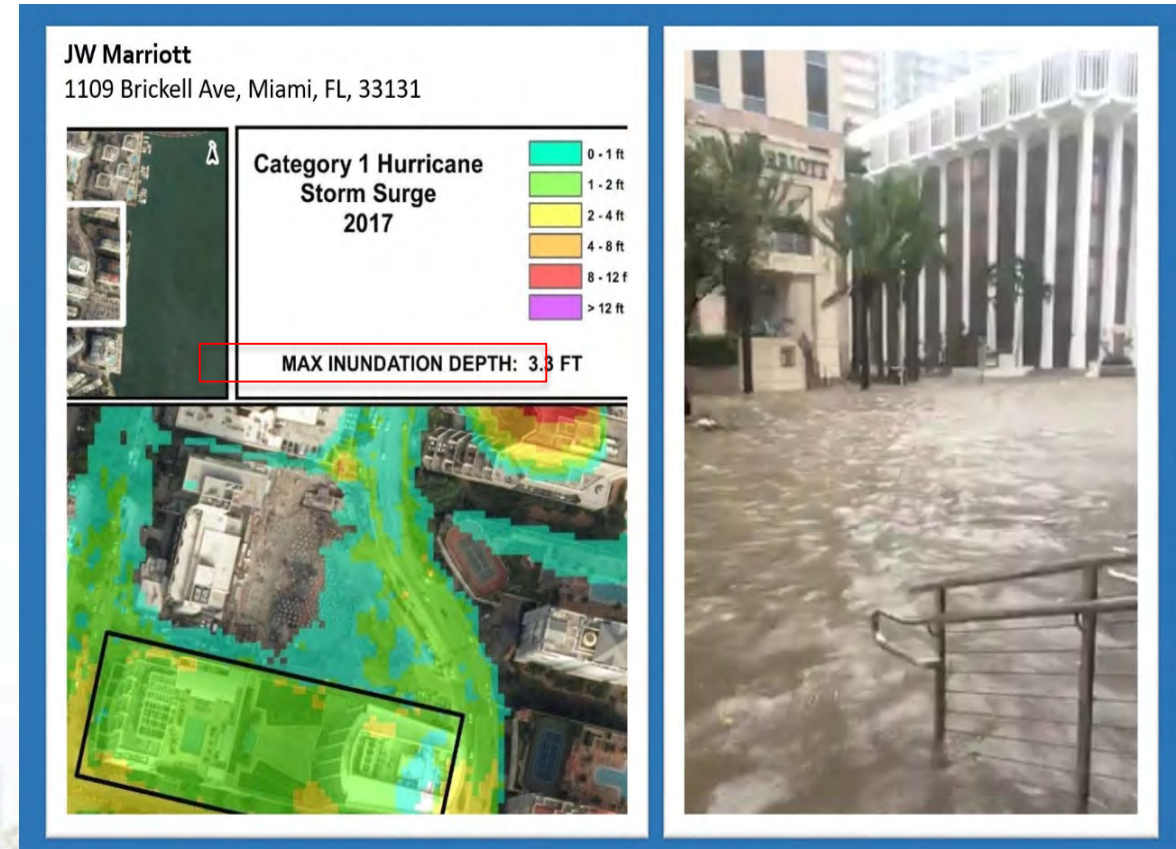
Compliant   
Non-Compliant   
Inactive 

## NOAA Sea Level Rise Calculator

# What Has Coastal Risk Created?

- Flood and natural hazard risk modeling **and** risk communication “engine”;
- “Engine” produces automated risk reports and risk scoring for every property in the US;
- Includes four types of flood risks: Riverine; Heavy Precipitation; Storm surge; Tidal/sea level rise;
- 5 natural hazards added: wind, tornado, wildfire, earthquakes, and tsunamis;
- Extreme heat stress, degree cooling days and drought being added.

Hurricane Irma, Brickell Ave., Miami, FL

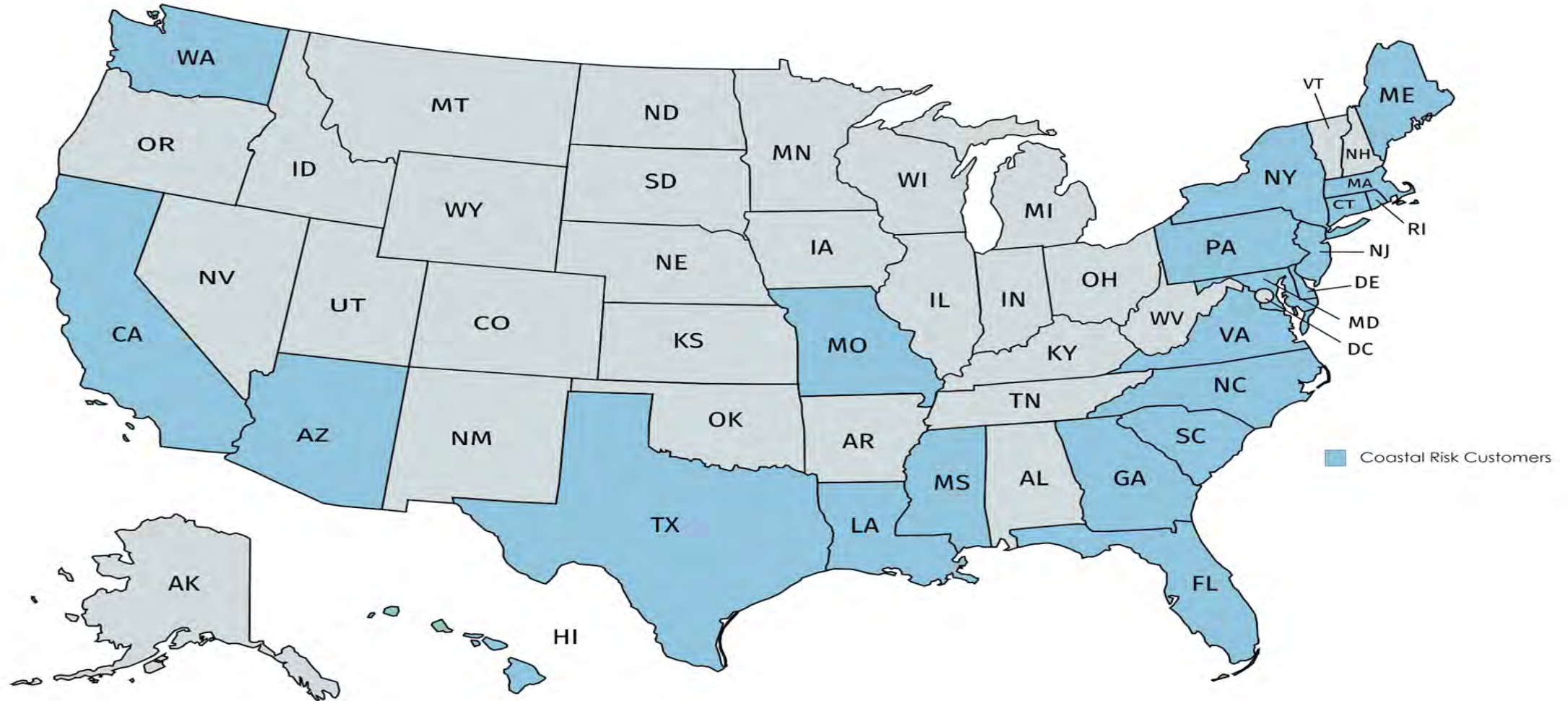


Coastal Risk Model

Actual Flooding




# States Where Coastal Risk Flood Reports Have Been Sold



# “Engine” Produces Risk Score Spreadsheets

## COASTAL RISK - HOLISTIC FLOOD RISK ASSESSMENT

Address	CRC Annual Flood Chance	Tidal Flood Risk	Storm Surge	Heavy Rainfall Flood Risk	FEMA Flood Risk	Hurricane Strike
Miami -City Hall	1%	LOW	HIGH	HIGH	AE	23%
Miami Beach - City Hall	1%	LOW	HIGH	HIGH	AE	23%
Coral Gables residential property	1%	LOW	LOW	HIGH	AE	23%
Palm Beach - Everglades Club	1%*(14%)	LOW	HIGH	MEDIUM	AE	16%
Naples Beach Hotel & Golf Club	1%	LOW	HIGH	HIGH	AE	15%
Tampa - 4003 S. Westshore Drive	1%	LOW	HIGH	HIGH	AE	7%
Jacksonville - Chamber of Commerce building	1%	LOW	HIGH	HIGH	AE	4%
Charleston -Port BMW storage area	33%	MEDIUM	HIGH	MEDIUM	VE	7%
Annapolis - Public docks	1%	MEDIUM	HIGH	MEDIUM	AE	2%
North Carolina - Asheville Riverine	1%	LOW	LOW	LOW	AE	0%
North Carolina - Winton property	0%	LOW	HIGH	LOW	X	3%
Houston - Addicks Reservoir neighborhood	1%	LOW	LOW	HIGH	X500	15%
Boston - Constitution Center	8%	MEDIUM	HIGH	MEDIUM	X	5%
Seattle - Pier 54	1%	LOW	LOW	LOW	X	0%
San Francisco - Palace of Fine Arts	1%	LOW	LOW	MEDIUM	D†	0%
San Diego - Convention Center	0%	LOW	LOW	MEDIUM	X	0%
Jersey City - Exchange Place	1%	LOW	LOW	LOW	AE	1%
Thomas Boyd Hall, Baton Rouge, LA 70802	0%	LOW	LOW	LOW	X	0%
	This is the CRC calculated risk of flooding at the property location using its proprietary risk modeling.	LOW: 0 days of tidal flooding in 2018. MODERATE: 1-10 days of tidal flooding in 2018. HIGH: Over 10-days of tidal flooding in 2018.	LOW: At risk of Category 5 storm surge, only. MODERATE: At risk of Category 3 storm surge or above. HIGH: At risk of Category 1 storm surge or above.	LOW: No areas of flooding, or brief areas of ponding. MODERATE: Areas of ponding lasting several hours. HIGH: Areas of ponding lasting several days.	LOW: Areas that are in Zone X. MODERATE: Areas that are in Zone X500 or Zone D. HIGH: Areas that are in A Zones (A, AO, AE, AH, ASB etc.), V Zones (V, VE)	Annual chance of a Category 1 Hurricane at this property from the National Hurricane Center.

