



Planning for Community Resilience in Satellite Beach: Stormwater Infrastructure and LDRs

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- We educate, advocate and negotiate to protect Florida's high quality of life.
- Our bipartisan board of directors includes advocates and experts from across the state.
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Dr. John M. DeGrove Webinar Series



- May 4, 1924 – April 13, 2012
- Icon of comprehensive planning both in Florida and across the nation
- One of the founders of 1000 Friends of Florida
- First Secretary of the Florida Department of Community Affairs
- His accomplishments recognized with the John M. DeGrove Eminent Scholar Chair in Growth Management and Development at Florida Atlantic University
- To find out more, please visit:
www.1000friendsofflorida.org/dr-degrove/



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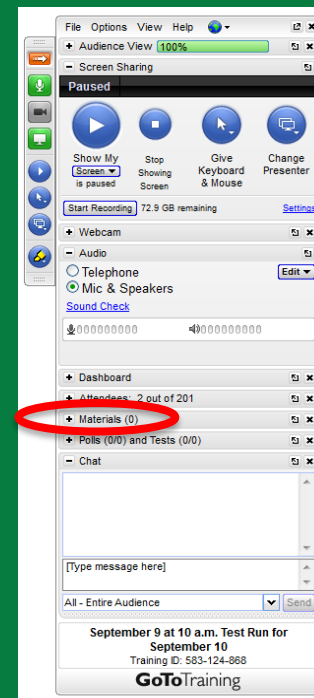
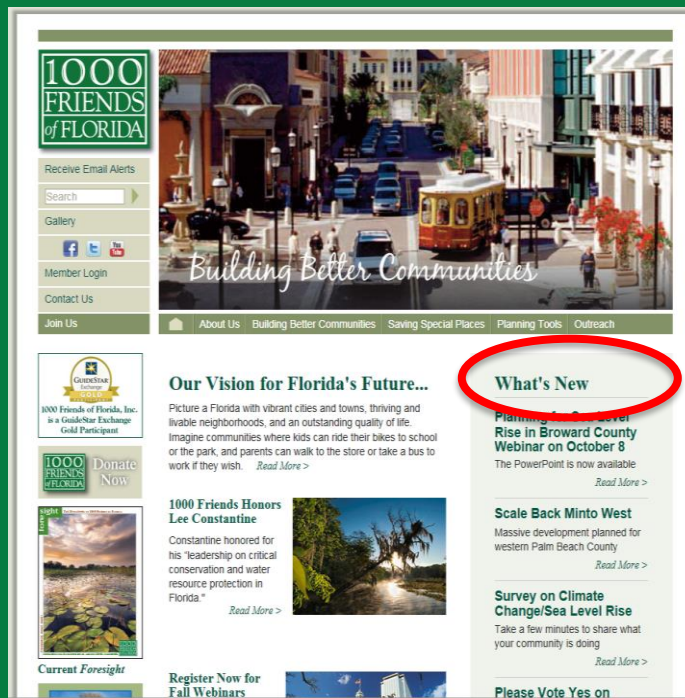
(Designate it for DeGrove Education Fund)

OR

Email vyoung@1000fof.org for more information



The PowerPoint is available at www.1000friendsofflorida.org



This webinar has been approved for:

- *1.5 AICP CM Credits for planners (#9138851)*
- *1 CEC for Certified Floodplain Managers*
- *2 CLE for Florida attorneys (1708851N - Intermediate)*
- *.125 CEUs for Florida Environmental Health Professionals.*

There is a link to a **BRIEF SURVEY** in the follow-up email you will receive. Please take a few minutes to give us feedback!



Upcoming Dr. John M. DeGrove Webinars

Spring 2017 DeGrove Webinar

Approved for professional certification credits for Planners (AICP CM), Certified Floodplain Managers, Florida attorneys (CLE) and Florida Environmental Health Professionals.

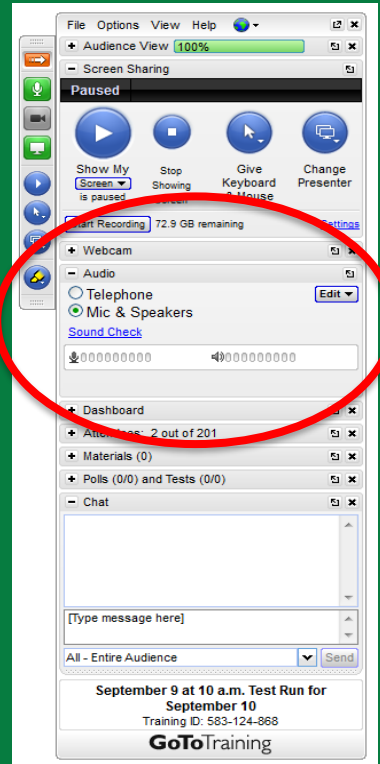
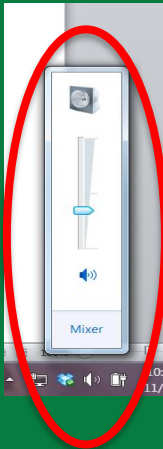
Register Now!

- March 21, 2018, Noon to 1:30 p.m. -- *2018 Florida Legislative Wrap Up*

Visit www.1000friendsofflorida.org/webinar/
to find out more!

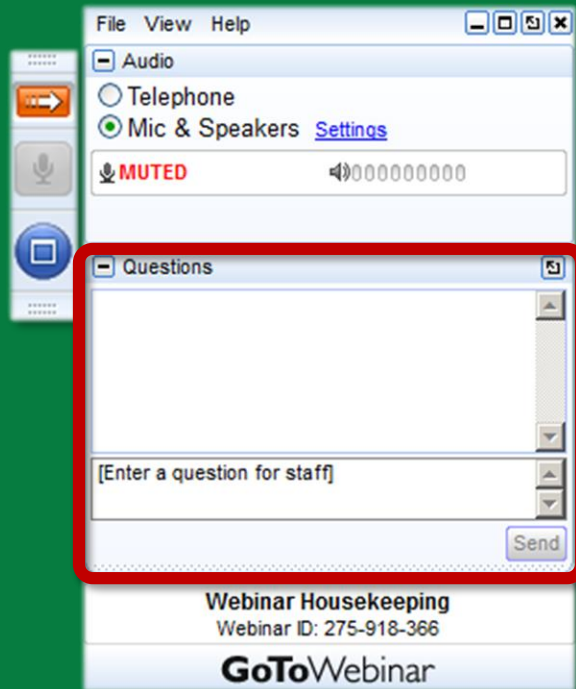


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- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits

Check out our Legislative Webpage!

Available at:

www.1000friendsofflorida.org/2018-florida-legislative-session-custom/

This site is:

- Updated weekly (or more often as needed)
- Includes Growth Management, Transportation and Conservation Legislation
- Includes links to the bills

The screenshot shows the website for 1000 Friends of Florida's 2018 Florida Legislative Session. The header includes navigation links: Home, About Us, Building Better Communities, Saving Special Places, Planning Tools, Outreach, and Donate Now. The main title is "2018 Florida Legislative Session" with a sub-header "Updated December 5, 2017". Below this, there are links for "Useful Links" (Florida House, Florida Senate, Find Your Legislators) and a "Bill Status" indicator showing "PASSED, DID NOT PASS". A section for "Register now for FREE 2018 Florida Legislative Preview Webinar" is also present, along with information about professional certification credits for planners and attorneys. A "Support 1000 Friends of Florida's Legislative Advocacy" link is provided. The main content area is titled "GROWTH MANAGEMENT/PLANNING LEGISLATION" and features a search bar. A table lists bills with columns for "Bill #/Sponsor" and "Title / Description". The table includes entries for SB 84 Lee, SB 292 Rodriguez, SB 324 Young/HB 697 Miller, SB 362 Perry/HB 207 McClain/Clemens, SB 432 Lee/HB 17 Raburn, SB 494 Lee/HB 405 Williamson, SB 542 Rodriguez, and SB 574 Steube/HB 521 Edwards. Each entry has a "Read More" link. The left sidebar contains a "Receive Email Alerts" section, a "Search" bar, a "Gallery" with social media links, a "Member Login" section, and a "Contact Us" section. The bottom of the sidebar features a "Charity Navigator" logo, a "Goldstar" logo, and a "Donate Now" button. The footer includes a "Current Forefront" section with a photo of a tree and a "1% FOR THE PLANET" logo.

1000 FRIENDS of FLORIDA

Home • 2018 Florida Legislative Session

2018 Florida Legislative Session

Updated December 5, 2017

Useful Links: [Florida House](#) • [Florida Senate](#) • [Find Your Legislators](#)

Bill Status: **PASSED, DID NOT PASS**

Register now for FREE 2018 Florida Legislative Preview Webinar
Wednesday, December 6 from noon to 1:30
Approved for professional certification credits for Planners (AICP CM LEGAL), Florida Attorneys (CLE), Certified Floodplain Managers (CEC) and Florida Environmental Health Professionals

Register now for FREE 2018 Florida Legislative Wrap Up Webinar
Wednesday, March 21, 2018 from noon to 1:30
Approved for professional certification credits for Planners (AICP CM LEGAL). Have applied for credits for Florida Attorneys (CLE), Certified Floodplain Managers (CEC) and Florida Environmental Health Professionals but cannot guarantee they will be offered

Support 1000 Friends of Florida's Legislative Advocacy

GROWTH MANAGEMENT/PLANNING LEGISLATION

Search:

Bill #/Sponsor	Title / Description
SB 84 Lee	SUPPORT Municipal Conversion of Independent Special Districts Read More
SB 292 Rodriguez	SUPPORT Private Property Rights SUPPORT – SB 292 exempts property owners who produce renewable energy and distribute it to users on their property from being defined as a public utility. <i>Senate Referrals (SB 292):</i> Communications, Energy, and Public Utilities; Community Affairs, and Rules Committees. Hide
SB 324 Young HB 697 Miller	Impact Fees UPDATED 12/5 Read More
SB 362 Perry HB 207 McClain Clemens	OPPOSE Growth Management/Private Property Rights OPPOSE – SB 362/HB 207 require local government adoption of a private property rights element into their comprehensive plan. <i>House Referrals (HB 207):</i> Agriculture and Property Rights Subcommittee; Local, Federal and Veterans Affairs Subcommittee; and Commerce Committee. <i>Senate Referrals (SB 362):</i> Agriculture and Property Rights Subcommittee; Local, Federal and Veterans Affairs Subcommittee; and Commerce Committee. Hide
SB 432 Lee HB 17 Raburn	Community Redevelopment Agencies Read More
SB 494 Lee HB 405 Williamson	Linear Facilities UPDATED 12/5 Read More
SB 542 Rodriguez	SUPPORT Public Financing of Construction Projects Read More
SB 574 Steube HB 521 Edwards	OPPOSE Tree and Timber Trimming, Removal, and Harvesting Read More

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1% FOR THE PLANET



Presenters



Courtney H. Barker, AICP



- City Manager for Satellite Beach since April 2013 and longtime resident
- Master of Science in Planning from Florida State University and Bachelor of Arts in Anthropology from University of Florida
- Active member on the boards of Capital Outlay Committee for Brevard County School District, the Beach Committee for Tourism and Development Council, Technical Advisory Committee, Space Coast League of Cities, Space Coast Public Managers Association, and Florida Redevelopment Association.
- Member of many professional associations such as the American Planning Association, American Institute of Certified Planners, National Trust for Historic Preservation, Leadership Brevard, and the Florida Redevelopment Association.
- Volunteered for the Planning & Zoning Board for the City of Satellite Beach, the Florida Redevelopment Association Board, and as Treasurer for the Atlantic Coast Section of Florida American Planning Association.



Jason M. Evans, Ph.D.



- Assistant Professor of Environmental Science and Studies at Stetson University.
- Interdisciplinary systems and landscape ecologist broadly interested in the emergent geo-spatial interfaces between human and natural systems.
- Current research projects involve collaborations with several regional Sea Grant programs to assist local governments along the southeastern U.S. coast with sea level rise adaptation.
- Working with Monroe County and the Village of Islamorada, Florida; St. Marys and Tybee Island, Georgia; and Hyde County, North Carolina.
- Other recent research has focused on land cover change, wildlife habitat and life cycle assessments for various bioenergy systems (including ethanol, biogas, and wood pellets) across the U.S.
- Also extensive experience and very strong ongoing interest in the ecology, management and restoration of Florida springs ecosystems.



Rochelle W. Lawandales, AICP



- In her 39 year career, Rochelle W. Lawandales, AICP, has garnered a reputation as a change agent, public involvement specialist, and expert in redevelopment planning in the State of Florida. She spent 10 years in public service before opening Lawandales Planning Affiliates in 1989, which helped many Cities or Counties create, expand, or implement CRA's. She also helped private sector clients bring quality development to fruition. After failing retirement in 2011, she became a sole proprietor, once again serving local clients.
- She got her Master's of City and Regional Planning (MCRP) from Clemson University in 1979, after obtaining a BA in Sociology/Psychology there in 1977. She became AICP in 1983.
- Rochelle served as a Board member, Officer, and as a former President of the Florida Redevelopment Association. She is former chair of the APA's Atlantic Coast Section, APA FL Division Chair, and long term Legislative Committee member of APAFL. She tries to give back to her community by serving on local boards, such as 211 and the Brevard County Planning Board; as well as being past chair of the Satellite Beach Planning and Zoning Board and Community Redevelopment Agency, Melbourne Architectural Review Board; among others.
- She has developed design and form based codes using smart growth ideals and performance incentives; and, has written land development codes and Redevelopment or Comprehensive plans for communities across the state, integrating best practices.
- Known as a forward thinker, she strives to create a more sustainable future via a marriage of planning and redevelopment practices, as a strategy to implement good growth management and sustainability measures.



City of Satellite Beach: Rising to Resilience!





Courtney Barker, AICP
City Manager

Rochelle W.
Lawandales, AICP
Planning Consultant

City of Satellite Beach

RISING TO RESILIENCE!



COURTNEY H. BARKER,

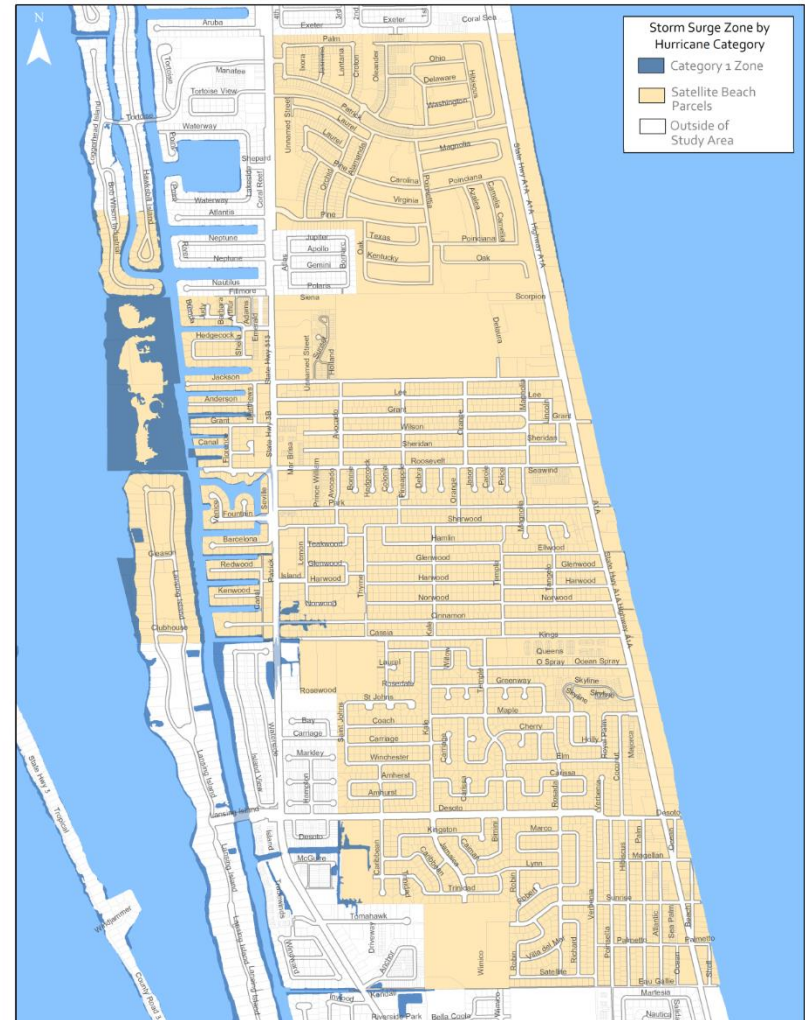
AICP

CITY MANAGER

PREPARING for RESILIENCY

WELCOME TO SATELLITE BEACH

- Situated on an barrier island between the Banana River and the Atlantic Ocean
- 15 miles south of Cape Canaveral Air Force Station and NASA
- Patrick Air Force Base is adjacent to our City
- Population is 10,300
- 3.8 square miles, with 617 acres of navigable canal system and Banana River



Source(s): ECFRPC, Brevard County GIS, NOAA (SLOSH)

TAKING ACTION

- **LOCAL GOVERNMENT AT CENTER OF CLIMATE CHANGE. WHY?**
 - **PROTECTION OF PUBLICLY OWNED LANDS, BUILDINGS AND INFRASTRUCTURE**
 - **PROTECTION OF PRIVATE PROPERTIES**
 - **RESPONSIBILITY AND AUTHORITY OVER REGULATORY DECISIONS**
 - **OBLIGATION TO THE PUBLIC TRUST TO PROTECT SOCIAL, ENVIRONMENTAL, AND ECONOMIC RESOURCES.**

“A resilient city is prepared to absorb and recover from any shock or stress while maintaining its essential functions, structures, and identity, as well as adapting and thriving in the face of continual change,” (ICLEI, 2015)

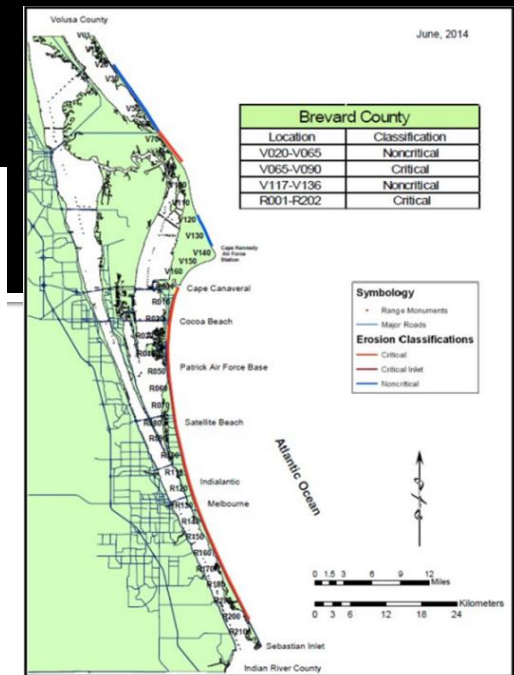
Vulnerability Assessment

■ Impacts of

- Sea Level Rise
- Storm Surge
- Flood (FEMA Flood Plain)
- Coastal Erosion

■ On:

- Financial Exposure
- Land Use and Building Exposure
- Critical Facility Exposure
- Environmental/Ecological Exposure



Satellite Beach, Florida - Storm Surge Zones by Hurricane Category



TAKING ACTION

DATA GATHERING AND PUBLIC INVOLVEMENT

2014-2016

- 6 well attended open houses, community events, workshops

2017-2018

- Created a Climate Ambassador 'think tank' to help with programs and projects
- Booths at major community events
- Ocean Reef Festival
- Inaugural Local Surf festival

2009-
2010

- Satellite Beach Climate Ready Estuaries Pilot Project
- Sea Level Rise Subcommittee of CPAB

2011

- Florida DEO Community Resiliency Initiative Begins
- State Adopts Community Planning Act with Adaptation Action Area Language

2013

- Initial Adaptation Action Area and Sea Level Rise Policy Adopted

2014 -
2015

- FDEP Coastal Partnership Community Resiliency Grant
- Adoption process of AAA policies including scenario

2016-
2018

- Sea Grant Project

This rain event happened before one of the workshops. A sign from above!





SEA LEVEL SCENARIO SKETCH PLANNING TOOL

Atlantic Coast

Mean High High Water (NAVD88)
USACE Low, Intermediate and High Projection Rate Curves
Planning Horizon: 2040, 2070, 2100

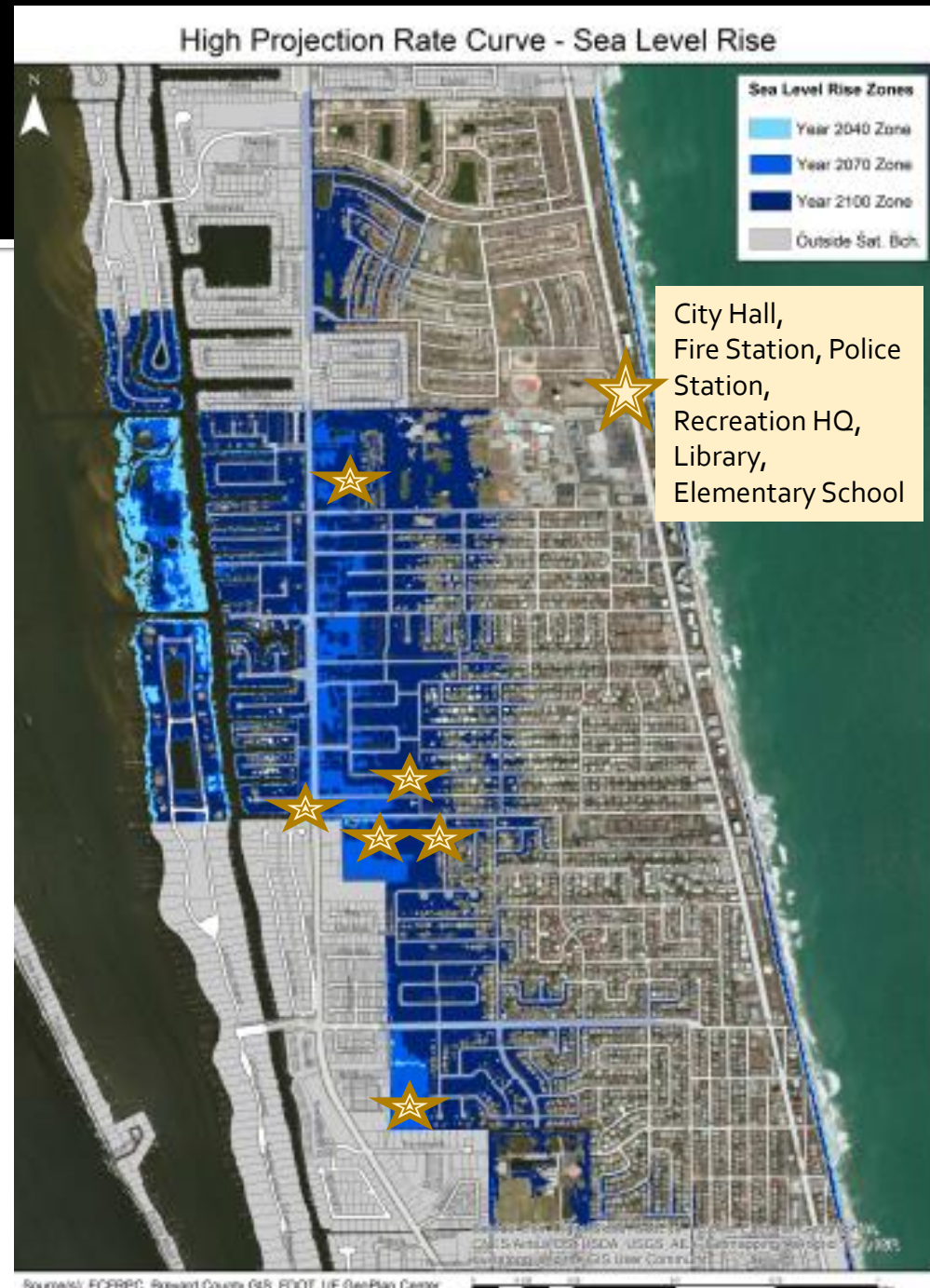
Lagoon Side

Mean Annual High Water (NAVD88)
USACE Low, Intermediate and High Projection Rate Curves
Planning Horizon: 2040, 2070, 2100

High USACE Projection Rate

Curve 2040

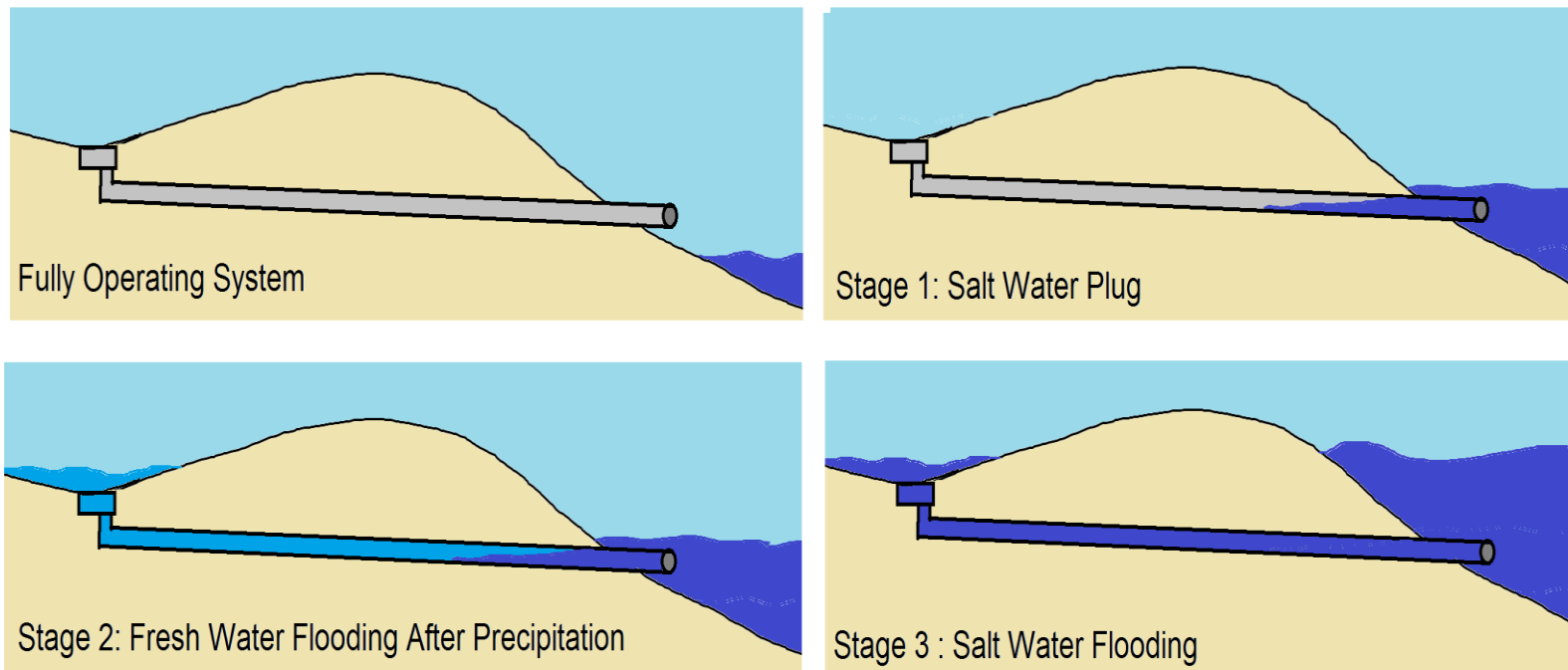
- **2040:**
 - 46 inch inundation using MHHW (Atlantic),
 - 19 inch inundation using MAHW (Lagoon)
- **2070:**
 - 66 inch inundation using MHHW (Atlantic),
 - 39 inch inundation using MAHW (Lagoon)
- **2100:**
 - 93 inch inundation using MHHW (Atlantic),
 - 66 inch inundation using MAHW (Lagoon)



Florida Sea Grant (2016-2018)

Why Stormwater?

Figure 1: Stages of Stormwater Infrastructure Failure due to Sea Level Rise



Legend

Ground Sky Fresh Water Salt Water Stormwater Drainage Infrastructure

Figure by Emily Niederman

Sea Grants, Rising Tides and Other Water Bodies

Dr. Jason M. Evans
Associate Professor of
Environmental Science
Stetson University

Dataset Development and Resilience Planning in Satellite Beach

1000 Friends of Florida Webinar



February 21, 2018

Jason M. Evans, Ph.D.
Associate Professor of Environmental Science
Stetson University



Tara McCue, AICP
East Central Florida Regional Planning
Council



Crystal Goodison, Associate Director
University of Florida GeoPlan



My Past Few Years

Outreach > [Hyde County, NC Adaptation Plan](#)

Researcher Helps Florida Cities Adapt to Sea-Level Rise

August 11, 2016



Satellite Beach, FL Public Works

(From left to right) Emily Niederman, Jason Evans, Ph.D., and Adam Carr are mapping out the vulnerable areas of Satellite Beach, Fla. Photo by Rhiannon Boyer

community in the form of tailored resilience and adaptation plans.



UPDATES: Apply now for

Outreach

Coastal Hazards

- > Climate Community of Practice
- > Crisis Response
- > Flood Insurance
- > Shoreline Change
- > Sea Level Rise
- > Tybee Island Sea Level Rise Plan
- > About the Project
- > Public Input and Outreach
- > Plan Outline
- > Planning Team
- > Media Coverage
- > Tybee Resources
- > St. Marys Flood Resiliency Plan
- > Hyde County, NC Adaptation Plan

Communicating Science

Healthy Coastal Ecosystem

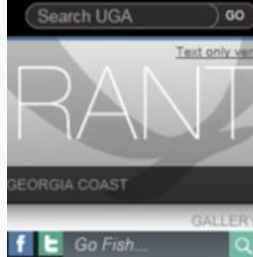
Safe and Sustainable Seafood

Sustainable Development

Outreach



Research

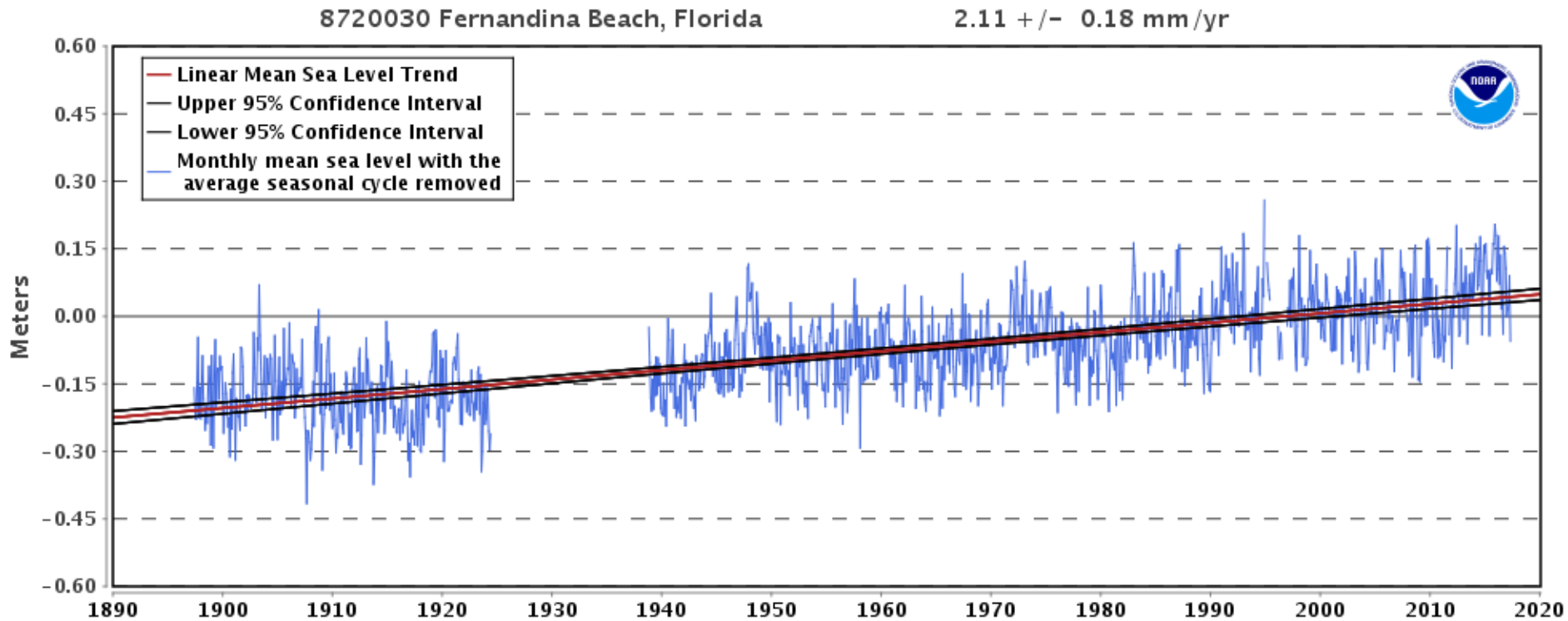


son Evans, Charles Hopkinson, Roger eaver and Mayor John Morrissey meet launch the St. Marys Flood Resiliency nning project.

established in 1787, t. Marys is a historic ity that is vulnerable o anticipated coastal hanges, such as icrosofted coastal ooding, rising seas nd intensified storm urges.