\* A Seawall is limiting the Annual Flood Chance to 1%

† FEMA Zone D is an undetermined, but possible Flood Hazard

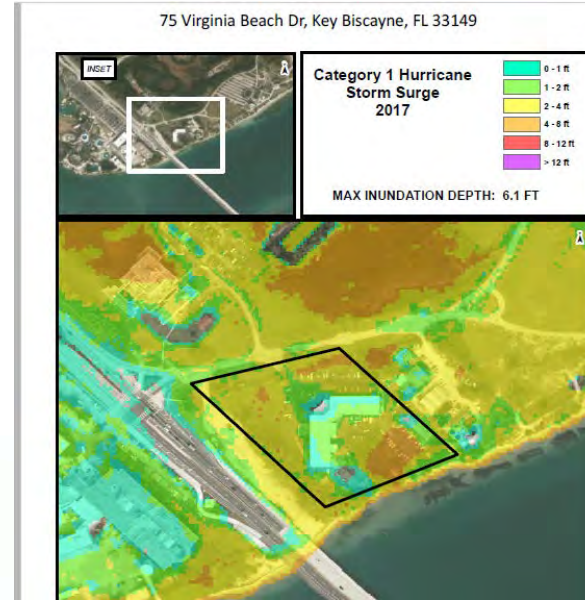
# “Engine” Produces Risk Reports



## FLOOD INSURANCE RISK REPORT™

75 Virginia Beach Dr, Key Biscayne, FL 33149  
November 02, 2017

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# “Engine” Produces Damage/Economic Loss Assessments

- Damage & Economic Loss Estimates at Property Level;
- Estimate damage potential for flood scenarios: riverine, heavy precipitation, storm surge, and tidal flood;
- Establish cost of repair; total cost of the damaged property, as functions of inundation depths and type of inundation, i.e., salt water vs. fresh water, etc.
- Business Interruption



# FEMA Flood Maps Aren't Good Enough

- <http://insurancethoughtleadership.com/fema-flood-maps-arent-good-enough/>
- FEMA Flood Maps aren't good enough for “buy, sell, protect, and insure decisions.”
- No heavy rainfall model
- No tidal flood/sea level rise model
- Riverine model not accurate enough
- Storm surge flood heights lower than NOAA SLOSH model



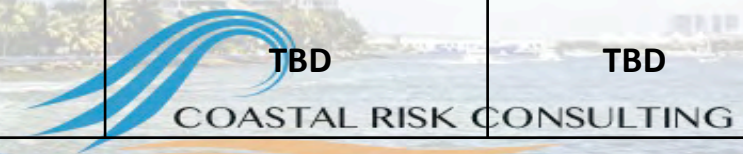
**Hurricane Florence 5-days later**

# Challenges to Taking Our System Global

- In the US, free 3m resolution LiDAR DEMs are widely available, as well as 1m LiDAR from local government;
- Outside of the US, free high-resolution Lidar data is scarce and free worldwide data sources such as NASADEM's 30-meter resolution product are too coarse for accurate modeling.
- NASADEM consists of a collection of sources; it is difficult to discern accuracy at a given location.
- To scale our company globally, we intend to purchase 4m resolution DTMs based on Pleiades stereo imagery for use with our riverine, heavy rainfall, storm surge and tidal flood modeling. These datasets are expensive and, the costs slow down the process.
- In the future, an option for model verification would be to observe surface water from satellite sensors daily. At present, Landsat does not have the spatial resolution (up to 15 meters) or the temporal resolution (16 days) to provide conclusive flood mapping at the property level.

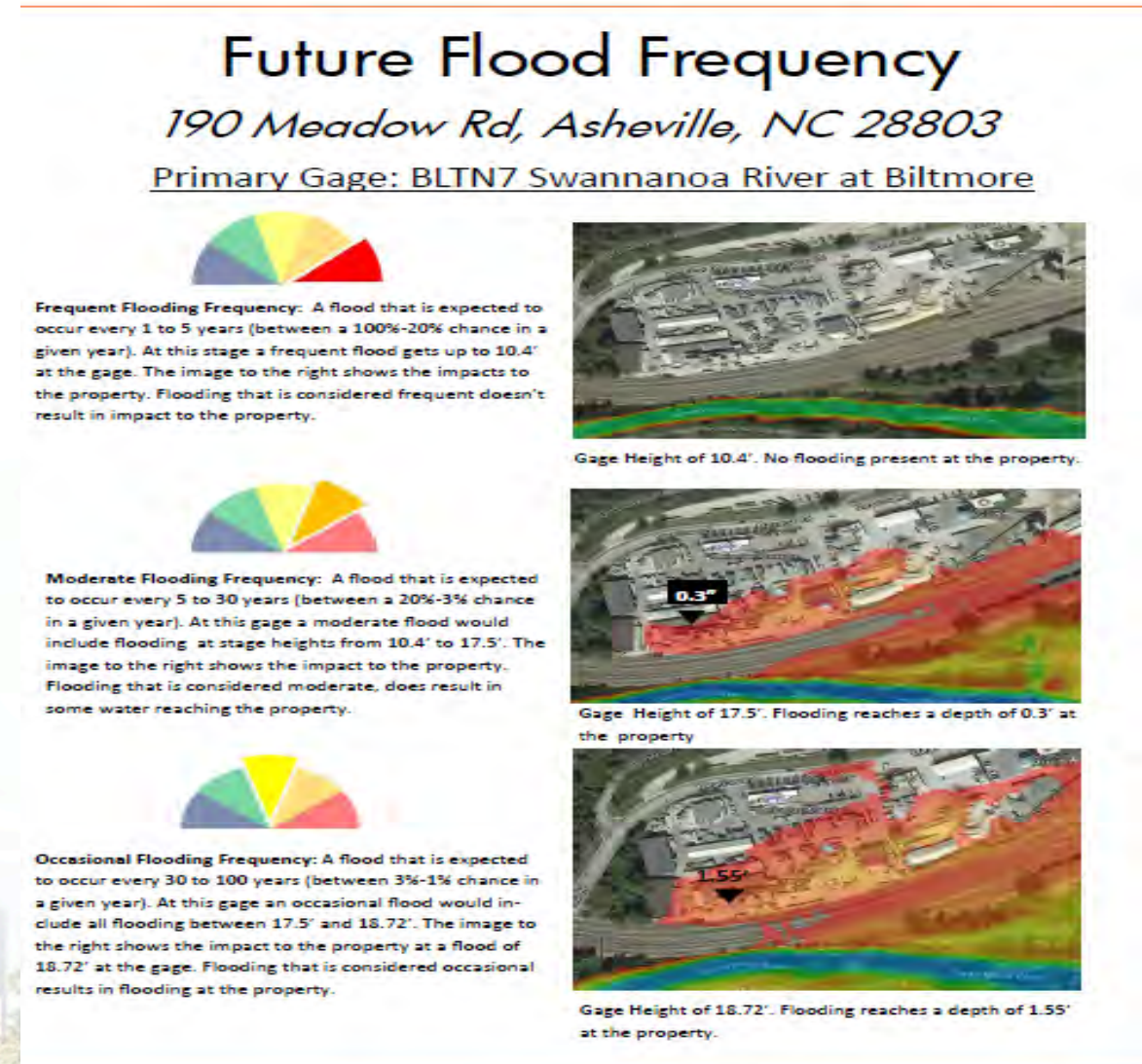
# Going Global - Peru Example - Data Sets and Quality

Datasets	Sources of Data	Availability	Quality
LIDAR/DEM	AIRBUS <a href="https://www.intelligence-airbusds.com/worlddem/">https://www.intelligence-airbusds.com/worlddem/</a>	YES	4M, 8M, 12.5M
Property Boundary Data	Local jurisdictions	Local Level	TBD
Riverine Model(s)	European Commission <a href="https://global-surface-water.appspot.com/">https://global-surface-water.appspot.com/</a>	YES	25M
Tide Gauge Data	UNESCO <a href="http://www.ioc-sealevelmonitoring.org/">http://www.ioc-sealevelmonitoring.org/</a>	YES	Hourly
Storm Surge Model	N/A	N/A	N/A
Sea Level Rise Model	Coastal Risk and Scientific Literature	Interpolation	TBD
Soils and Groundwater	ISRIC <a href="https://www.soilgrids.org">https://www.soilgrids.org</a>	YES	25M
Peru specific research, Modeling	Universities, USGS, NOAA, UN reports	TBD	TBD



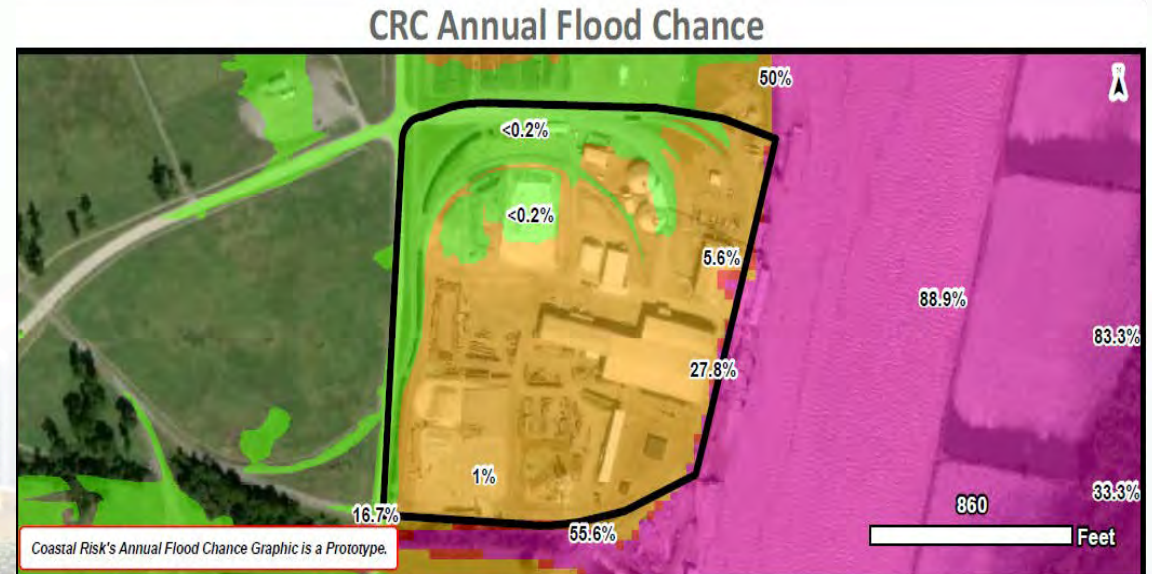
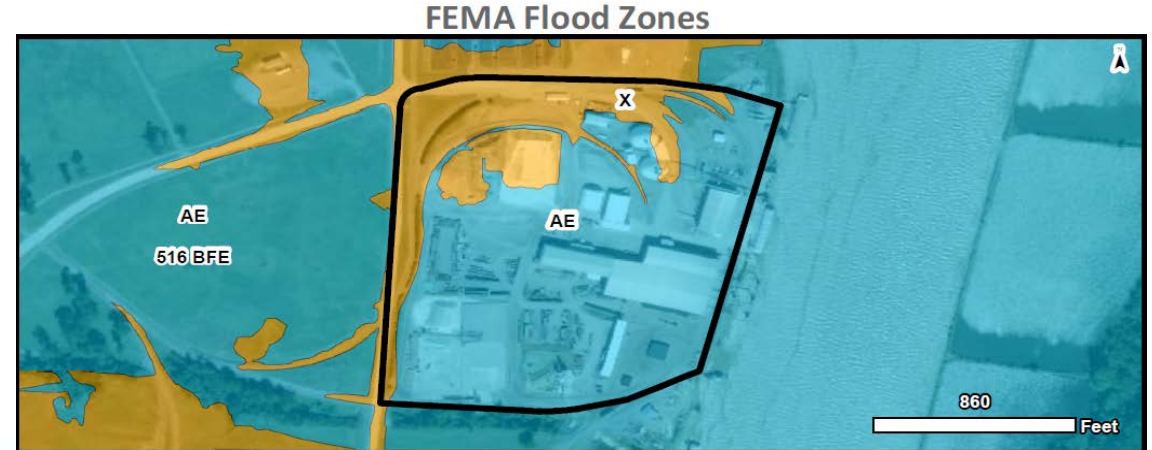
# Going Global – No “FEMA” Flood Map Equivalent Available