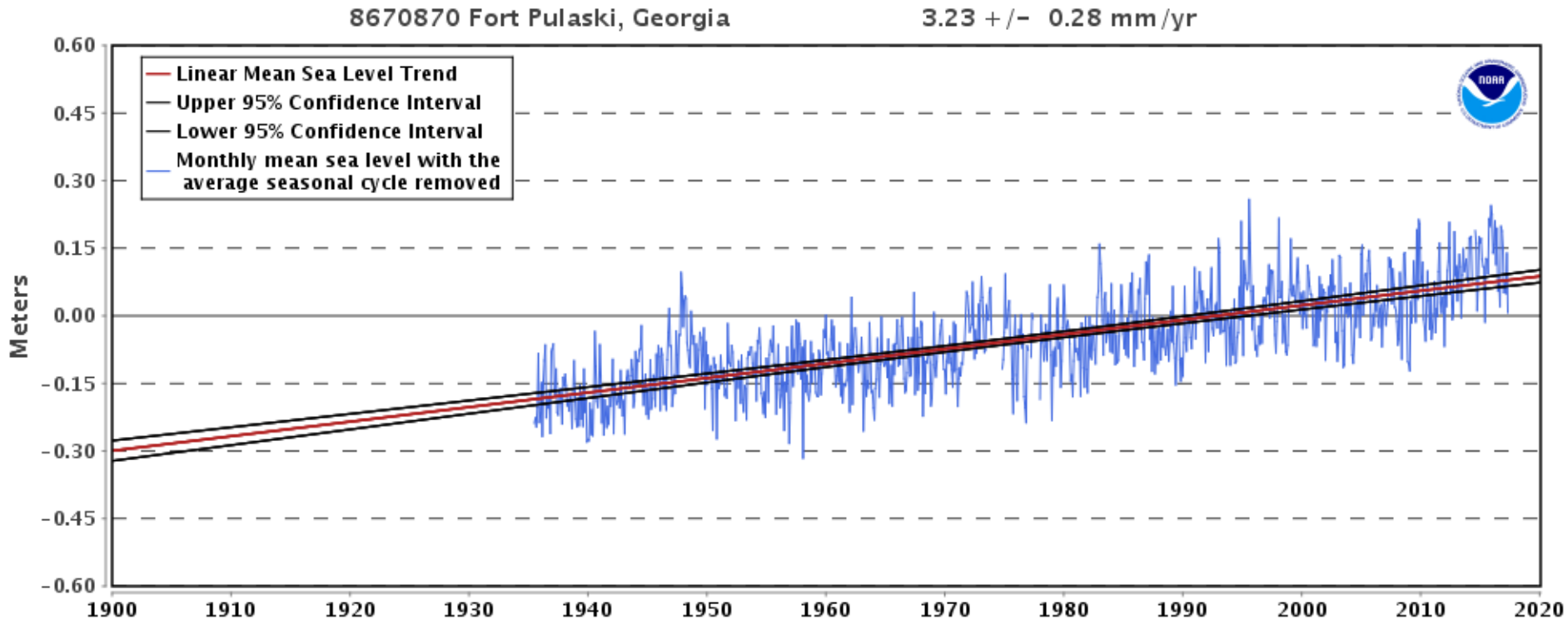
the project.

Yes, the sea is rising...



Trend of approximately 8 inches over 100 years

Yes, the sea is rising...



Trend of approximately 1 foot over 100 years



Weather.gov Forecast

City, ST

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NOAA: 'Nuisance flooding' an increasing problem as coastal sea levels rise

Study looks at more than 60 years of coastal water level and local elevation data changes

July 28, 2014

Eight of the top 10 U.S. cities that have seen an increase in so-called "nuisance flooding"—which causes such public inconveniences as frequent road closures, overwhelmed storm drains and compromised infrastructure—are on the East Coast, according to a new NOAA technical report.

This nuisance flooding, caused by rising sea levels, has increased on all three U.S. coasts, between 300 and 925 percent since the 1960s.

The report, [Sea Level Rise and Nuisance Flood Frequency Changes around the United States](#),

also finds Annapolis and Baltimore, Maryland, lead the list with an increase in number of flood days of more than 920 percent since 1960. Port Isabel, Texas, along the Gulf coast, showed an increase of 547 percent, and nuisance flood days in San Francisco, California increased 364 percent.

"Achieving resilience requires understanding environmental threats and vulnerabilities to combat issues like sea level rise," says Holly Bamford, Ph.D., NOAA assistant administrator of the National Ocean Service. "The nuisance flood study provides the kind of actionable environmental intelligence that can guide coastal resilience efforts."

"As relative sea level increases, it no longer takes a strong storm or a hurricane to cause flooding," said William Sweet, Ph.D., oceanographer at NOAA's [Center for Operational Oceanographic Products and Services \(CO-OPS\)](#) and the report's lead author. "Flooding now occurs with high tides in many locations due to climate-related sea level rise, land subsidence and the loss of natural barriers. The effects of rising sea levels along most of the continental U.S. coastline are only going to become more noticeable and much more severe in the coming decades, probably more so than any other climate-change related factor."

The study was conducted by scientists at CO-OPS, who looked at data from 45 [NOAA water level gauges](#) with long data records around the country and compared that to reports of number of days of nuisance floods.



Annapolis, Maryland, pictured here in 2012, saw the greatest increase in nuisance flooding in a recent NOAA study. (Credit: With permission from Amy McGovern.)

News release on July 28, 2014

Miami Beach, April 2013



<http://s13.therealdeal.com/trd/m/up/2013/07/Miami-flooding-4-13-13.jpg.jpg>

Big Pine Key, FL

September 29, 2015

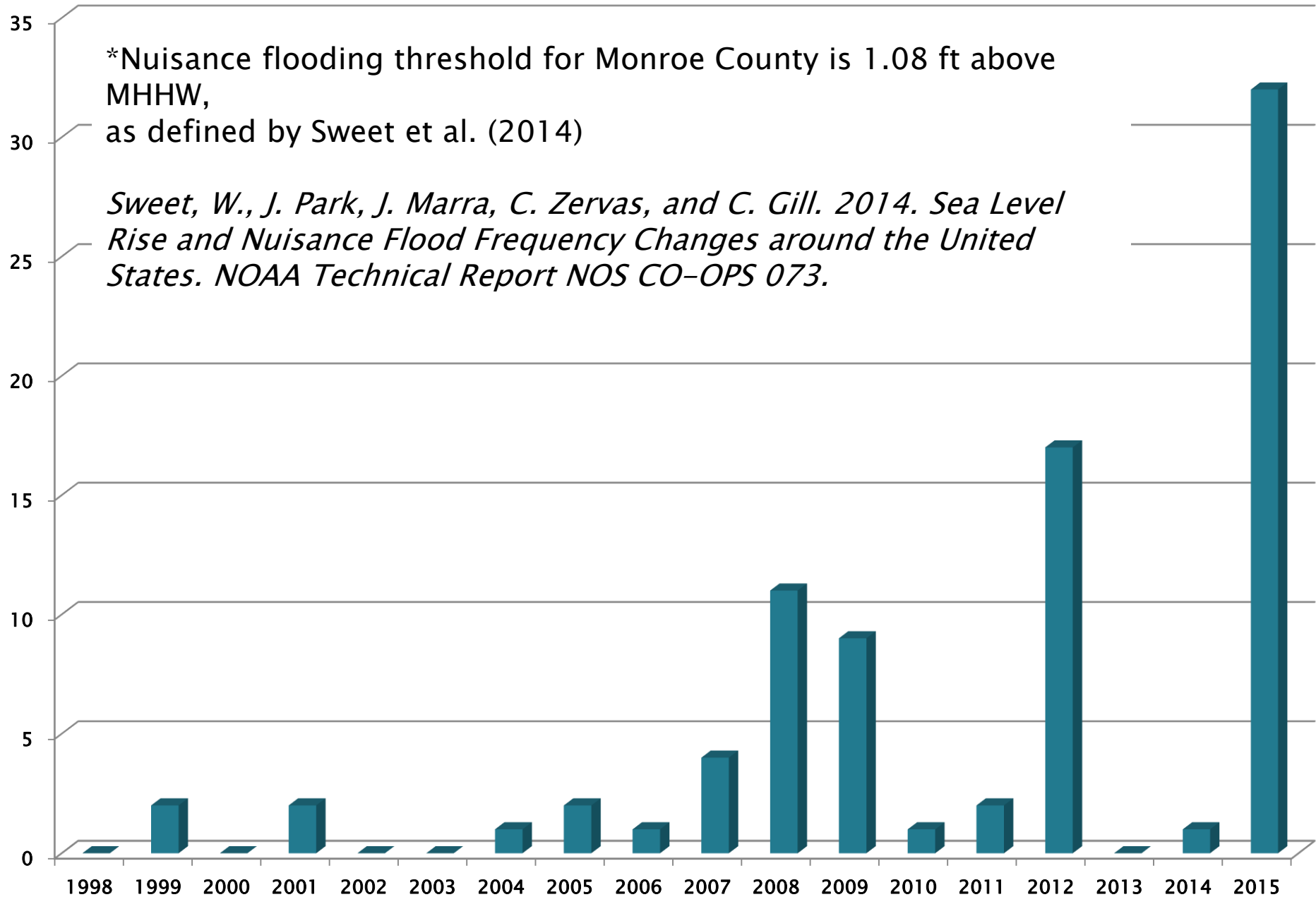
Photo credit: Greg
Corning, provided by
Monroe County staff



Nuisance Floods Per Year at Vaca Key (Marathon, FL)

*Nuisance flooding threshold for Monroe County is 1.08 ft above MHHW,
as defined by Sweet et al. (2014)

Sweet, W., J. Park, J. Marra, C. Zervas, and C. Gill. 2014. Sea Level Rise and Nuisance Flood Frequency Changes around the United States. NOAA Technical Report NOS CO-OPS 073.



Tidal flooding on Tybee Island, GA

US Highway 80

October 27, 2015



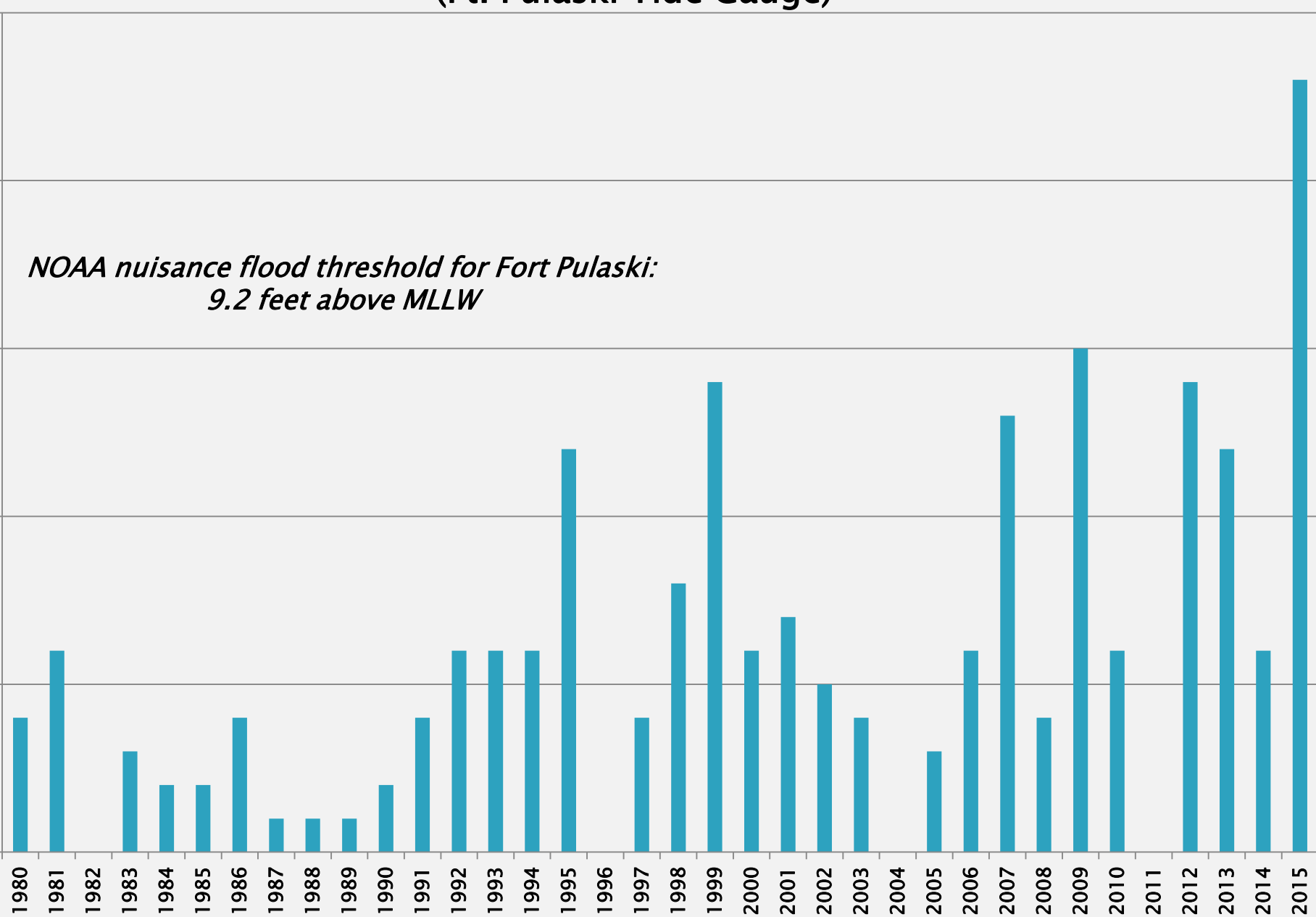
<http://sav-cdn.com/sites/default/files/imagecache/superphoto/14845662.jpg>