- Estimating flood risks and frequencies where no flood maps exist;
- European Commission 30-year satellite data;
- Riverine flood modeling – how to do it fast and cost-effectively?
- New technologies available:
  - RiverTrak™; HydroBid (<https://www.iadb.org/en/node/20506>)
  - GIS Flood Tool <https://pubs.er.usgs.gov/publication/ofr20161038>
  - additional analysis using detailed engineering tools (HEC-HMS and HEC-RAS)



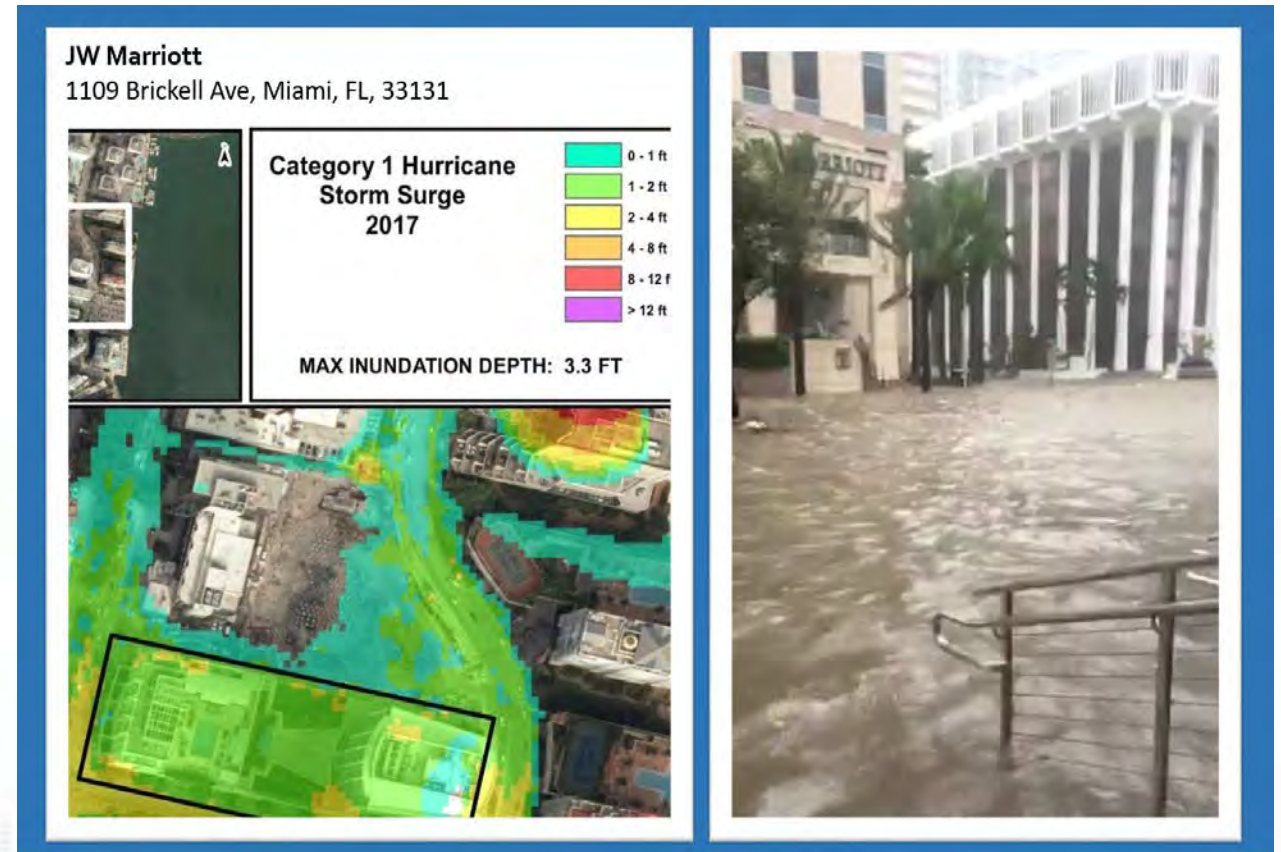
# Coastal Risk's "4-Cylinder Flood Model" – #1 Riverine Flood Model

- Re-calculates flood return frequencies based on LiDAR elevations in FEMA flood maps;
- Downscaling to Property Boundary or GIS Polygon;
- More accurate depiction of flood risks on a property-by-property basis;
- Uses best available, high-resolution elevation data and proprietary algorithms.



# Cylinder #2 - Storm Surge Model

- Uses NOAA SLOSH Grids;
- DEMs/LIDAR;
- Nearest Tide Gauges;
- Sea Level Rise Curves for Future Surge Heights;
- Downscaling to Property Boundary or GIS Polygon;
- Shows Surge Heights in Maximum Inundation Above Ground Level (AGL) and NAVD 88;
- Shows Annual Strike Frequency from National Hurricane Center;
- Proprietary Algorithms.



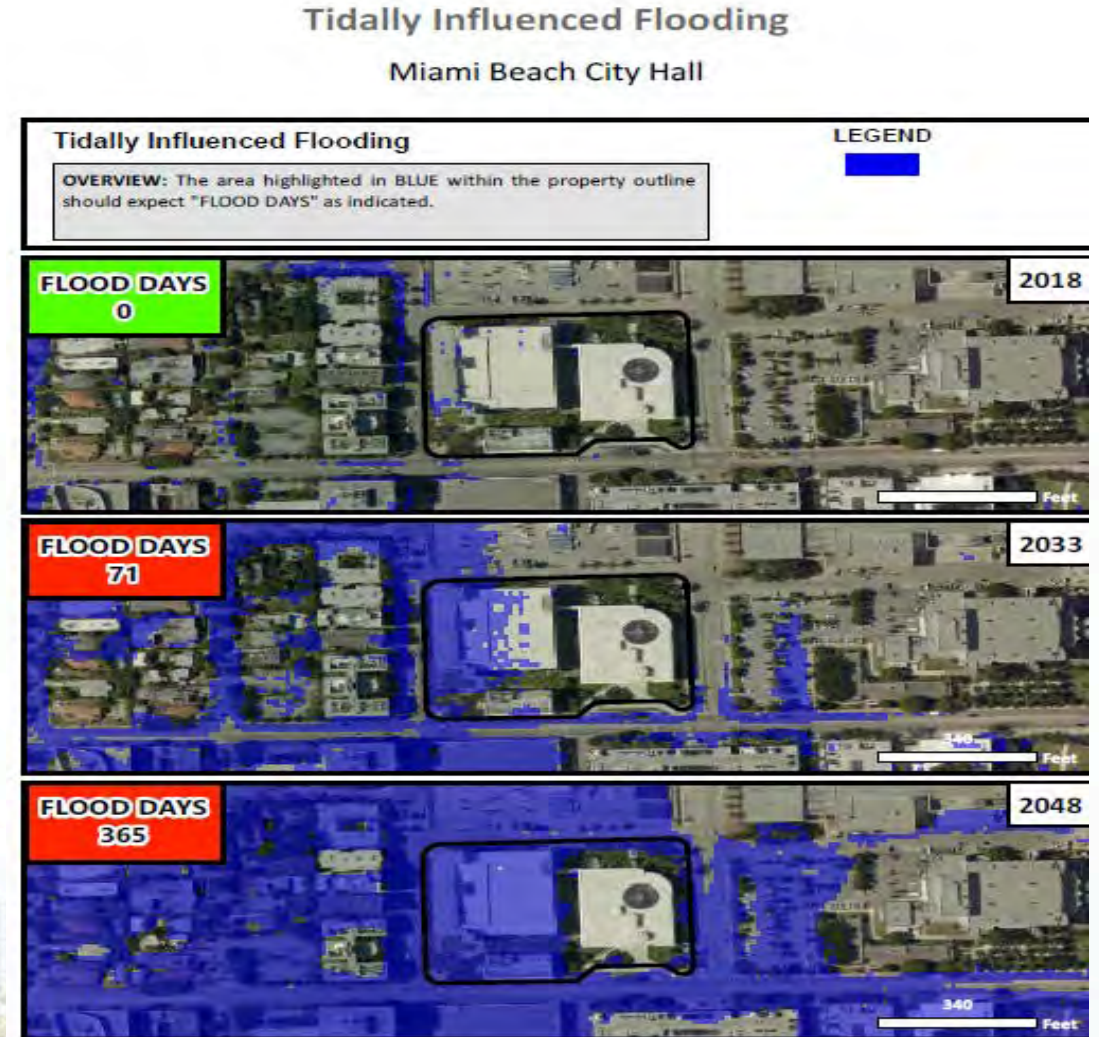
Coastal Risk Model

Actual Storm Surge

Hurricane Irma Brickell Ave., Miami, FL

# Cylinder #3 - Tidal/Sea Level Rise Model

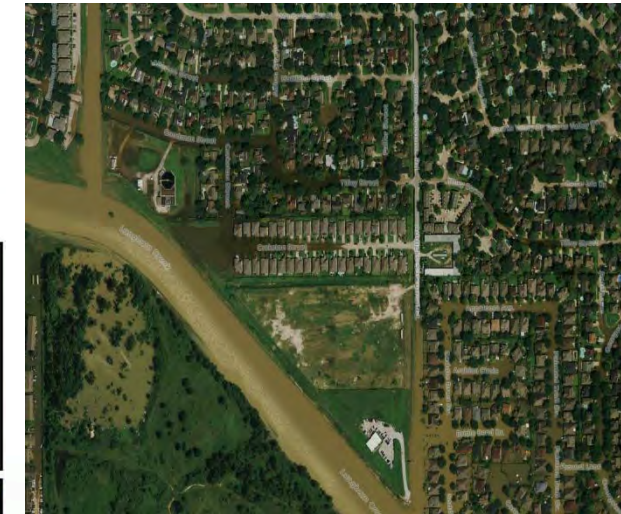
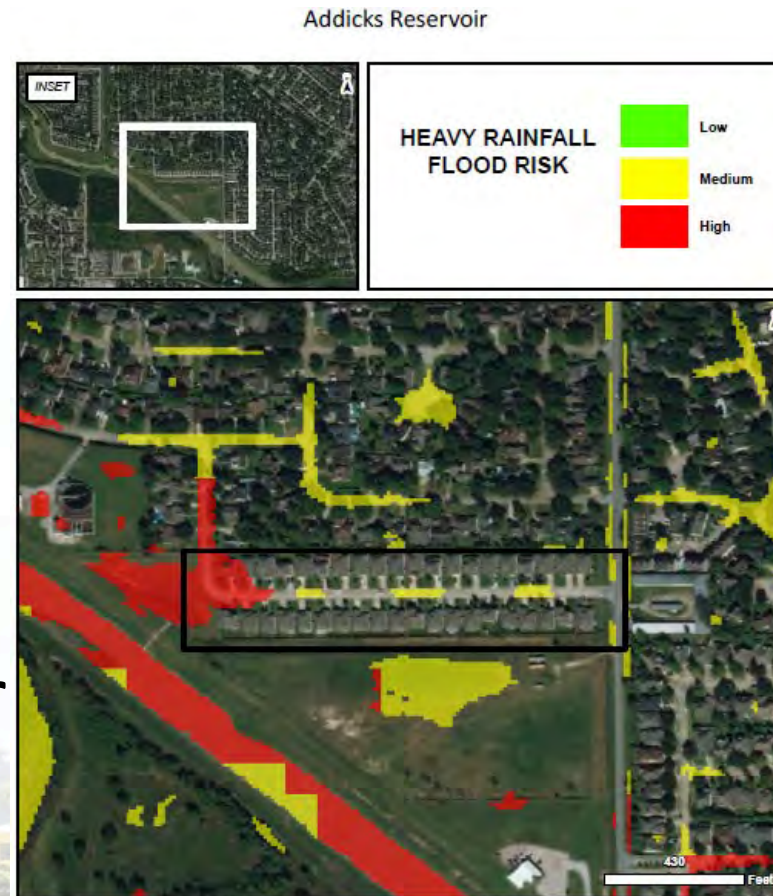
- Calculates the number of tidal flood days over the property, now, and into the future;
- Closest Tide Gauge;
- DEM/LIDAR;
- Property Boundary or Polygon;
- NOAA Regional Sea Level Rise Curve;
- Shows areal extent of tidal flooding on property;
- Proprietary algorithms.





# Cylinder #4 - Precipitation Flood Model

- Use Flow, Flow Direction, Sink, Watershed, and Zonal Fill modeling;
- DEM/LiDAR;
- Property Boundary Data or Polygons;
- Drainage Layers, Soil Type, Soil Runoff and Groundwater Depth;
- Proprietary Algorithms.



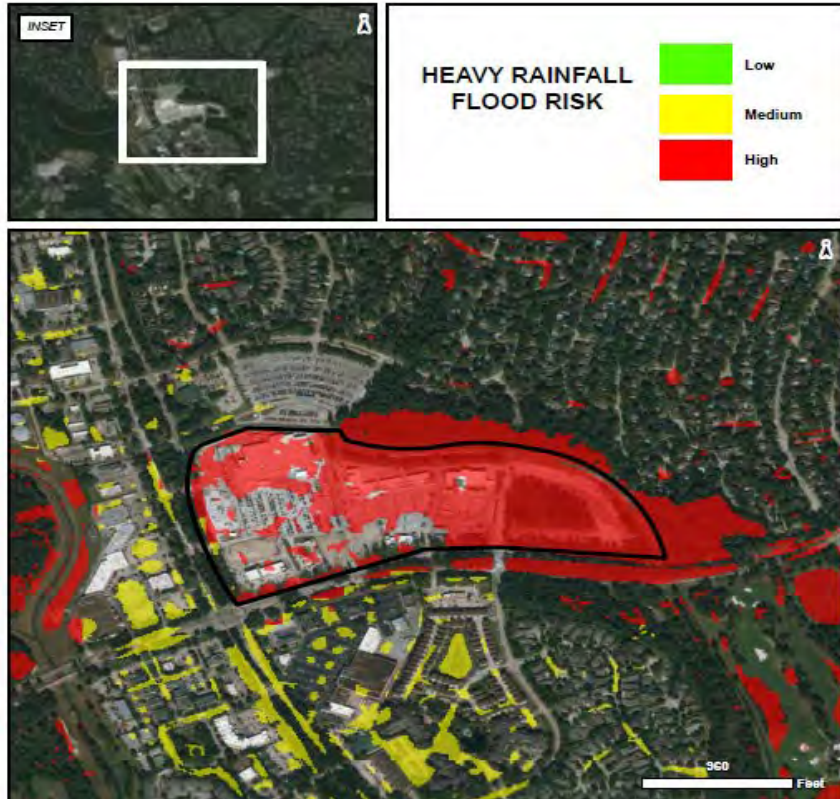
Actual flooding  
Hurricane Harvey  
Houston, TX

Coastal Risk Neighborhood  
Heavy Rainfall Model

# Coastal Risk's Heavy Rainfall Model

Heavy Rainfall Flood Risk

Main Street Kingwood

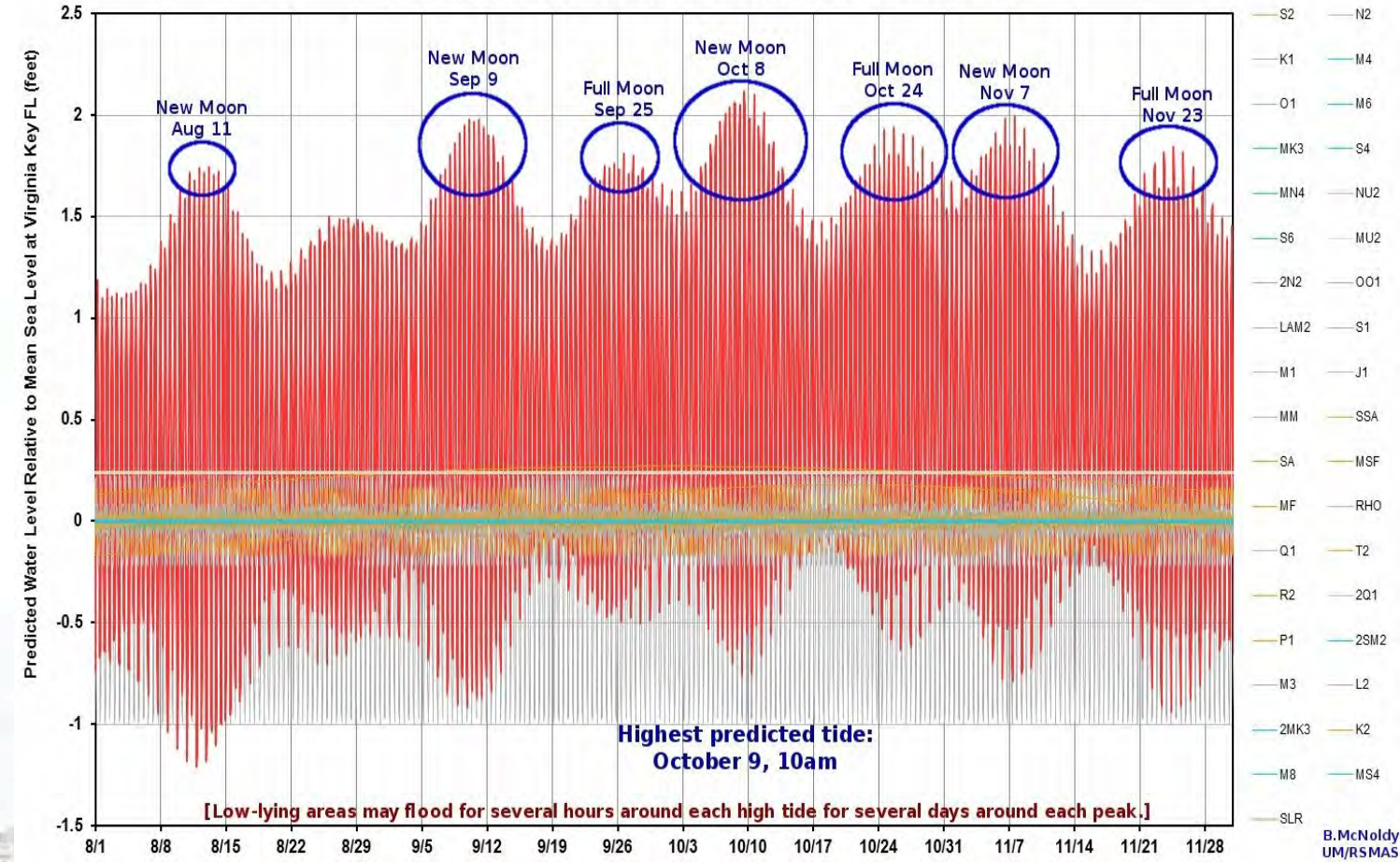


Coastal Risk Heavy Rainfall Model

Hurricane Harvey actual flooding, Kingwood, TX

# Coastal Risk Models “King Tides” – a “Threat Multiplier”

Hourly Water Level Predictions at Virginia Key, FL for 2018  
(includes contributions from the standard 37 harmonic constituents + SLR)



The dates of annual extreme tides overlap with the Atlantic Hurricane Season.