*Fifth highest tide on record (since 1935) for this gauge
(10.43' above Mean Lower Low Water, MLLW)*

Only exceeded by tropical storm surges

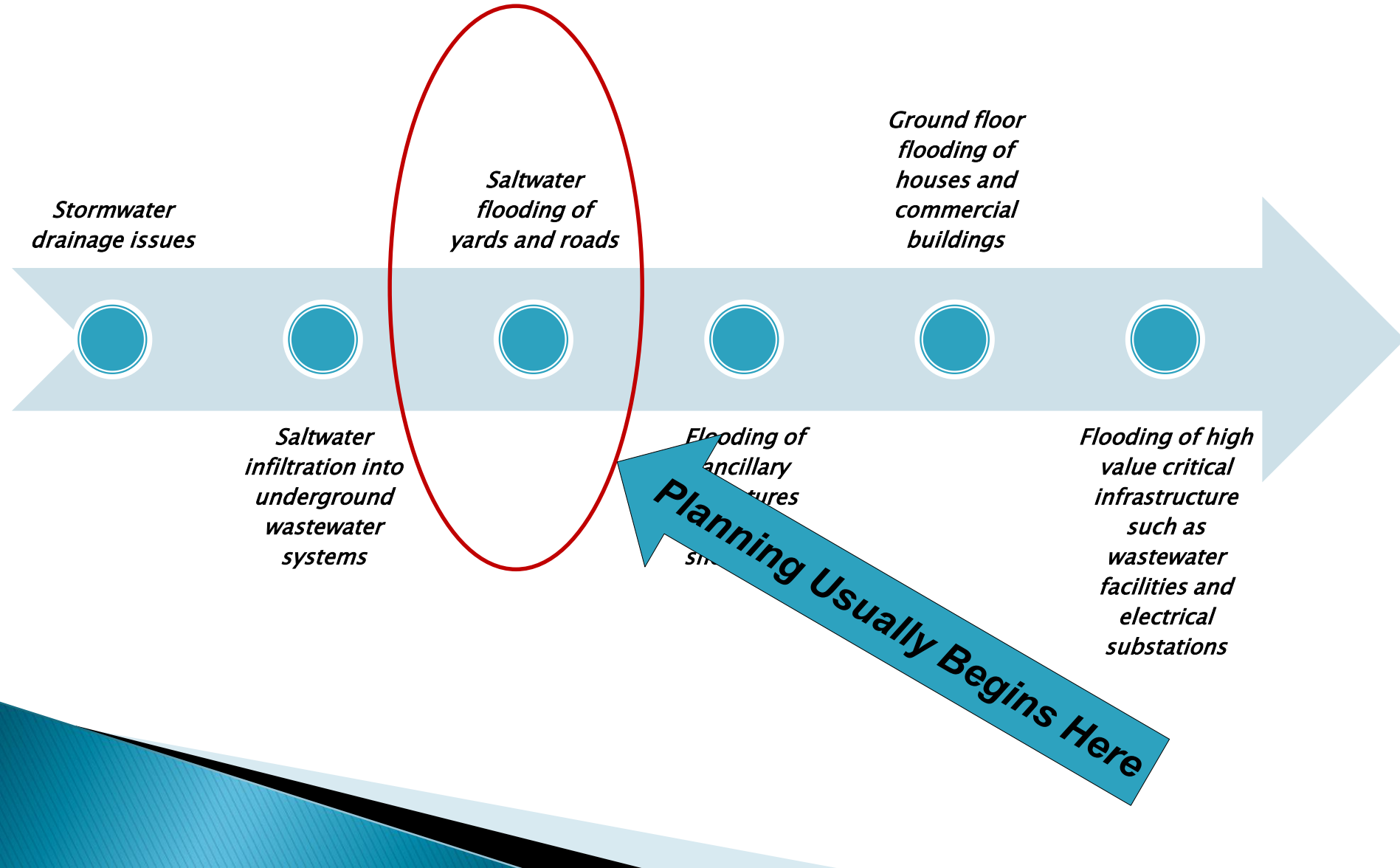
Nuisance Floods by Year at Tybee Island, GA (Ft. Pulaski Tide Gauge)

*NOAA nuisance flood threshold for Fort Pulaski:
9.2 feet above MLLW*



Data Source: <https://tidesandcurrents.noaa.gov/stationhome.html?id=8670870>

General Timeline of Sea Level Rise Impacts on the Built Environment



Tidal flooding on Tybee Island, GA

US Highway 80

October 27, 2015



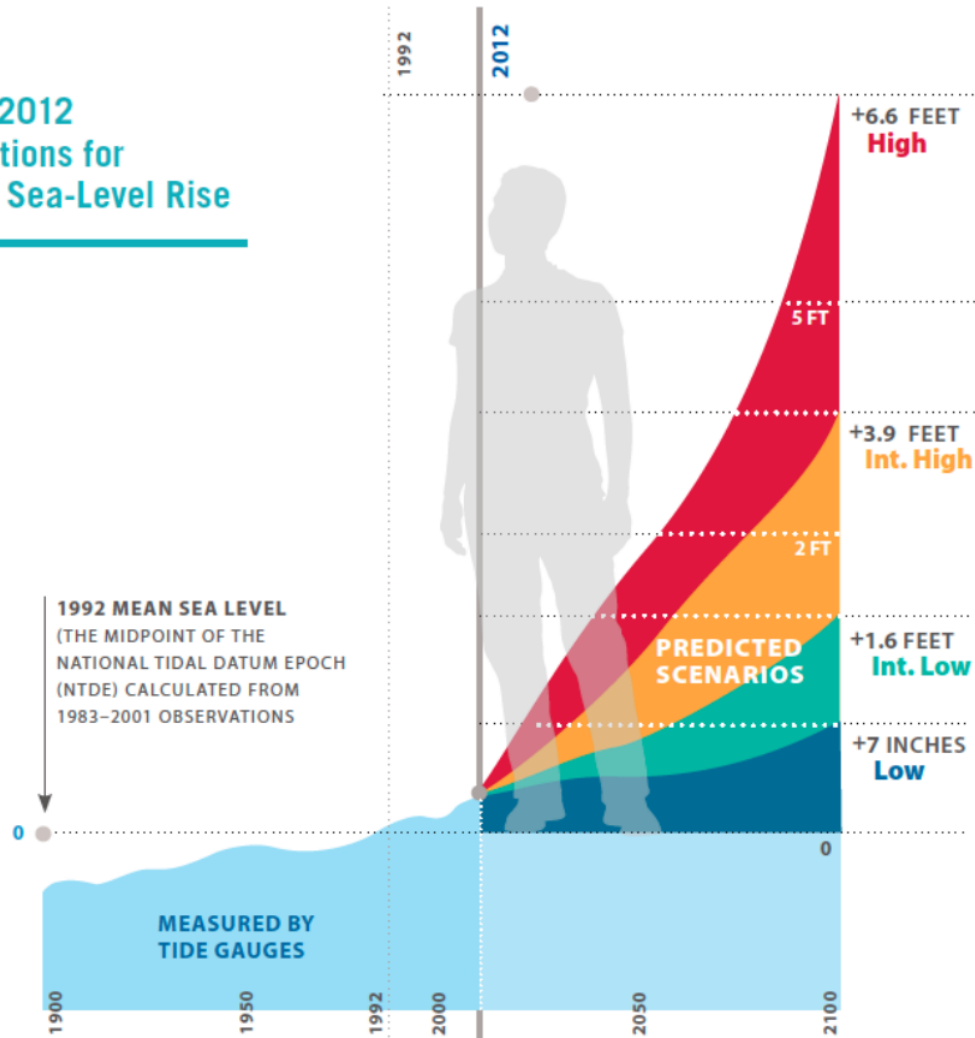
<http://sav-cdn.com/sites/default/files/imagecache/superphoto/14845662.jpg>

*Fifth highest tide on record (since 1935) for this gauge
(10.43' above Mean Lower Low Water, MLLW)*

Only exceeded by tropical storm surges

Yes, sea-level rise is likely accelerating

NOAA 2012 Predictions for Global Sea-Level Rise



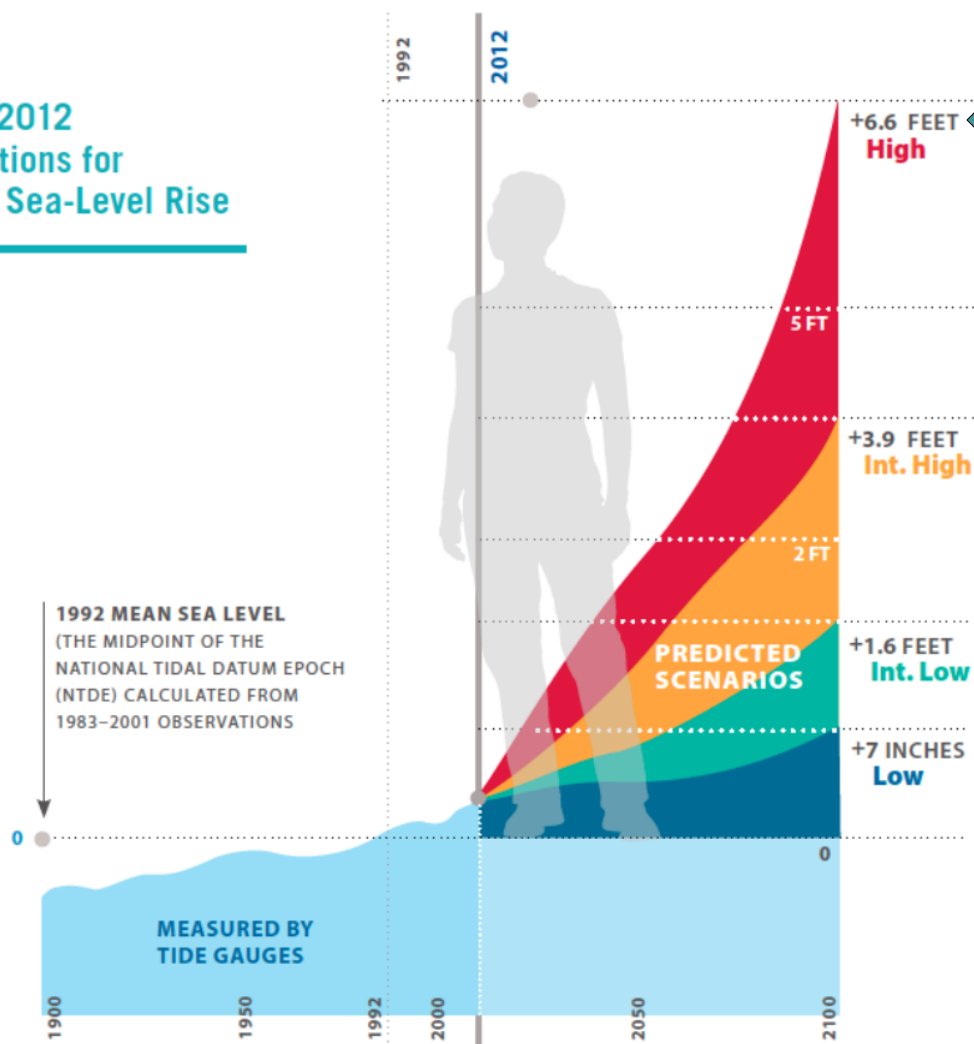


"Scientists have very high confidence that global mean sea level will rise at least 8 inches and no more than 6.6 feet by 2100."

NOAA REPORT, DEC. 2012

What to do????

NOAA 2012 Predictions for Global Sea-Level Rise



Or maybe this?

Plan for this?



Marine Extension and
Georgia Sea Grant
UNIVERSITY OF GEORGIA



ga.coast.uga.edu

Garden Shed or Nuclear Power Plant?

“Risk-based” scenario planning for sea-level rise and climate change-induced flood risk...