From Dr. Brian McNoldy, University of Miami; Coastal Risk Science Advisor

# Model Compares NOAA SLOSH and FEMA BFE

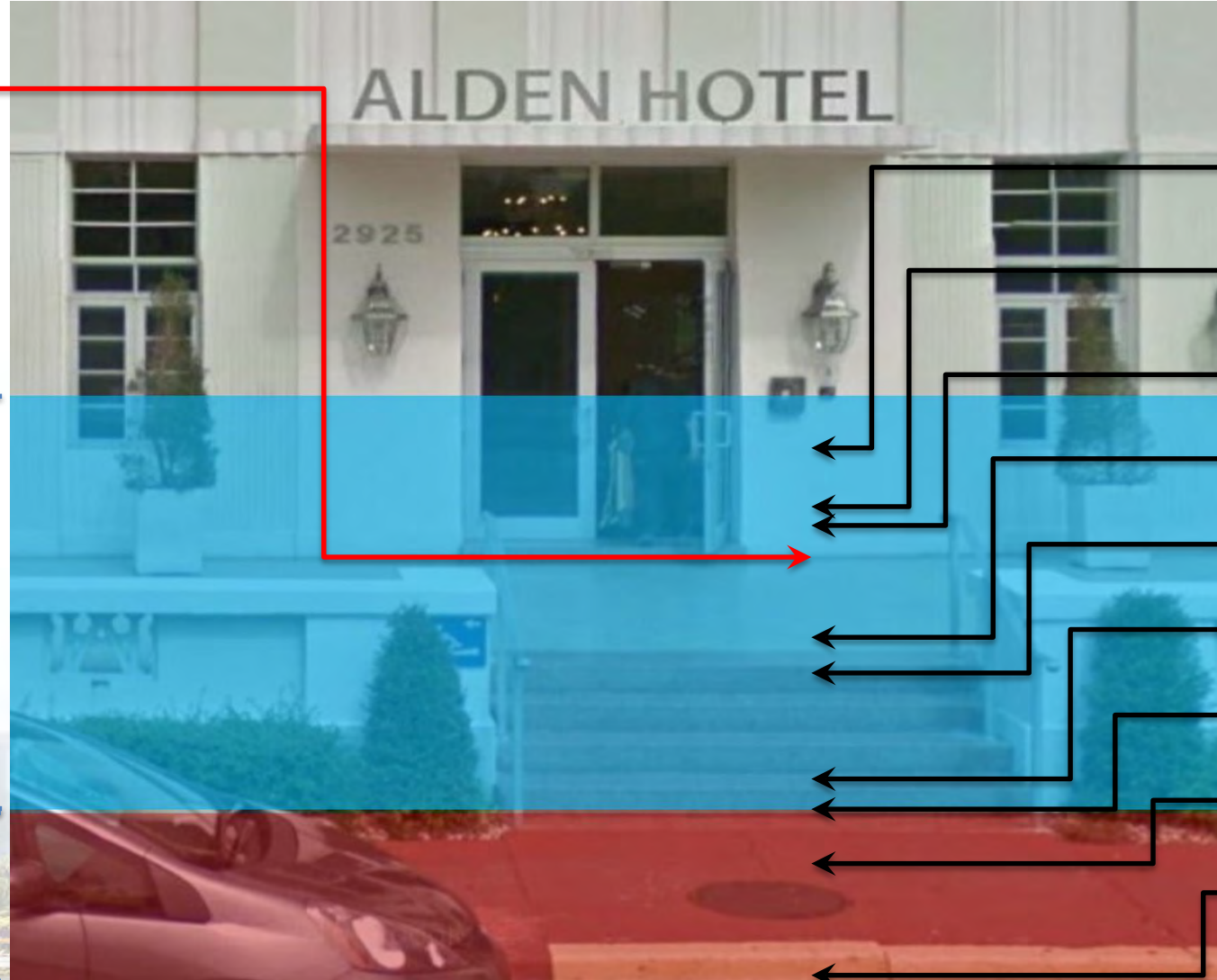
## FEMA 100-year Flood Plain

Base Flood Elevation  
(6.44 ft. Elevation NAVD 88)

All other elevations calculated by  
Coastal Risk models

Extreme weather-  
related flooding

King tide / Sea-level  
rise flooding



Category 5 High Tide  
(8.6 ft. Elevation NAVD 88)

1 ft. Above  
Base Flood Elevation  
(7.44 ft. Elevation NAVD 88)

Category 4 High Tide  
(6.6 ft. Elevation NAVD 88)

Category 3 High Tide  
(4.4 ft. Elevation NAVD 88)

Category 2 High Tide  
(4 ft. Elevation NAVD 88)

Category 1 High Tide  
(3 ft. Elevation NAVD 88)

King Tide 2045  
(2.74 ft. Elevation NAVD 88)

King Tide 2030  
(2.12 ft. Elevation NAVD 88)

King Tide 2016  
(1.66 ft. Elevation NAVD 88)

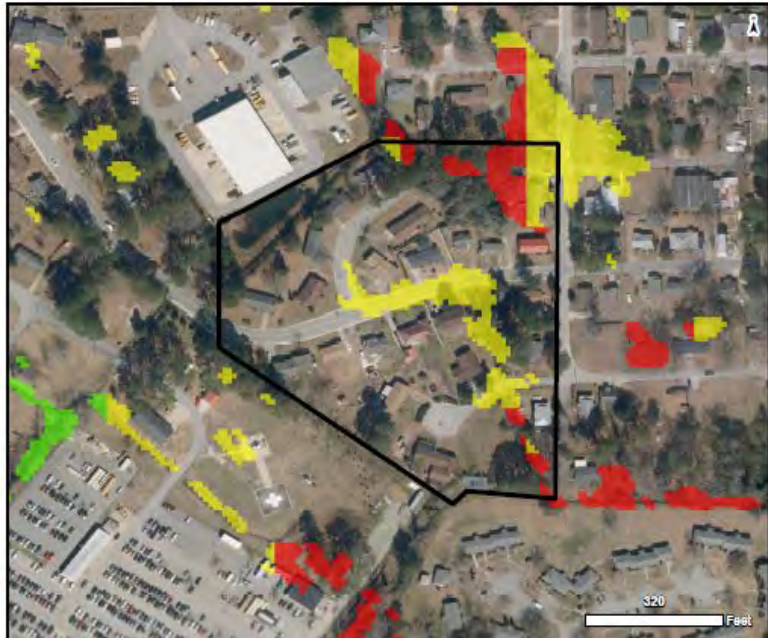
Indian Creek (80 feet away)

# Hurricane Florence – New Bern, NC

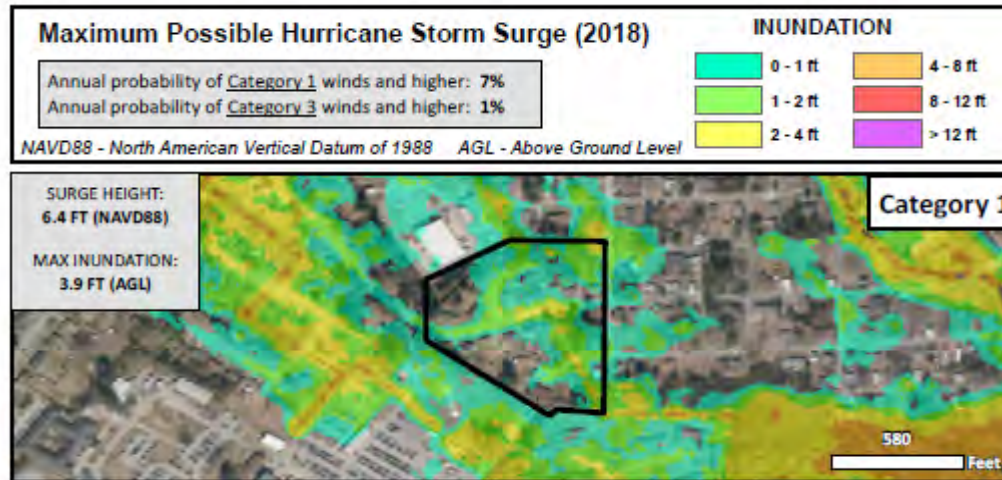


## Heavy Rainfall Flood Model

Heavy Rainfall Flood Risk  
New Bern, NC



## Storm Surge New Bern, NC



Cat 1 Storm Surge  
Model and Drone Photo  
of Actual Flooding

3.9 feet Above Ground  
Level

# Reports Also Include 5 Natural Hazards

## Five Natural Hazard Risk Meters:

1. WIND
2. TORNADOS
3. EARTHQUAKES
4. WILDFIRES
5. TSUNAMIS

### Risk Categories

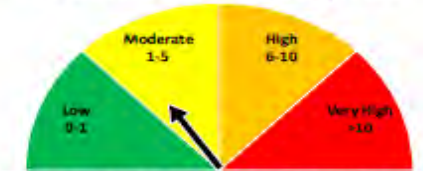
Coral Gables, FL

#### Wind Zone: III



Design building code requirements can be located at <https://hazards.atcouncil.org>

#### Tornado Risk: 2 per year



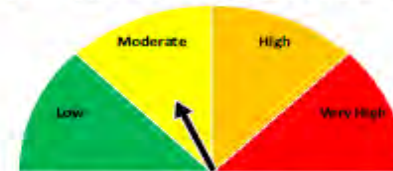
This area (1000 sq. mi.) records 1.9 tornados per year and is considered Moderate risk

#### Community Rating Score: 7



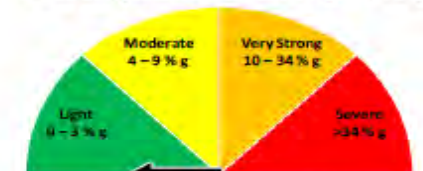
This property is eligible for a 15% reduction in flood insurance

#### Wildfire Potential: Moderate



Wildfire Hazard Potential (WHP) is a qualitative measure of wildfire likelihood and intensity