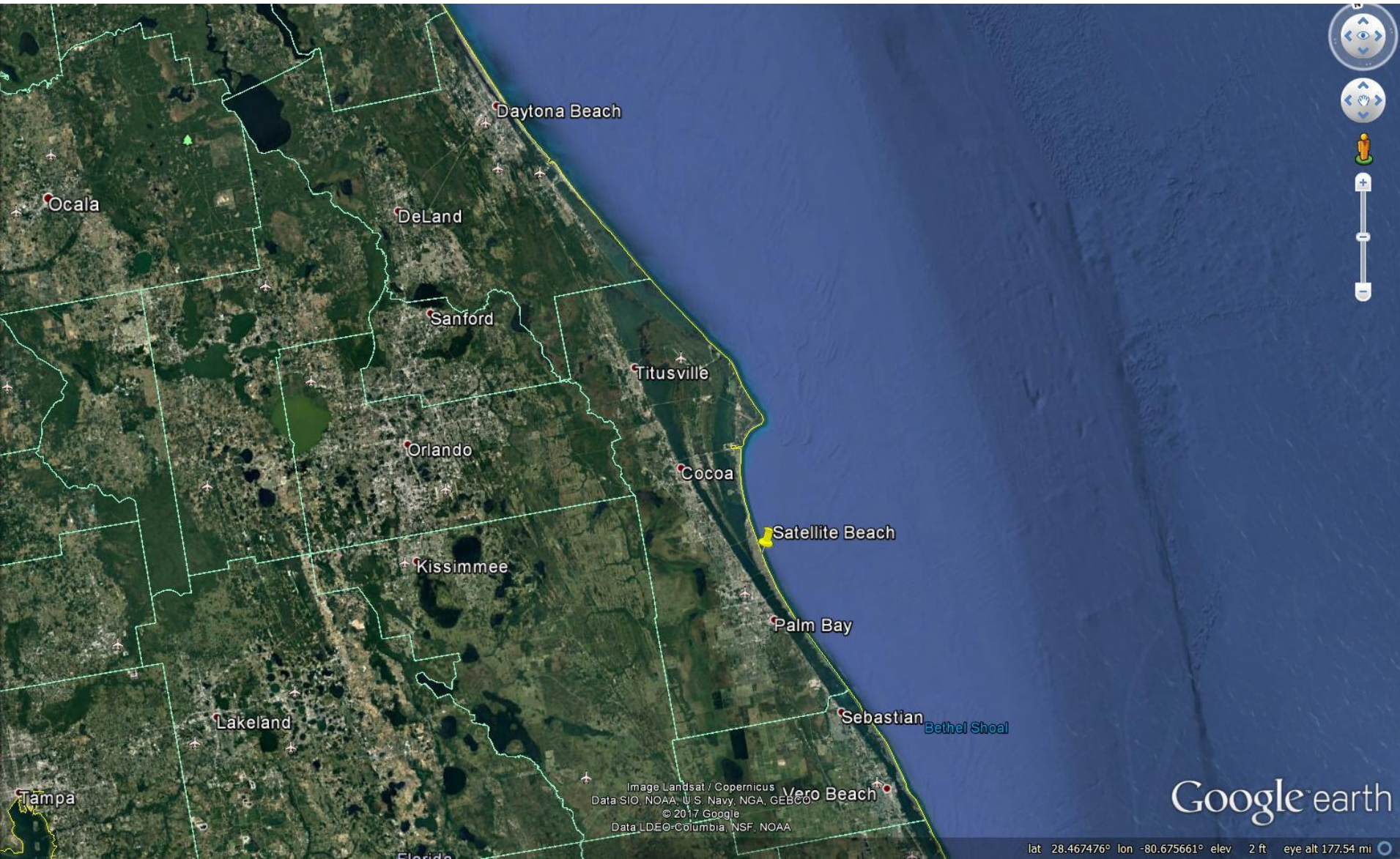


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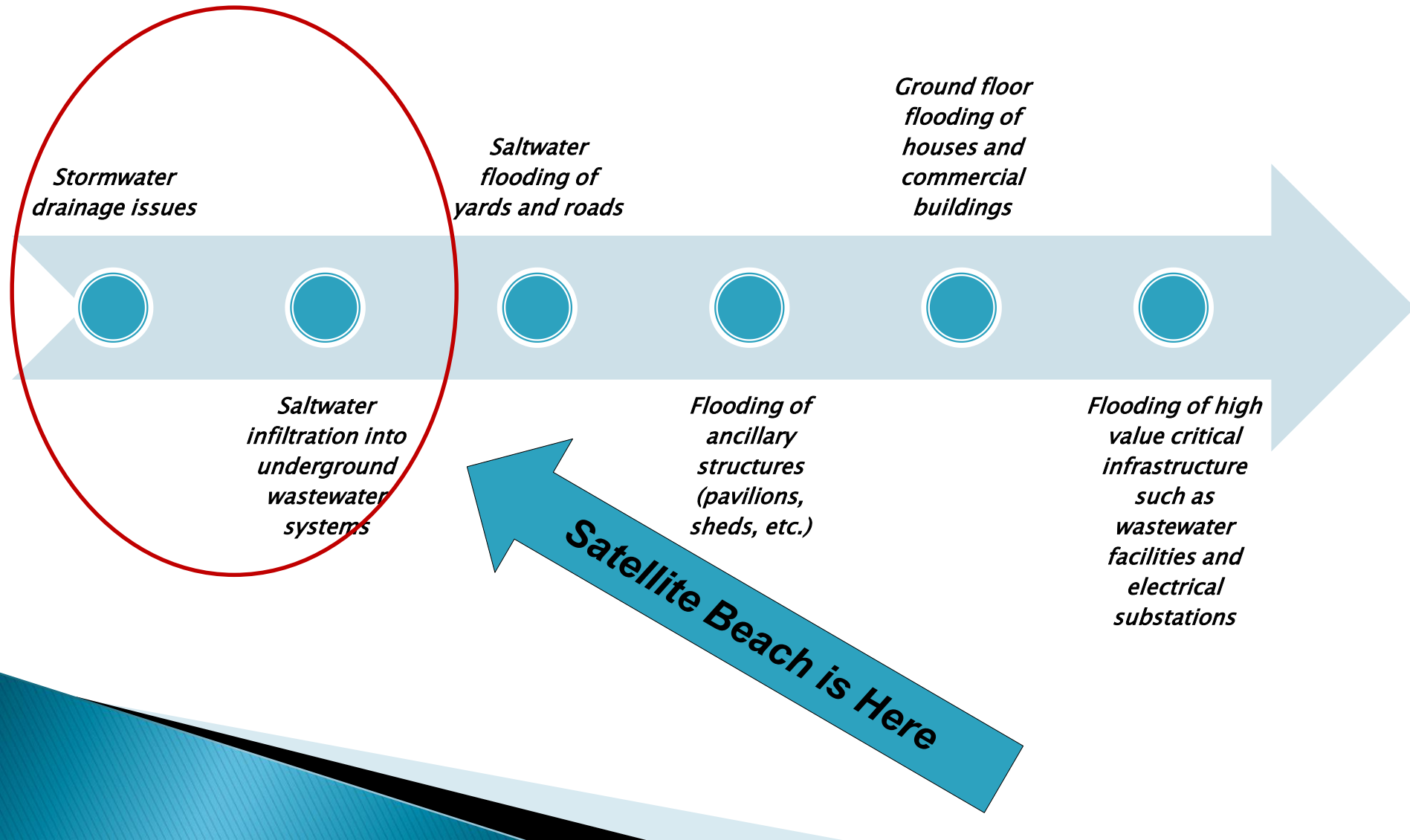


https://nuclear.gepower.com/content/dam/gepower-nuclear/global/en_US/images/hero-images/Nine-Mile-Point-Nuclear-Plant-cropped.jpg

Satellite Beach: A Regional Leader in Climate Adaptation Planning

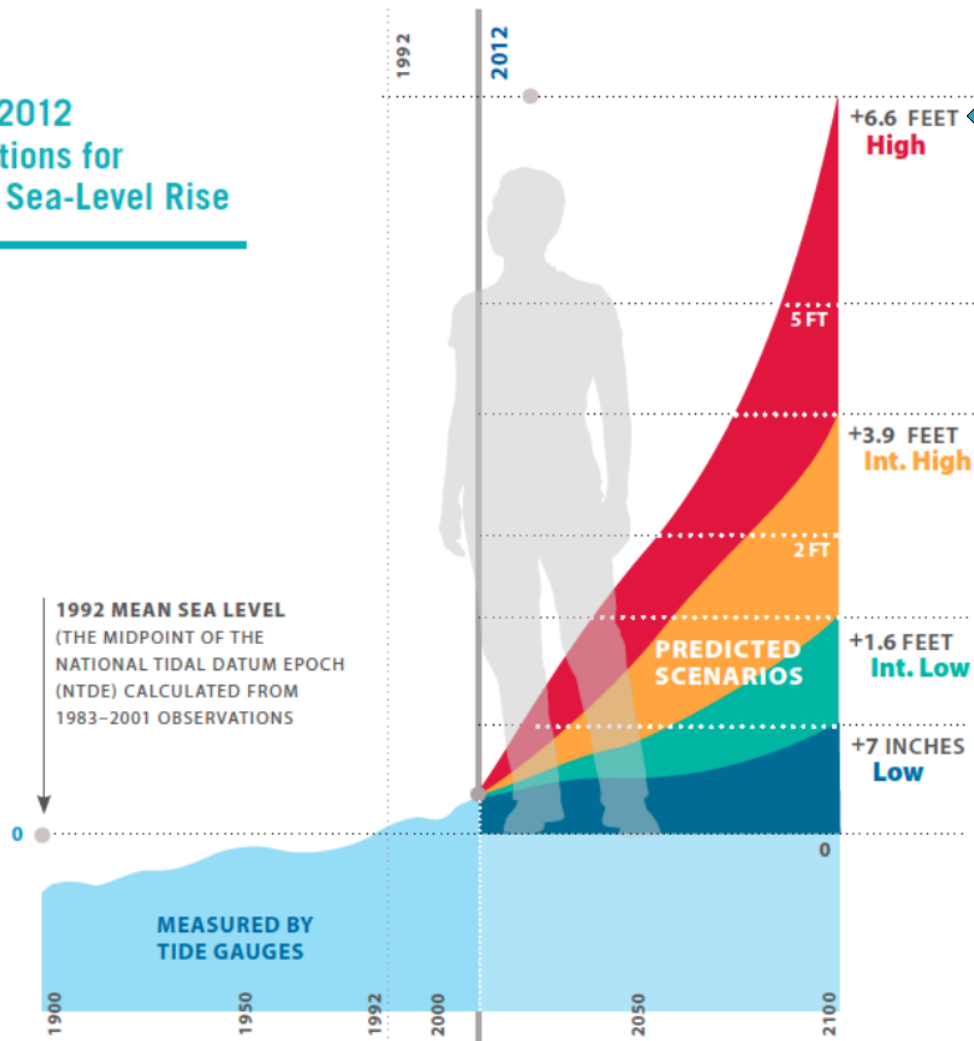


General Timeline of Sea Level Rise Impacts on the Built Environment



What to do????

NOAA 2012 Predictions for Global Sea-Level Rise



Or maybe this?

Plan for this?



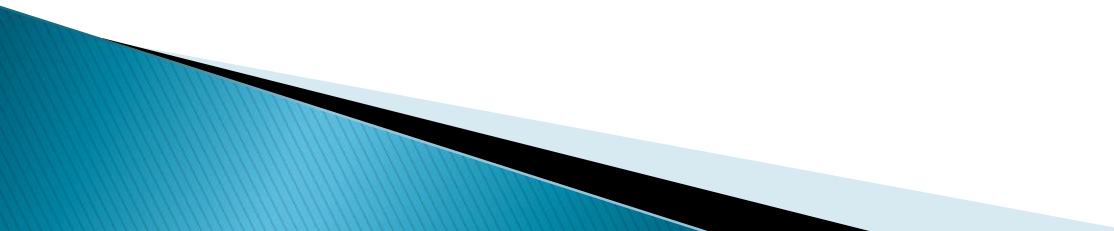
Marine Extension and
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ga.coast.uga.edu

Satellite Beach Comp Plan

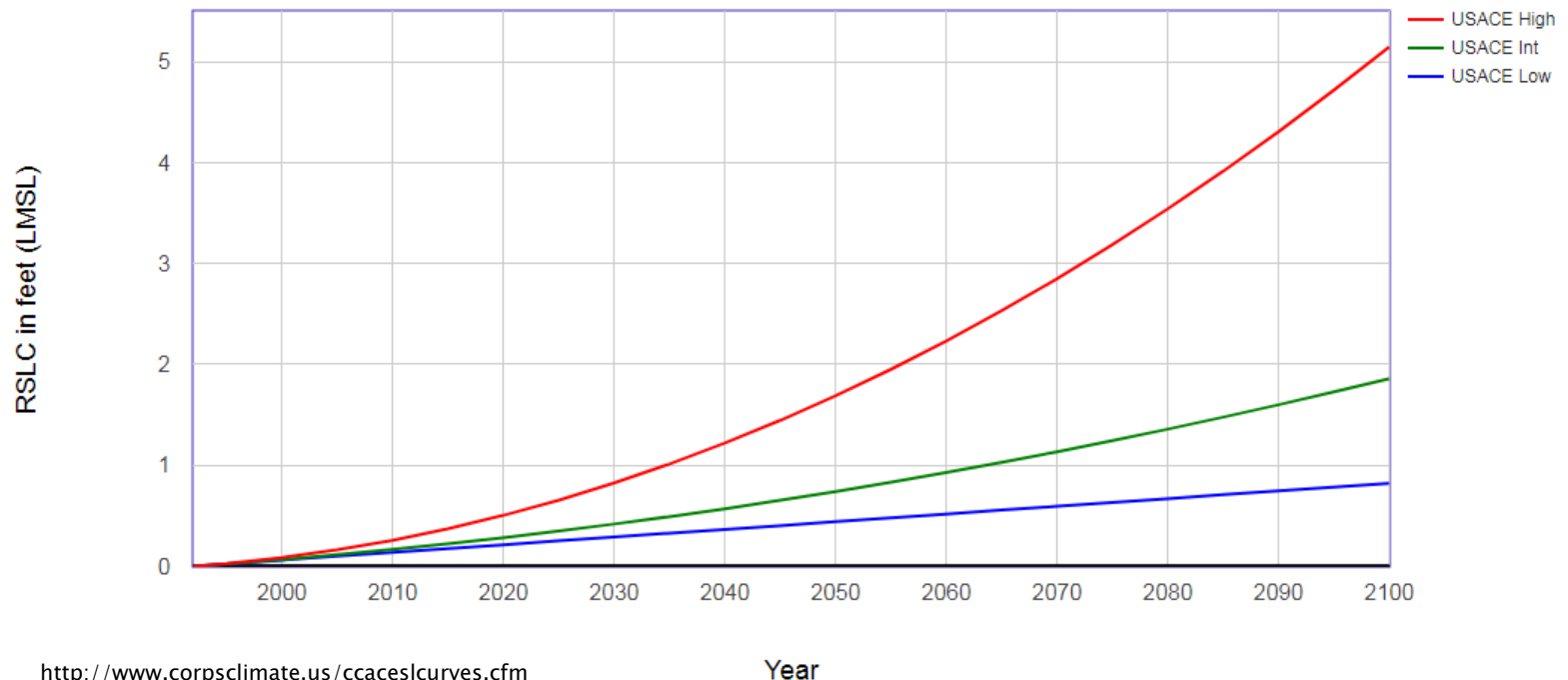
Policy 1.1.6 – The City shall utilize a 2070 planning horizon and the USACE high curve for sea level rise, where applicable to the life span of the infrastructure and decision process. 2070 year projections shall be utilized for new infrastructure with life spans over 50 years and anticipated to be built by 2025. These ranges and projection curve model shall be updated based upon the newest data projection curves, when available, but at least every 5 years.



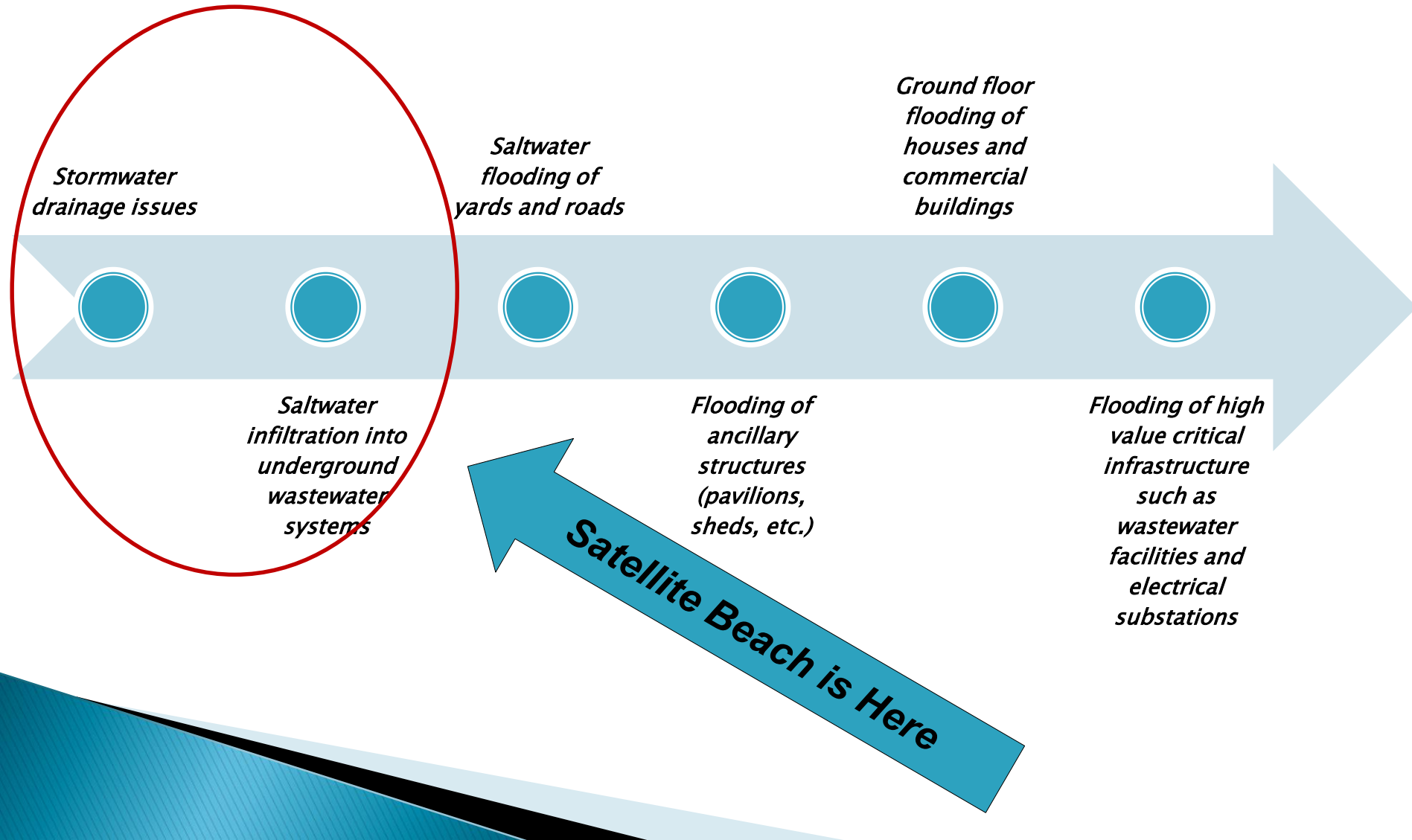
Army Corps High Projection?