#### Earthquake Intensity: 0% g



This area is likely to experience No ground shaking in the next 50 years

#### Special Flood Hazard Area (SFHA):

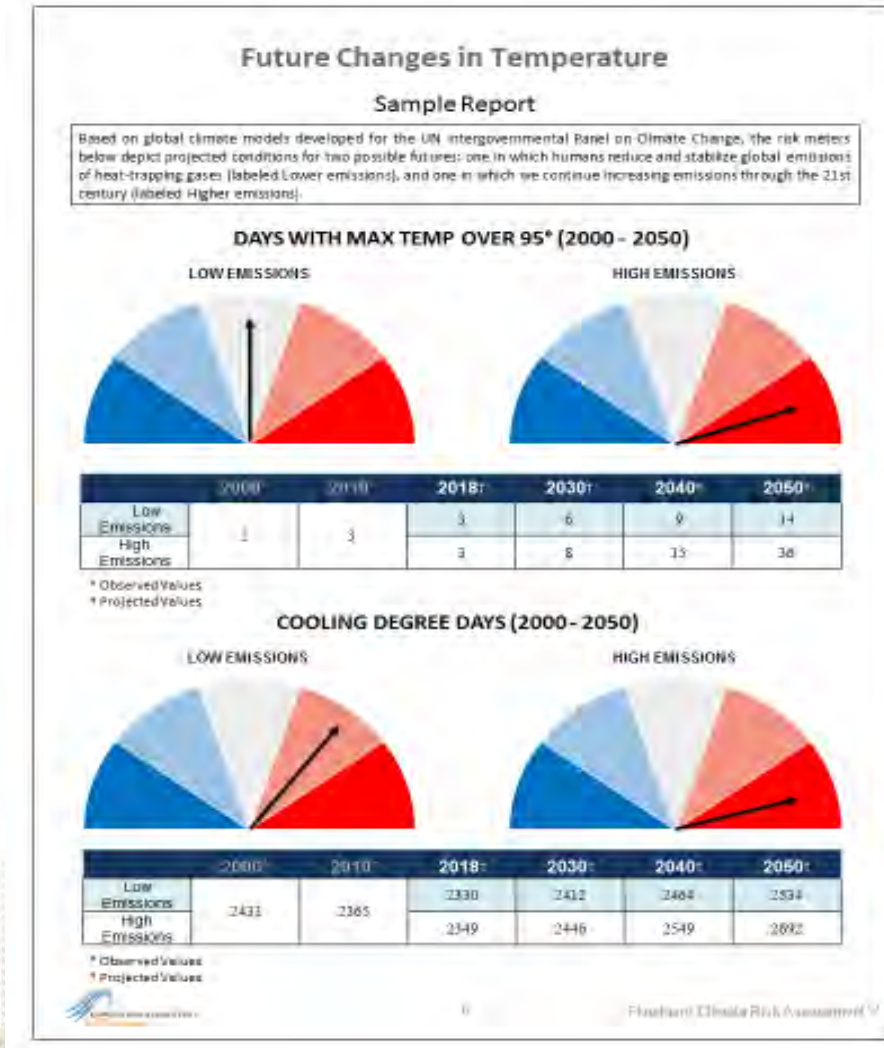
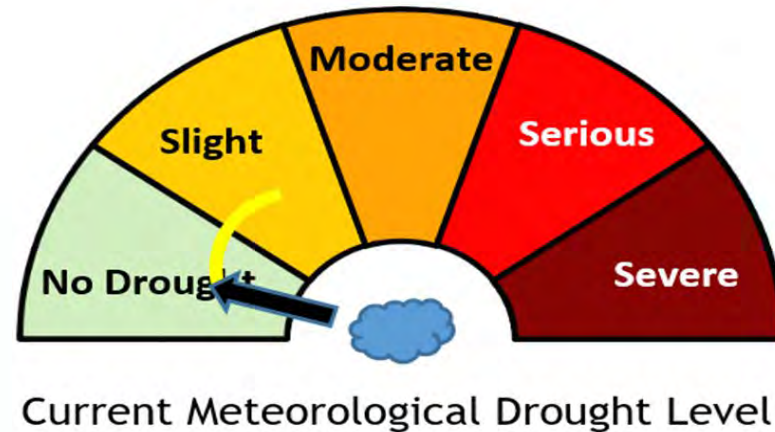
This property is in a SFHA



COASTAL RISK CONSULTING

# Heat Stress, Cooling Degree Days and Drought

- Provide clients information on current and future heat risks, degree cooling days and drought.
- We are currently automating these metrics.
- US Climate Resilience Toolkit <https://crt-climate-explorer.nemac.org/about/>



# Damage Ratio and Economic Loss at Property Level

- Damage Ratio & Economic Loss
- Estimates damage potential of particular flood scenarios: riverine, heavy precipitation, storm surge, and tidal flood.
- Cost of repair and the total cost of the damaged property, as functions of inundation depths and type of inundation, i.e., salt water vs. fresh water, etc.
- Financial-loss estimates and business interruption.





# Coastal Risk Models Risk Mitigation Investments

## Cost-Benefit Analysis (ROI)


### Tidally Influenced Flooding

Miami City Hall

**Tidally Influenced Flooding**

**LEGEND**

**OVERVIEW:** The area highlighted in BLUE within the property outline should expect "FLOOD DAYS" as indicated.



Existing



Proposed



Barrier eliminates tidal flooding

### Storm Surge

Miami City Hall

**Maximum Possible Hurricane Storm Surge (2018)**

Annual probability of Category 1 winds and higher: **23%**  
 Annual probability of Category 3 winds and higher: **13%**

NAVD88 - North American Vertical Datum of 1988 AGL - Above Ground Level

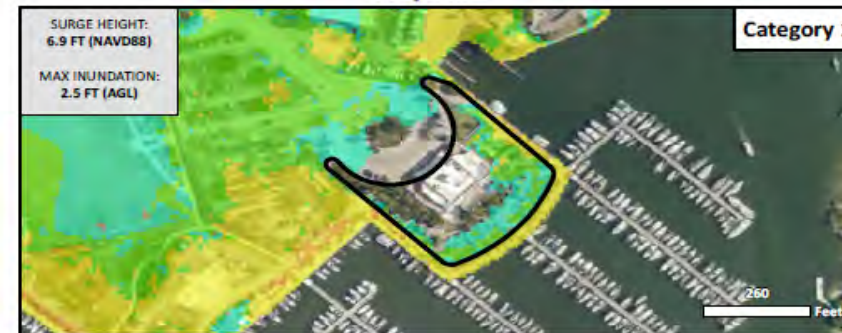
**LEGEND**

0 - 1 ft	4 - 8 ft
1 - 2 ft	8 - 12 ft
2 - 4 ft	> 12 ft

Existing



Proposed



Barrier reduces storm surge by two-feet or more

# Coastal Risk Help Desk: Flood Protection as a Service™

**Phase 1 – Flood Risk Vulnerability Assessments** online at [www.floodscores.com](http://www.floodscores.com)

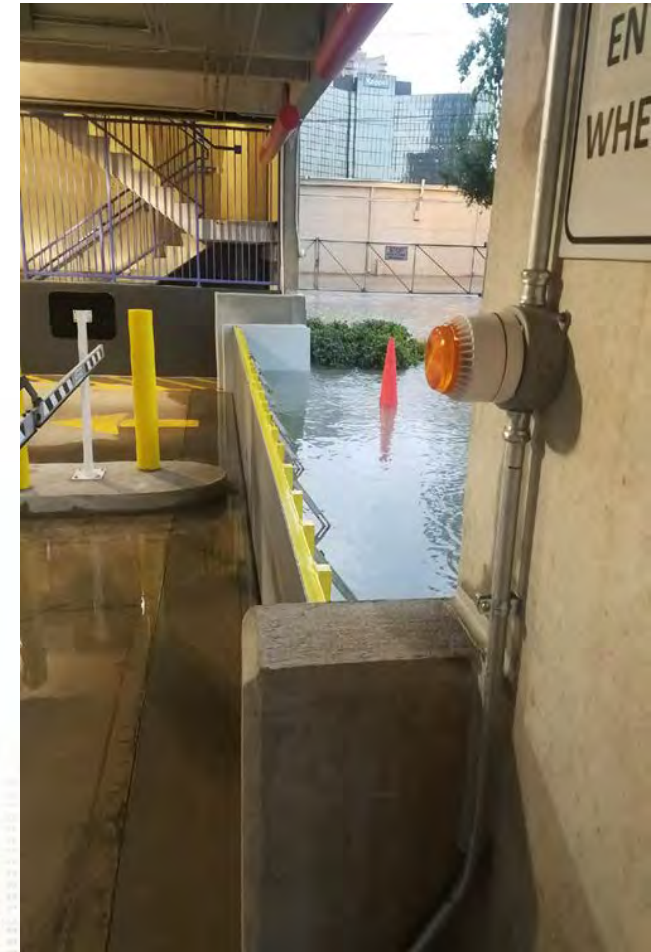
**Phase 2 – Engineering evaluations of flood defense solutions**

**Phase 3 – Financing, Implementation & Annual Maintenance/Certification**

**Phase 4 – Flood Insurance premium reductions, as appropriate**



Retractable flood wall deployed during Hurricane Harvey



# Coastal Risk Matches Flood Defense Systems with Risks

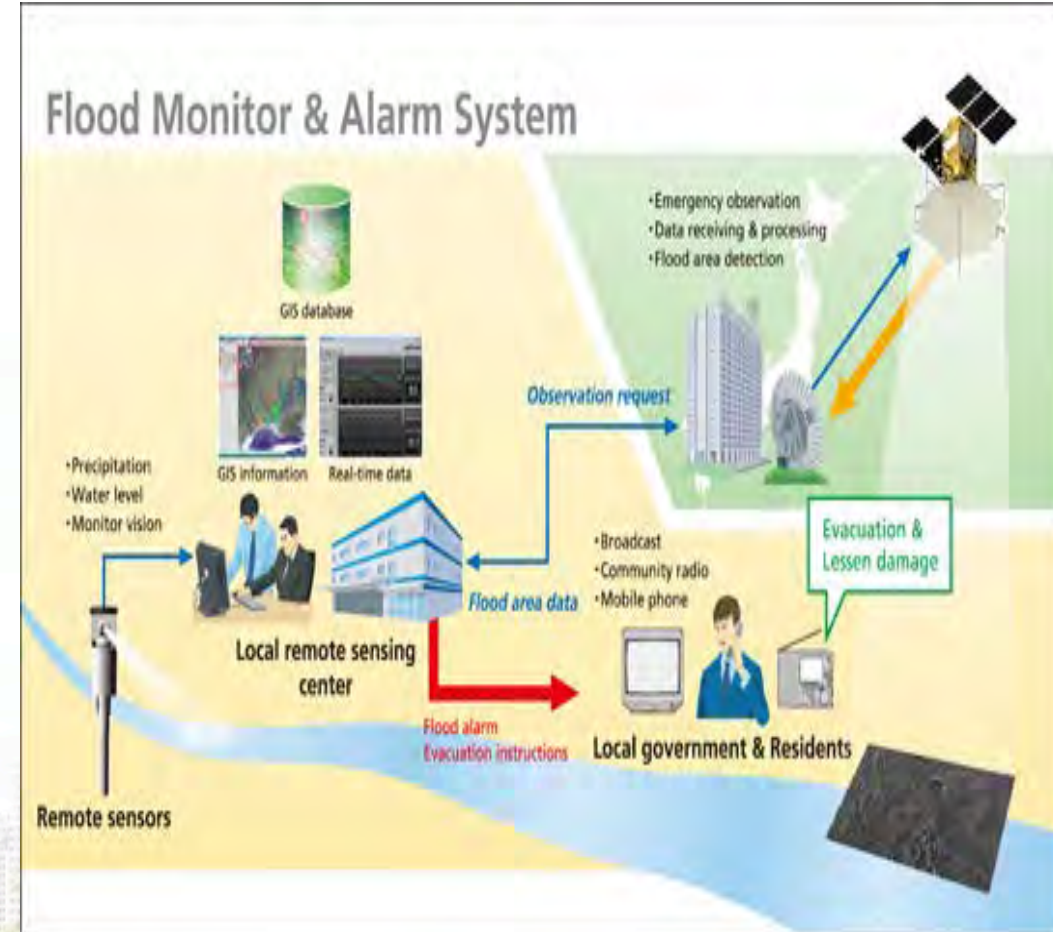


*Personalized resilience-  
accelerating advice for  
individuals, businesses  
and governments*