Year	Relative Sea Level (Ft)	Relative Sea Level (In)
1992	-0.37'	-4.4"
2015	0.00'	0.0"
2040	0.85'	10.2"
2070	2.48'	29.8"

Estimated Relative Sea Level Change Projections - Gauge: 8721120, Daytona Beach Shores, FL



General Timeline of Sea Level Rise Impacts on the Built Environment



To be clear: Sea-level rise is not the primary culprit for these breaks (but it doesn't help)

Broken Main Discharged 1 Million Gallons Of Raw Sewage In Florida



By Peak Johnson

More than 1 million gallons of raw sewage went into a canal that leads to Central Florida's Banana River, after an old sewer pipe broke last week near the border of Satellite Beach and Indian Harbour Beach.

"It's 20-year-old pipe," Don Walker, spokesman for Brevard County told *Florida Today*. "It's kind of a problem we've got all over the county."

The county had asked residents to curtail their water use in the hours following the leak to reduce impacts to the sewers. To prevent sewage backups at homes and businesses, the county diverted 688,000 gallons of raw sewage into a pond near Sea Park Elementary School and 1.05 million gallons of raw sewage into Anchor Drive Canal, which connects with the Banana River.

A similar spill happened in the same area of South Patrick Drive in November 2012. The county leaked sewage into the same canal when a pipe failed. A pipe discharged 60,000 gallons of sewage for several hours, until the pipe could be sealed.

The Florida Department of Environmental Protection at the time found no wrongdoing, so it did not fine the county.

Repairing the leaking sewer force main was complicated by excessive inflow of groundwater in the excavation area, county officials said, because it was so close to a canal. The pipe was 9 feet underground.

Utility staff and two contractors worked around the clock for 38 hours, reported *Florida Today*.

"After the first 24 hours, the ability to store and/or haul sewage was exhausted, so the decision was made to divert sewage to a nearby canal to prevent backups into streets, homes or businesses," County Manager Stockton Whitten said. "Additional staff and equipment was brought in to complete the repair."



May 2016

Satellite Beach residents warned to avoid sewage spill

Jim Waymer, FLORIDA TODAY

Published 12:50 p.m. ET Feb. 2, 2018 | Updated 1:53 p.m. ET Feb. 2, 2018



(Photo: Malcolm Denemark)

CONNECT TWEET LINKEDIN COMMENT 4 EMAIL MORE



Signs warn residents along the Cassia Boulevard canal to avoid swimming or fishing in the area until

February 2018

October 1, 2017 (after Irma was long past)

More than 10 inches of rain fell on Palm Bay, Indialantic; flooding could continue

Tyler Vazquez, FLORIDA TODAY

Published 12:11 p.m. ET Oct. 2, 2017 | Updated 6:45 p.m. ET Oct. 2, 2017



[VIDEOS: RECORD RAINS IN BREVARD](#)

1 of 6

Scenes of flooding in Merritt Island | 2:33

Monday in the aftermath of heavy rains from Sunday. Video by Tim and Riley Shortt. Posted 10/2/17.

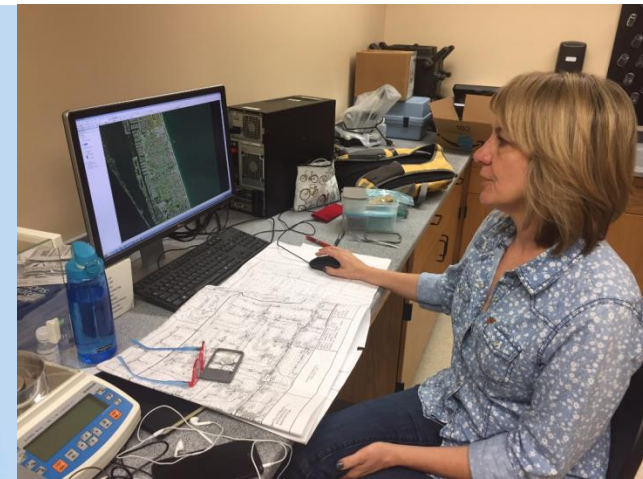
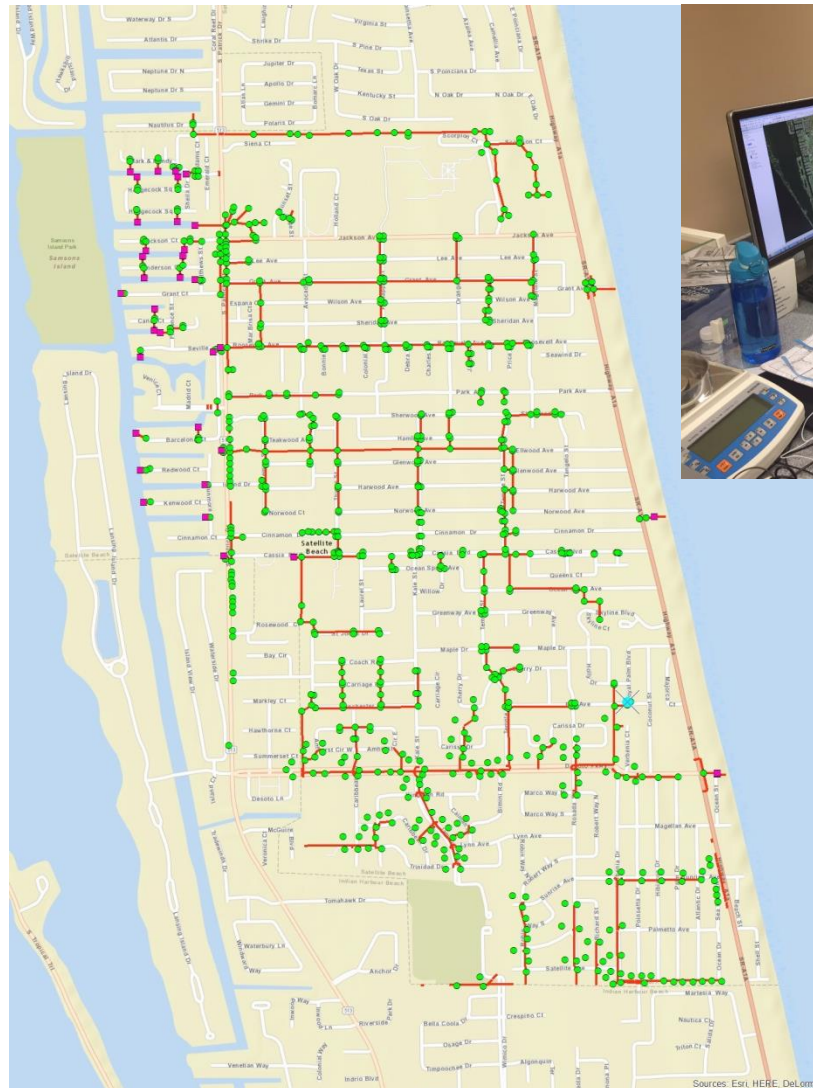
Florida Sea Grant (2016-2018)

Objective 1: Work with the City to develop and update geographic information system (GIS) files to include high precision elevation data for stormwater, critical facilities, and vulnerable buildings



July 2016

Stormwater Data



Project Goals

Objective 2: Use improved infrastructure datasets to develop enhanced storm surge flood assessments using FEMA's HAZUS Multi-Hazard Assessment Tool



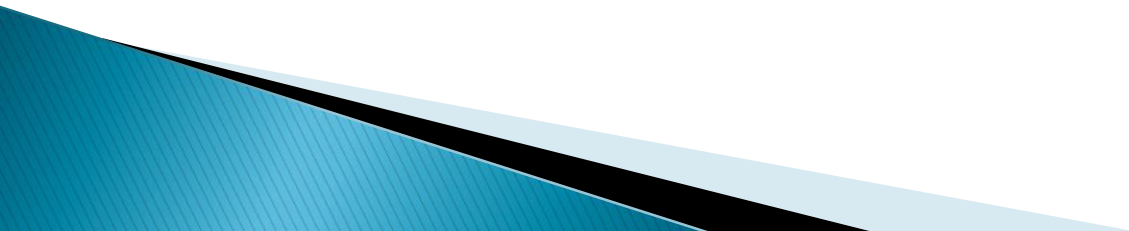
STETSON
UNIVERSITY

Benefits

HAZUS–MH allows the user to:

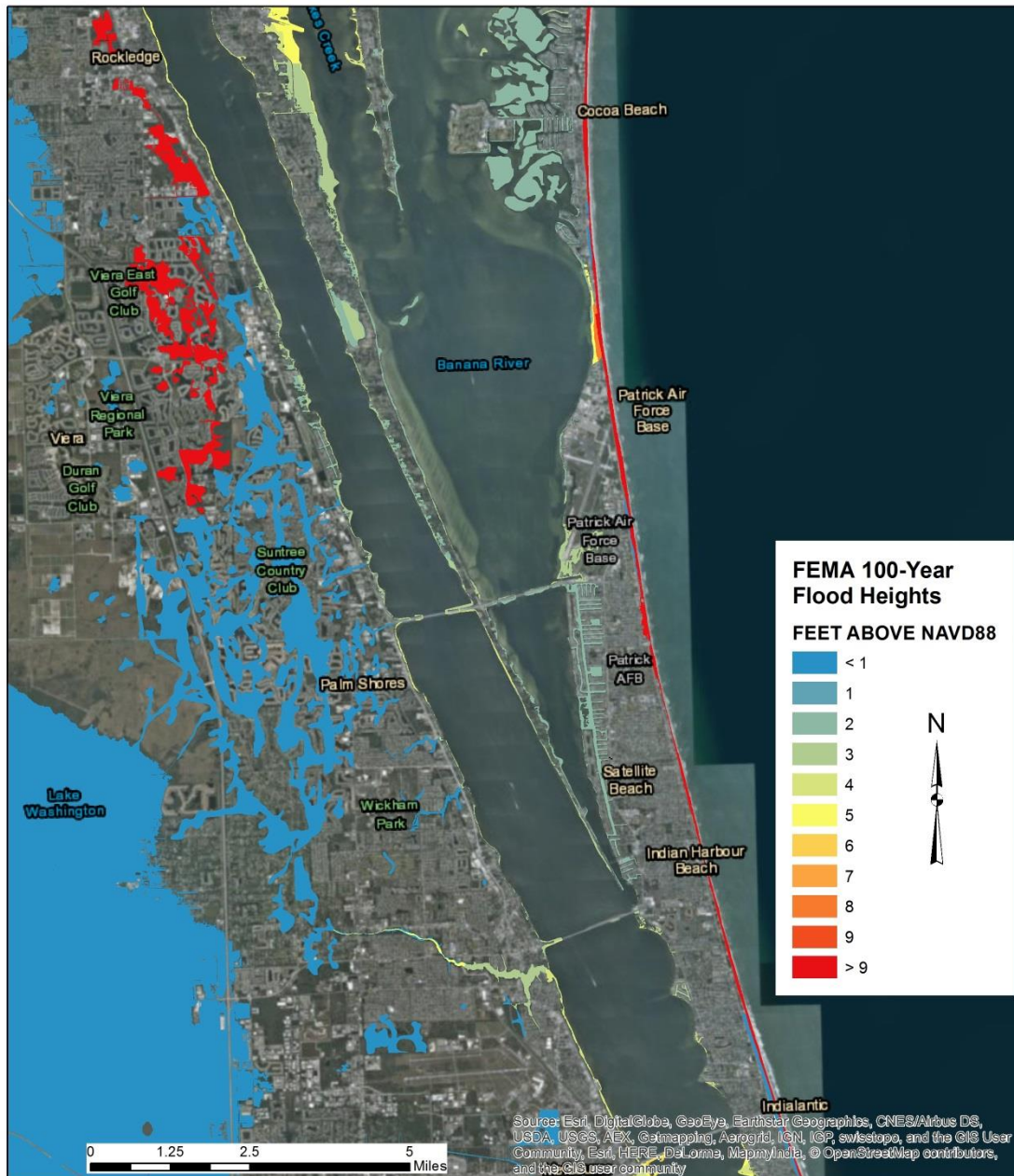
- **IDENTIFY** vulnerable areas that may require planning considerations
- **ASSESS** level of readiness and preparedness to deal with a disaster before it occurs
- **ESTIMATE** potential losses from specific hazard events (before or after a disaster hits)
- **DECIDE** how to allocate resources for most effective and efficient response and recovery
- **PRIORITIZE** mitigation measures that need to be implemented to reduce future losses

***But running HAZUS near
Satellite Beach gave us some
unexpected results...***

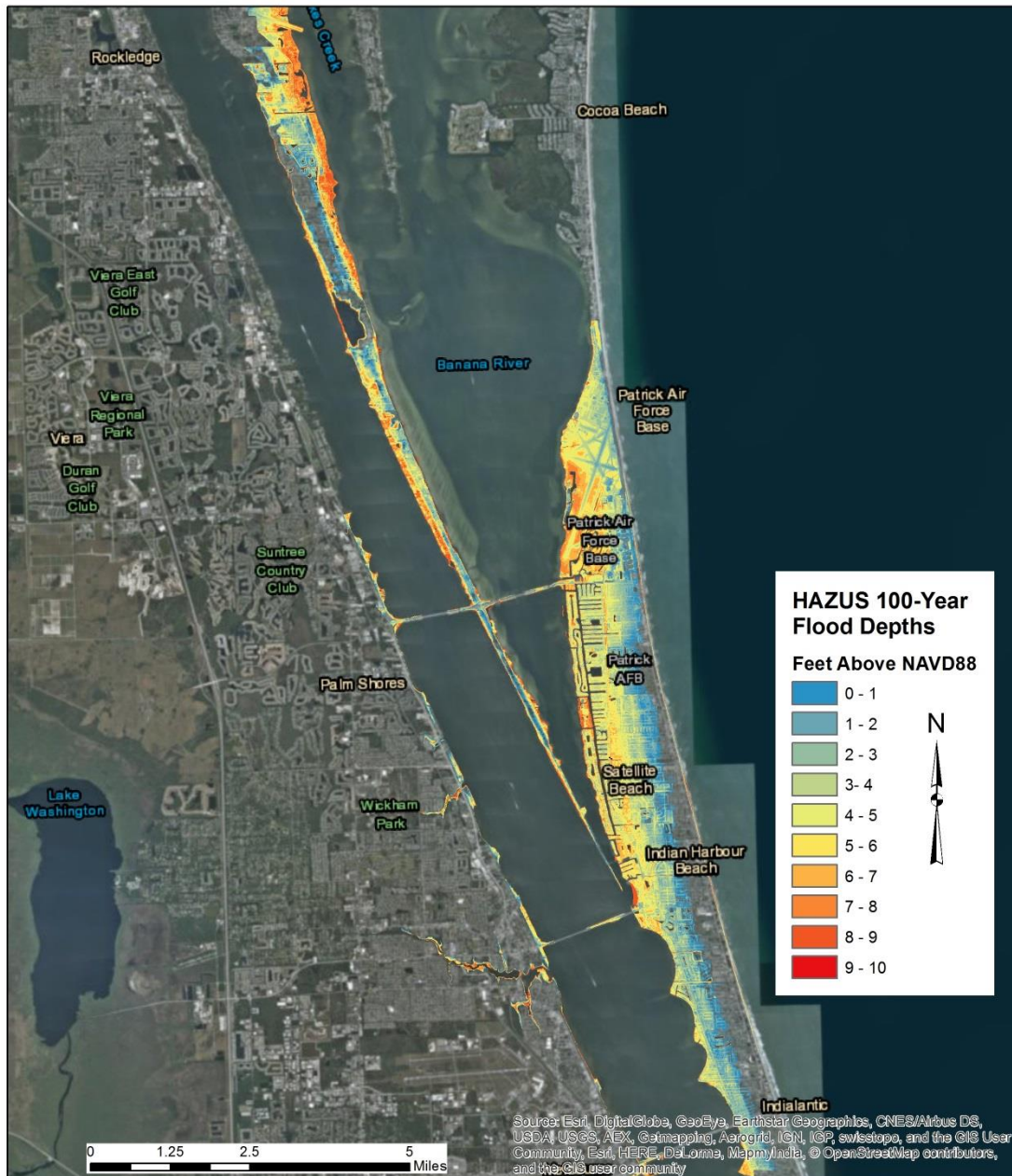


Current Flood Insurance Rate Maps Southern Brevard County, FL

FEMA Floodzones, SE Brevard County

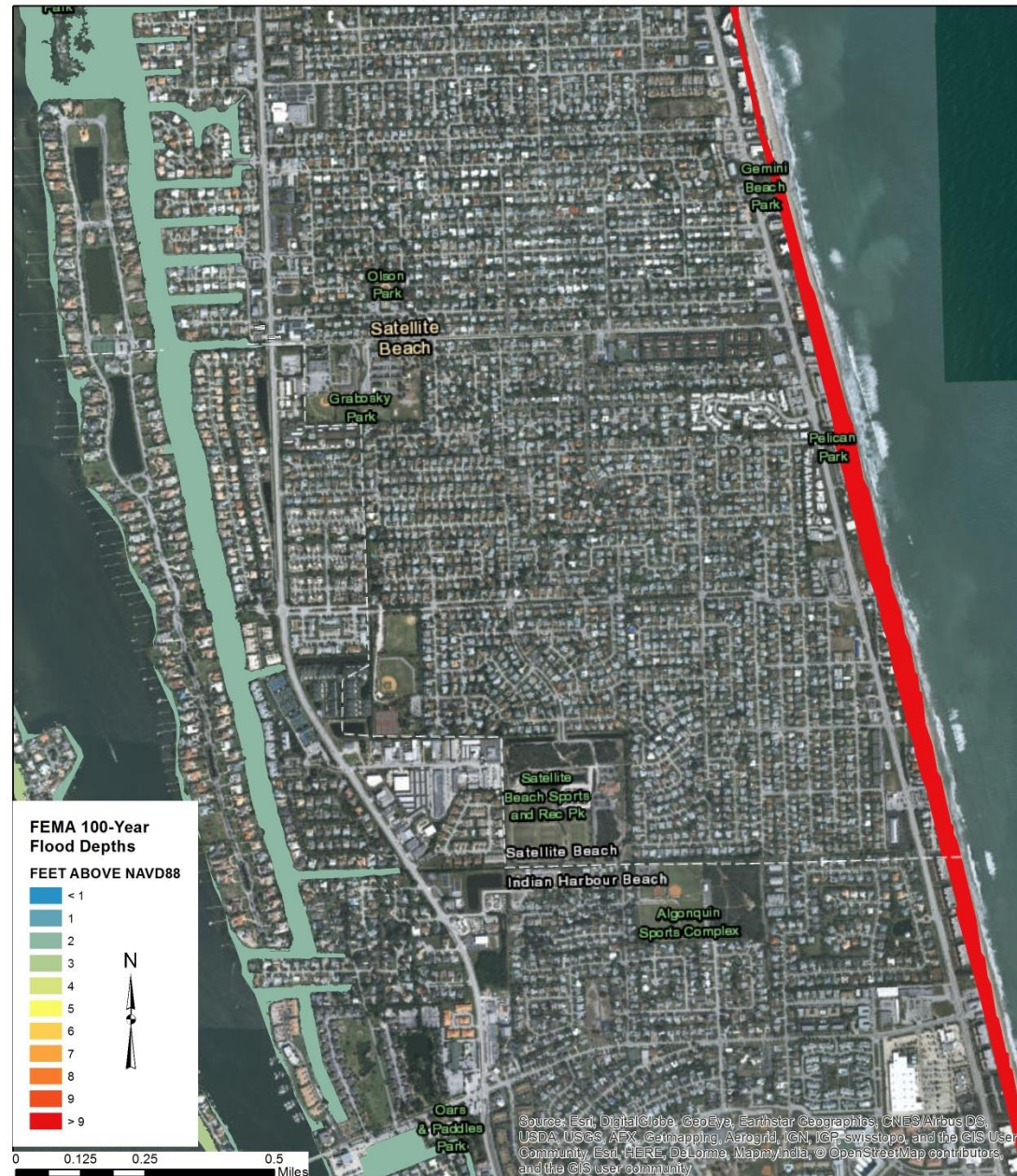


HAZUS 100-Year Coastal Flooding Depth Grid Southern Brevard County, FL



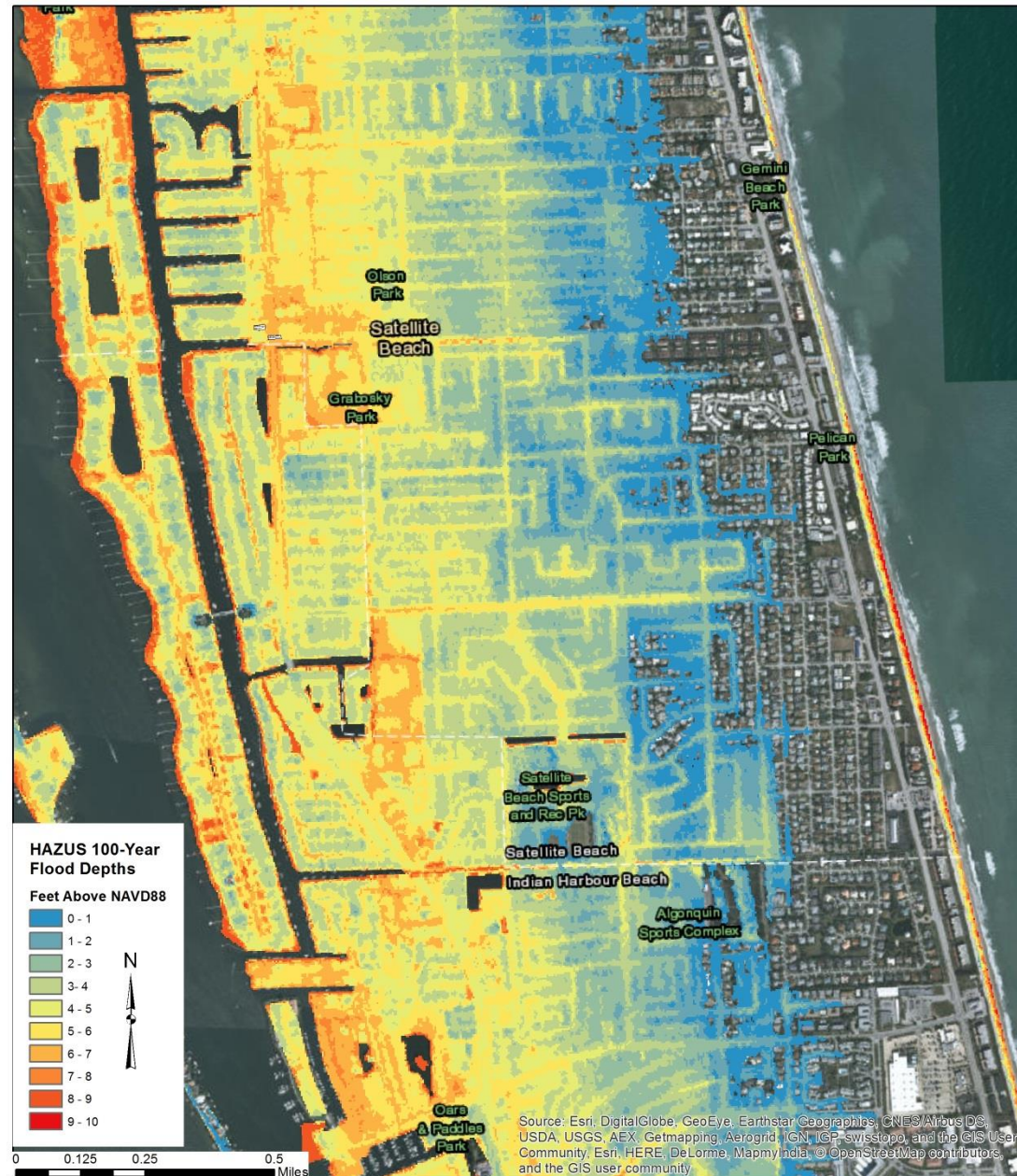
HAZUS Coastal Flood Risk Zones (also a FEMA tool)

Current Flood Insurance Rate Map Satellite Beach, FL



FEMA Flood Zones in Satellite Beach

HAZUS 100-Year Coastal Flooding Depth Grid Satellite Beach, FL

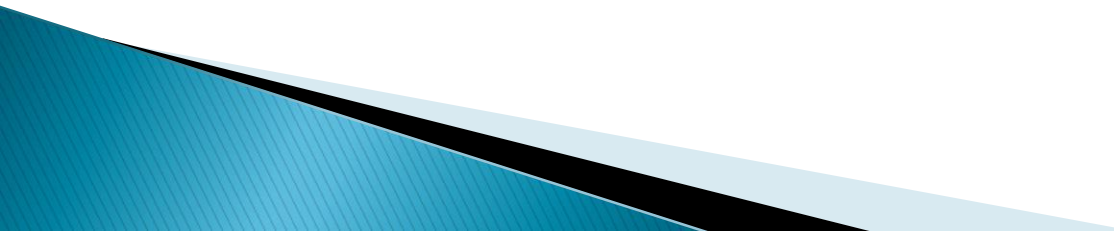


HAZUS Coastal
Flood Risk
Zones (also a
FEMA tool)

Current
conditions
(i.e., no sea
level rise)

Big takeaway lesson #1:

Flood risk characterization tools for flood insurance (property) are quite different than the flood risk characterization for evacuations and critical facility (human life).



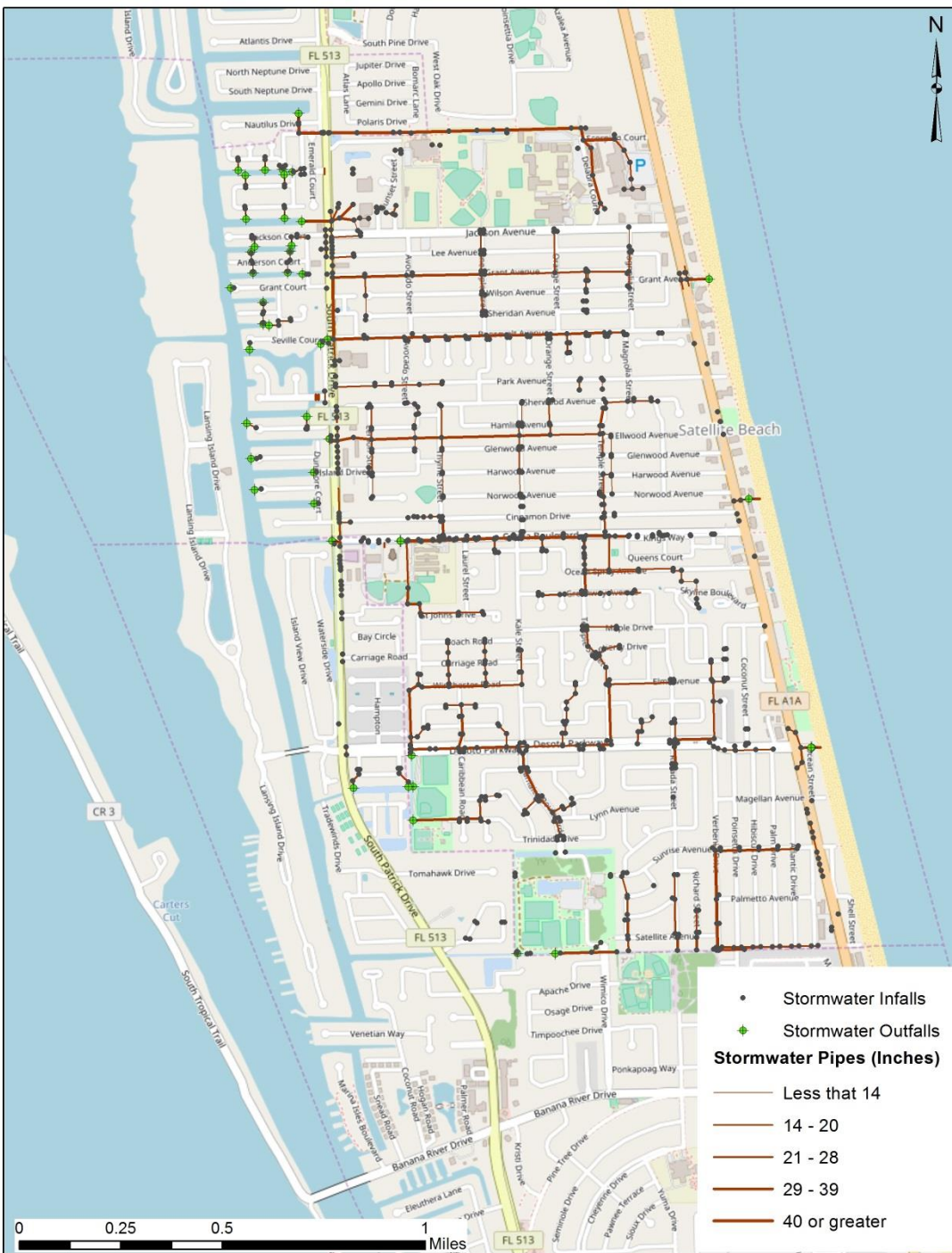
Project Goals

Objective 3: Integrate new datasets with previous vulnerability assessments and policy frameworks to develop specific recommendations for increasing Satellite Beach's resilience to sea-level rise and future flood risks



ERIN L. DEADY, P.A. 