# New Technologies Like IoT, AI, Crowdsourcing, Real-time Weather, Augmented Reality Can Save Lives and Property, But...

- Real-time systems (delivering “bad news”) can save lives and property, but, resilience requires pre-disaster modeling, planning and investment;
- Heuristics/rules-based systems or machine-learning (AI) can be property-specific, based on flood and nat haz models.



# Use of Satellite Data in the Future

- Combine with AI and Machine Learning
- Use remoted-sensed data to produce intelligence
- Individualized property data
- Insurance underwriting
  - Cost to rebuild
  - Damage/Loss estimates
- Residential and Commercial real estate due diligence
- Image recognition
- Value estimate of building and costs to rebuild?
- Vegetation analysis and wildfire risks

# Coastal Risk Tech Combines Property-Specific Flood Models with Real-Time Weather Alerts



June 07,  
2017



**We provide property owners with site specific, flood prediction modeling and can provide site specific weather alerts.**

# The Future: Deliver Flood Risk Information to Smartphones Globally



**Augmented Reality and Real-time will save lives!**



**Coastal Risk's technology has supported over \$2 billion in real estate investments and development in the past year.**



# Coastal Risk Helps Condo HOAs Get Resilient

**“Our HOA Board purchased a Flood and Climate Risk Assessment™ from Coastal Risk Consulting for our two condo buildings in Vero Beach, FL. We needed a more in-depth and professional review of flood risks to enable us to reassess our current flood insurance coverage and to educate our residents on our vulnerability to storms and floods. We found the Coastal Risk modeling and visualization of flood risks very accurate and in line with our experiences with the buildings over the past three decades. Also, we were impressed with Coastal Risk’s Help Desk services and the time they spent explaining in details the results of their analyses. They explained the report graphics and data thoroughly and answered all of the Board’s questions in a professional manner. We will gladly refer Coastal Risk Consulting to other HOA Boards that want a clear understanding of their flood, climate and surge risks.”**

**-Joseph Cagnazzi**



## Is your home at risk from rising seas?

The FEMA flood zone that your home is in is a key indicator of your home's risk from flooding. But there's a caveat. The FEMA maps are created from historical data. Given the mounting evidence of climate change and rising sea levels, the reliability of these maps to predict the risk of future flooding diminishes.

A three-year-old, startup company, Coastal Risk Consulting LLC (CRC), has created modeling software that considers the rising sea levels to predict your home's risk of flooding over the next 30 years.

And while the company provides reports individualized for single homes, it also provides services to businesses and governments.

CRC's "Flood and Climate Risk Assessment" projects your property's risk from storm surge, extreme tides, sea level rise, and heavy rainfall over the next 30 years. That is the life-cycle of a typical mortgage. The reports are available for individual properties all the way up to entire neighborhoods.

This company caught my eye because I have not seen any other service or modeling software that incorporates FEMA maps with climate-change and sea-level projections to assess future flood risks. The utility of the reports extends beyond individual property owners. For example, a large employer searching for a headquarters site would not want to build in a location where the employee parking lots will face frequent flooding in the future. A community, developer, or their investors may not want a development that is likely to experience frequent flooding in the future. The company also provides services to cities and other governmental entities.

CRC also offers solutions to existing property owners looking to mitigate future tidal, rainfall, and storm surge flooding. One intriguing solution is an inflatable water barrier around the perimeter of a home. That's a lot more affordable than relocating a home on stilts. The company acknowledges that most homeowners have limited funds, so it prioritizes mitigation steps that provide the most protection.

Property owners who have ordered a report also have access to a customer support technician who can make recommendations such as the above tailored to their own budget.

An AP wire report by Kimberly Miller relayed the story of a Palm Beach homebuyer whose first choice was oceanfront property.

He has considering buying a home on the Intracoastal Waterway instead, thinking it would be less vulnerable to future flooding.

The buyer ordered a CRC report on both properties and was happily surprised that the prognosis for the oceanfront condo was "dramatically better."

His instincts were wrong.

This week, I chatted with Albert Slap, the President of Coastal Risk Consulting. I sensed that the mission of this company is more altruistic than profit-driven. There is a sense of passion and confidence that the company can best explain and predict the new global changes.

Albert listed over a dozen locations where we now have 40 or more days of flooding a year, from Fort Lauderdale to the New Jersey Shore.

This seems particularly relevant because so many

of us Floridians live near the water. It's rather disconcerting to read so much about rising sea levels lately. The report I obtained for my home Rotonda West home was reassuring.

My home is less than 2 miles from the Intracoastal Waterway.

But my report predicts zero days of tidally influenced flooding for the next 30 years.

The cost of the report for a residential property is \$199, although as of Thursday it was discounted down to \$99. CRC's website includes sample reports. The website for Coastal Risk Consulting is <https://floodscores.com/> and their phone number is 844-732-7473.

*Brett Slattery is broker/owner of Brett Slattery Realty llc in Charlotte County.*

*Brett responds to all questions and column suggestions, including those not printed due to space limitations. Reach him via 941-468-1430, [Brett@BrettSlattery.com](mailto:Brett@BrettSlattery.com), or [www.BrettSlattery.com](http://www.BrettSlattery.com).*

*com.*



**Brett  
SLATTERY**  
COLUMNIST

# Developer Builds Sea Level Rise Ready “Dream Home” Using Coastal Risk Modeling

Grey Door Luxury Homes

[www.greydoorluxuryhomes.com](http://www.greydoorluxuryhomes.com)

**"Coastal Risk's models and succinct, but comprehensive, report provided everything we need. We see this as a valuable and differentiating part of our business model and one that gives our clients added confidence when buying one of our homes on South Florida waterways." -- Stanley Young, President, Grey Door Luxury Homes**

**Broward Palm Beach New Times, January 2016: "Homeowner Spends 1 Million to Prepare for Sea Level Rise."**

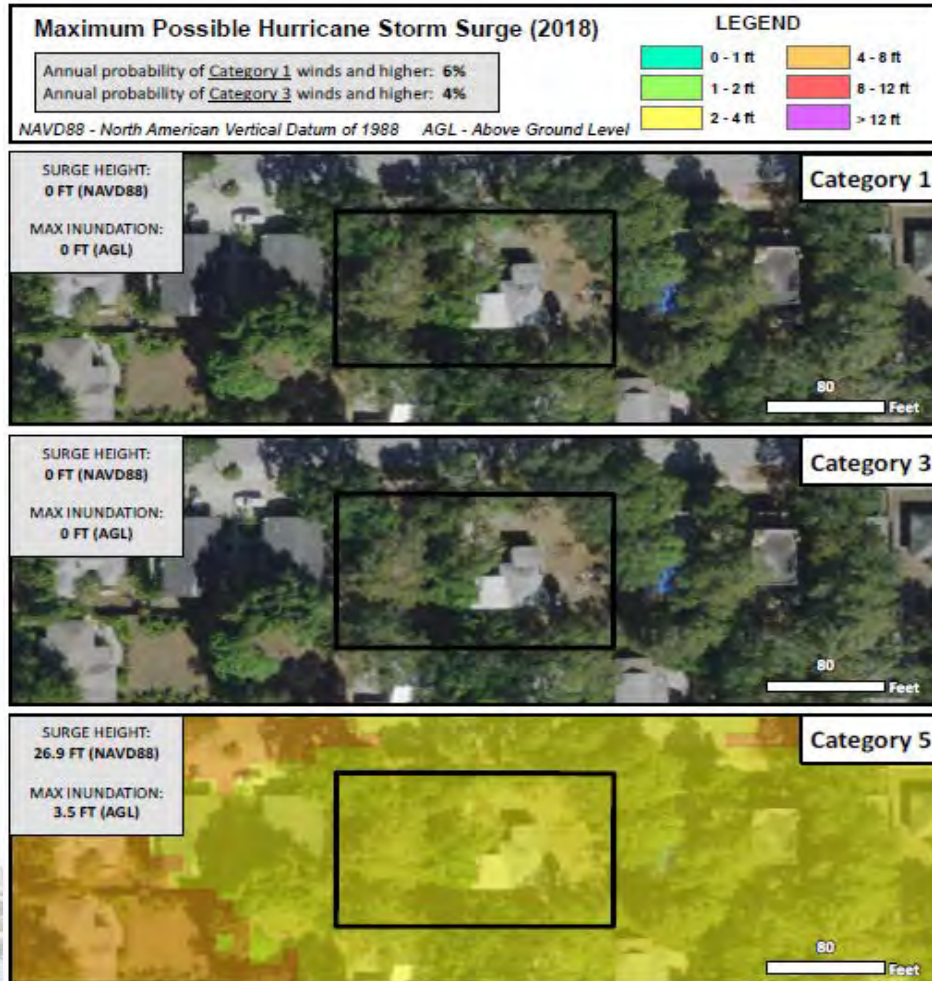
**<http://www.browardpalmbeach.com/news/homeowner-in-las-olas-isles-spends-1-million-to-raise-property-to-prepare-for-sea-level-rise-7533531>**



# Coastal Risk Helps Homeowners Get Resilient

## Storm Surge

1842 6th St, Sarasota, FL 34236



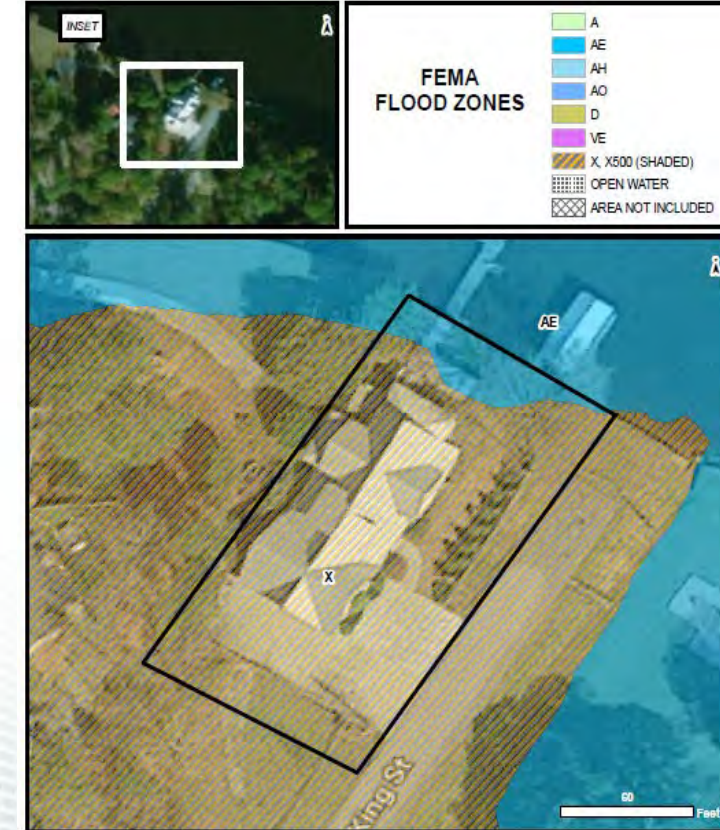
“I did research before deciding whether to build a home and how high to elevate it. It was very difficult to get much real information upon which to base my decision. I found that local zoning had no future resiliency built in. Of course, much is unknown and there are no guarantees. But, this report from Coastal Risk helped me make informed decisions, and, I am very grateful for that. Simply taking a guess and adding a few feet of elevation or deciding, without any scientific basis, how many steps to add didn't seem responsible to me. So thank you for offering this report, it really helped me a great deal!”

Kayle Simon  
Sarasota FL

# Coastal Risk Helps Homebuyers with Flood Insurance Issues

"I purchased a report from Coastal Risk before even making an offer on a lovely riverfront home in North Carolina. Their comprehensive flood risk report helped me decide that the house was a safe investment for me and my family. Additionally, as result of Coastal Risk's visual evidence, my flood insurance premium was reduced from \$2500/year to \$770. I am very satisfied with Coastal Risk's products and service and highly recommend them to anyone buying property and dealing with flood insurance issues."

David Friedman, MD, Winton, NC



# Commercial Real Estate Customer Uses CRC Online “Due Diligence” to Close \$2M Deal

CRE Customer in California  
Pre-Purchase Due Diligence for \$2M Investment  
Property in Florida  
Report showed little flood risk and sale completed



“I called Coastal Risk Consulting as part of my due diligence for the purchase of a piece of land on the Eastern coast of Florida because I was very concerned about the possibility of flooding. The Coastal Risk Rapid Assessment™ report I received greatly exceeded my expectations. It was very thorough, helpful, and made it easy to move forward in this \$2 million sale. I found this company to be very helpful and responsive. I would recommend Coastal Risk to anyone who is buying, insuring, or funding any piece of property!”  
-Diana Goulet, Commercial Real Estate Buyer



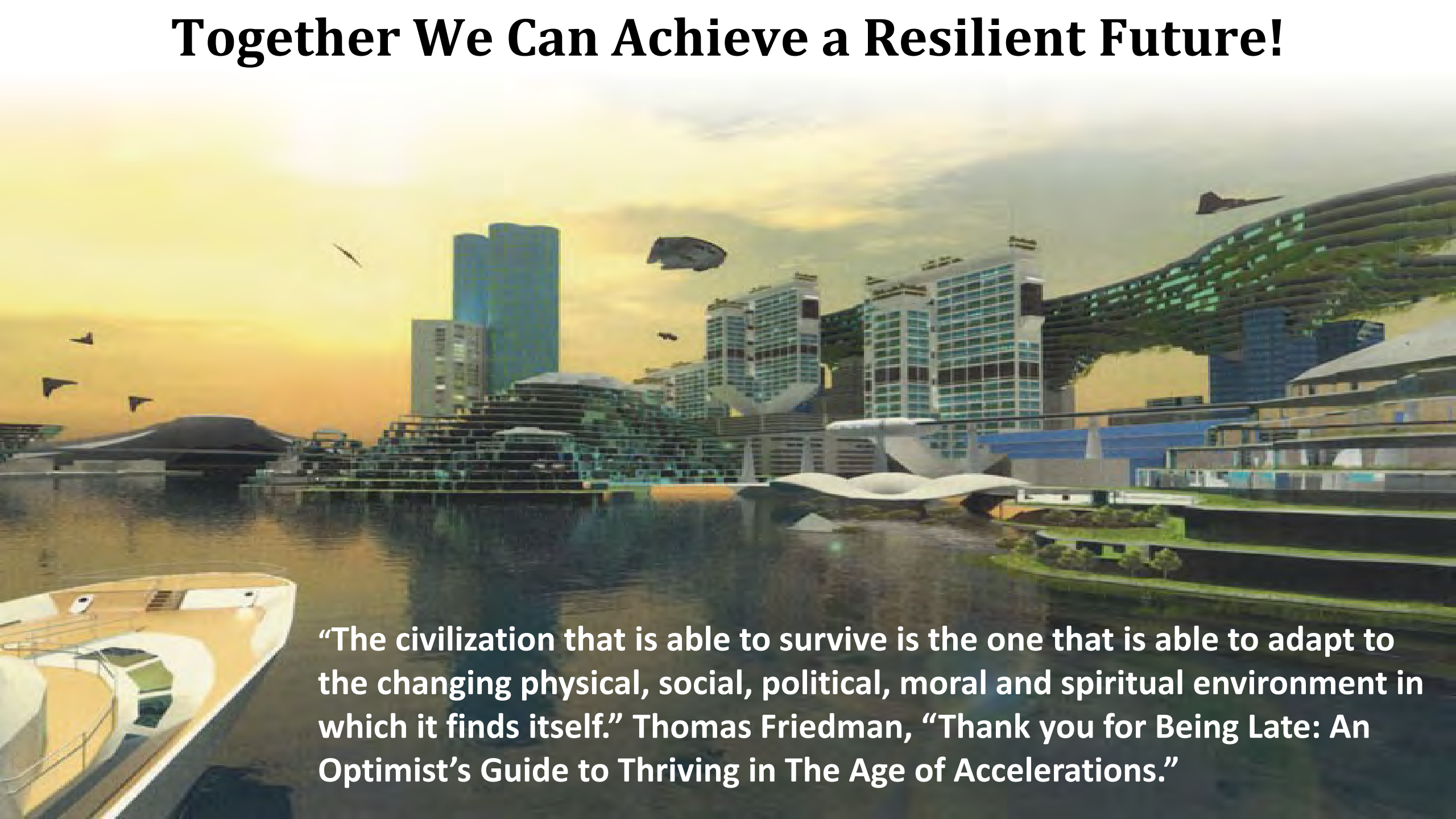
# CRC Helps Local Communities Improve Resilience and Lower Insured Losses

“ Coastal Risk Consulting conducted a comprehensive vulnerability analysis and provided detailed street by street flood risk visualizations for every year for the next 30 years. This was very useful for a community that is increasingly impacted by Sea Level Rise, to determine what actions to take to preserve and protect our structures and way of life. Coastal Risk also provided Key Biscayne with practical adaptation strategies that were effectively explained to Village residents and officials at well-attended Town Hall Meetings. ”

-**Melissa White, Executive Director**, Key Biscayne Community Foundation & Village of Key Biscayne Partnership



# Together We Can Achieve a Resilient Future!



**“The civilization that is able to survive is the one that is able to adapt to the changing physical, social, political, moral and spiritual environment in which it finds itself.” Thomas Friedman, “Thank you for Being Late: An Optimist’s Guide to Thriving in The Age of Accelerations.”**



# Coastal Risk's Awards and Recognition



American Business Awards  
2016: "Startup of the Year"



American Business Awards  
2016: "Tech Startup of the Year"



Broward Palm Beach  
New Times: "3rd Coolest  
Startup" 2016



Miami Herald Business  
Plan Challenge 2015:  
Finalist



Smart City Startups  
2015: Finalist



Knight Foundation &  
Singularity University  
2015: Finalist

## Featured in:

The  
New York  
Times



SCIENTIFIC  
AMERICAN

theguardian



# Coastal Risk Customers

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# Top-flight Management Team and World-Renowned Advisory Board Members



## Senior Management:

- Albert J. Slap – Nationally-recognized environmental attorney and law professor.
- Dr. Leonard Berry – Prof. Emeritus, FAU. Extensive worldwide environmental field experience . Lead Author – US Third National Climate Assessment.
- Dr. Brian Soden – Prof. Climatology, University of Miami (UM). Lead Author, UN IPCC, that won Nobel Prize with VP Al Gore.
- Rajiv Krishnan – CFO, former International CFO, Citibank & Assurant.
- Robert Hubbell – VP Marketing – former partner of Andersen Worldwide and former partner & global MD of Cantor Fitzgerald.

## Advisory Board (partial list):

- Andy Kao, BE, MBA – Former Dir. Air Worldwide, Consultant in business development for catastrophe risk quantification services;
- Kaj Ahlmann – Managing Dir., Global Advisory Council Insurance, Deutsche Bank; Owner Six Sigma Ranch
- Dr. Peter Williams – Former CTO of IBM “Big Green Innovations” & Smart Cities & Resilience Lead – Energy, Environment & Utilities.
- Dr. Ben Kirtman – Prof UM – Global Leader in Climate Change modeling & measurement.
- Prof. Brian McNoldy – Prof UM – Meteorology; Washington Post “Capitol Weather Gang” Reporter.
- Dr. Mahadev Bhat – Prof. Natural Resource Economics, FIU. Expert on sustainable development, agriculture and ecosystems.

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***Dr. Leonard Berry, Vice President and Co-Founder***

***[leonardberry@coastalriskconsulting.com](mailto:leonardberry@coastalriskconsulting.com)***

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