Stormwater Inventory Base

City of Satellite Beach, Florida

Stormwater Tidewater Inflow Assessment

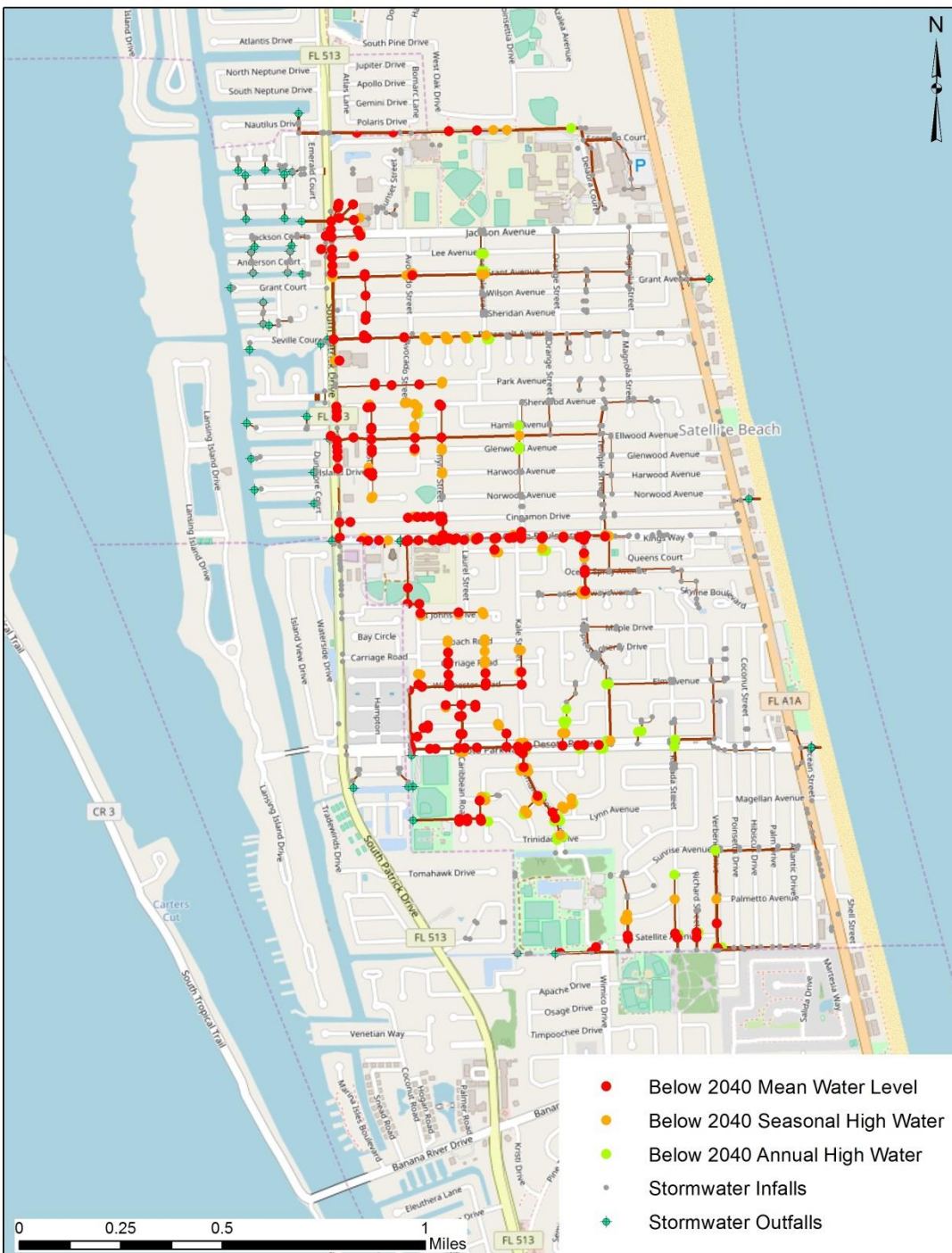
2015 Water Levels

***Mean Water Level =
Tidewater in pipe at least
 $\frac{1}{2}$ of the year***

***Seasonal High Water =
Tidewater in pipe for
~ 1 month***

***Annual High Water =
Tidewater in pipe for ~ 1 day***





Stormwater Tidewater Inflow Assessment

2040 Water Levels

***Mean Water Level =
Tidewater in pipe at least
½ of the year***

***Seasonal High Water =
Tidewater in pipe for
~ 1 month***

***Annual High Water =
Tidewater in pipe for ~ 1 day***

- Below 2040 Mean Water Level
- Below 2040 Seasonal High Water
- Below 2040 Annual High Water
- Stormwater Infalls
- ◆ Stormwater Outfalls



Stormwater Tidewater Inflow Assessment

2070 Water Levels

***Mean Water Level =
Tidewater in pipe at least
½ of the year***

***Seasonal High Water =
Tidewater in pipe for
~ 1 month***

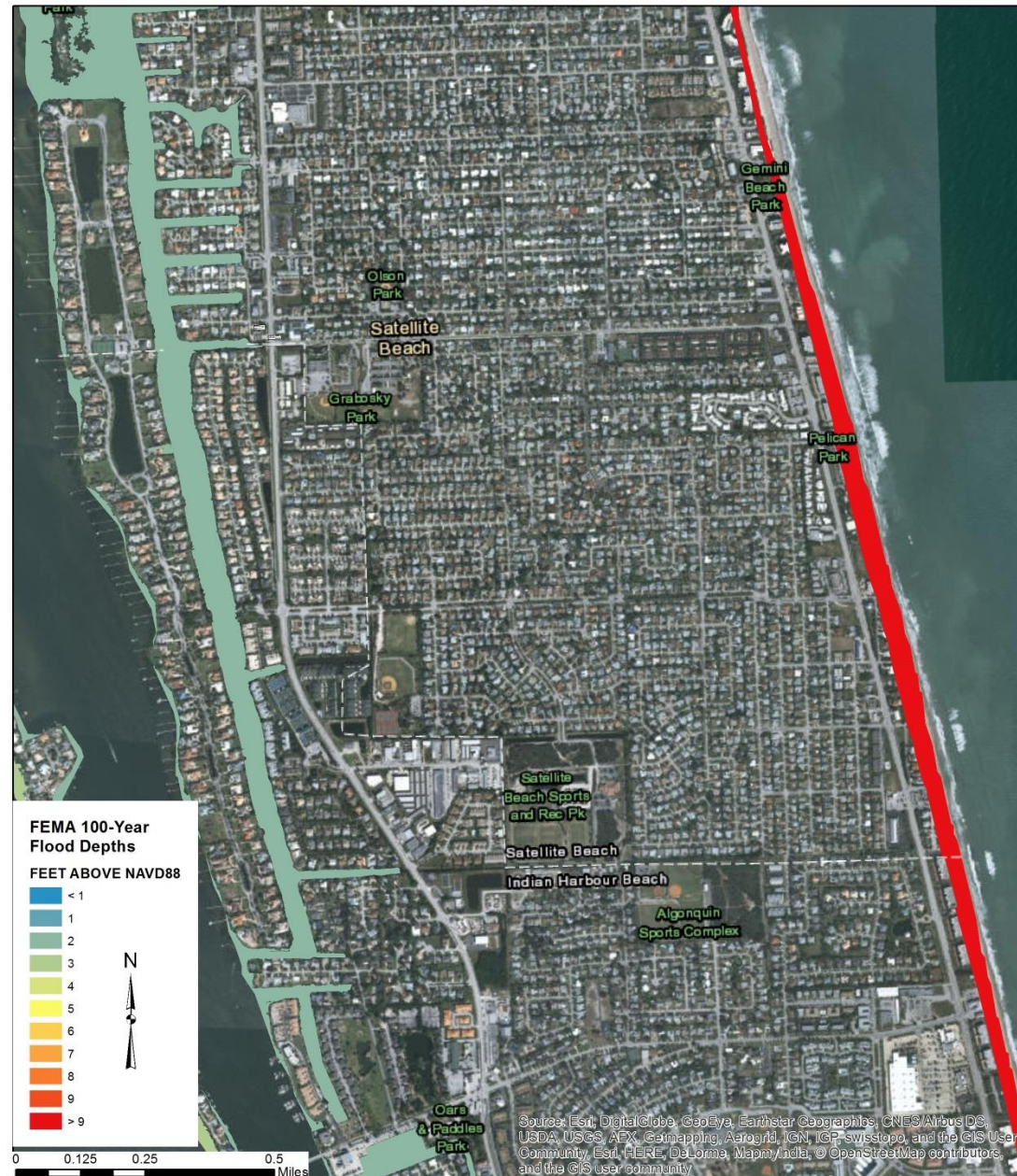
***Annual High Water =
Tidewater in pipe for ~ 1 day***

- Below 2070 Mean High Water
- Below 2070 Seasonal High Water
- Below 2070 Annual High Water
- Stormwater Infalls
- ◆ Stormwater Outfalls

Current Flood Insurance Rate Map
Satellite Beach, FL

Big takeaway #2

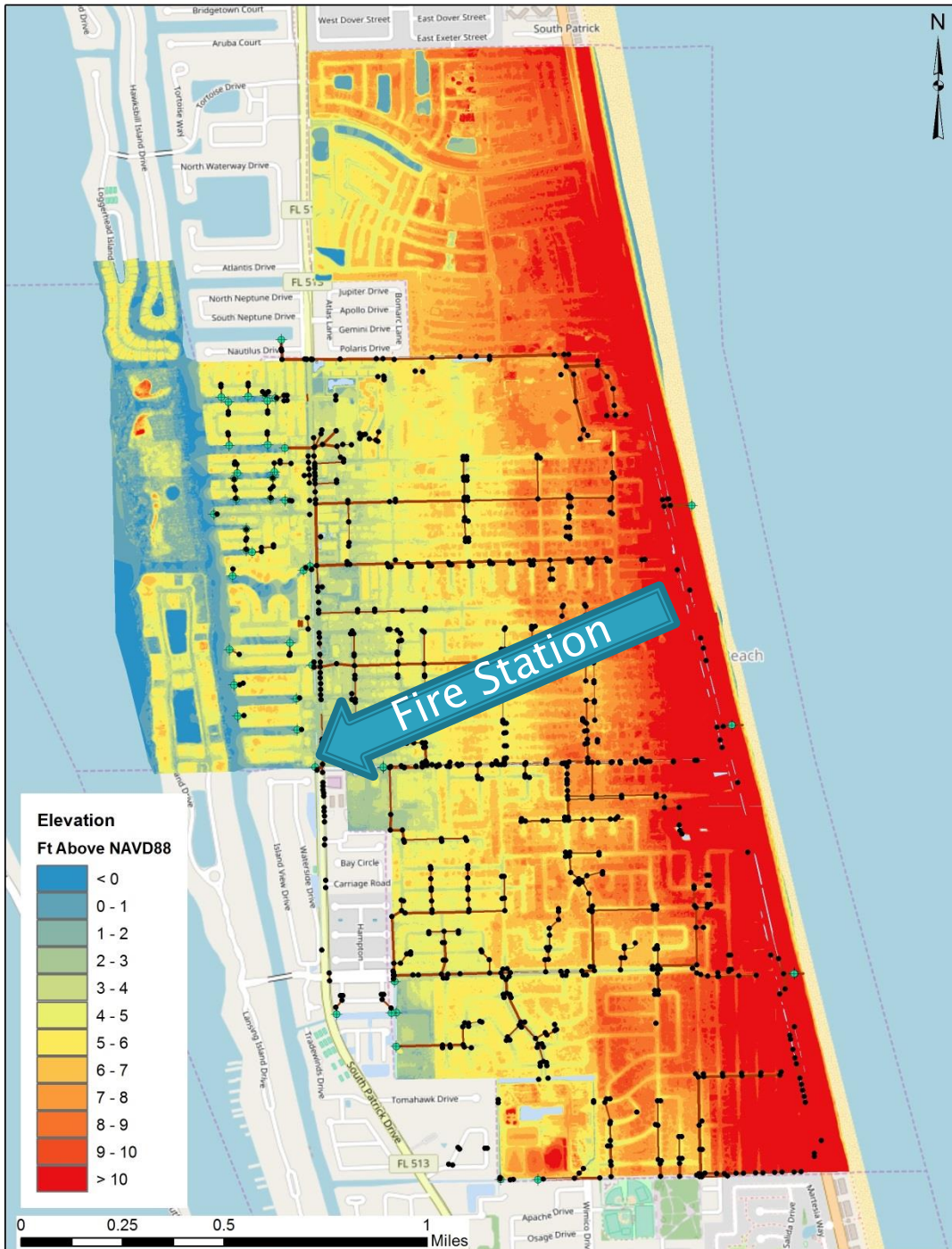
FEMA flood zones in the coastal zone are almost exclusively for storm surge... and DO NOT account for local stormwater drainage



Satellite Beach Fire Station



Site-level
flood
assessment
requested
by city
officials in
July 2017



Yes, this is one of the lowest lying areas in the City of Satellite Beach

Delivered to City Council on September 6, 2017

**Site Flood Vulnerability Assessment for the Satellite Beach Fire Department
(1390 South Patrick Drive, Satellite Beach, FL)**

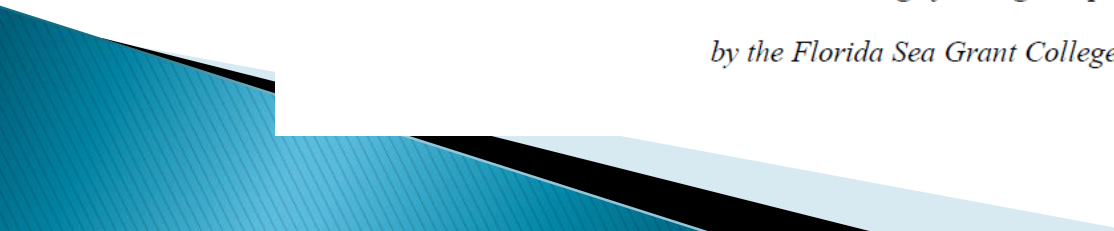
Report for the City of Satellite Beach

August 28, 2017

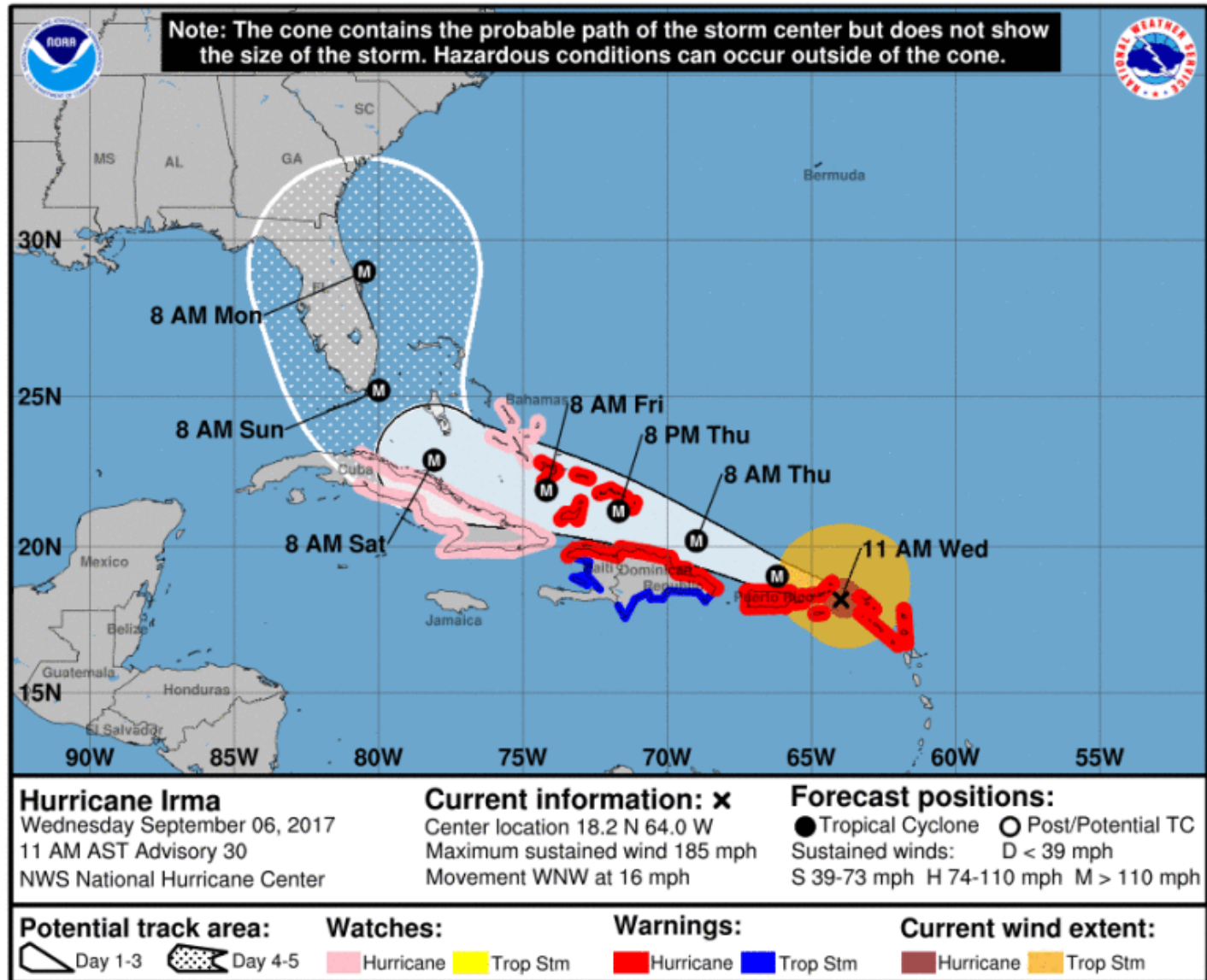
Dr. Jason M. Evans – Department of Environmental Science and Studies, Stetson University

Adam Carr, Crystal Goodison, and Dr. Paul Zwick – GeoPlan Center, University of Florida

*Assessment conducted through funding and project support provided
by the Florida Sea Grant College Program*



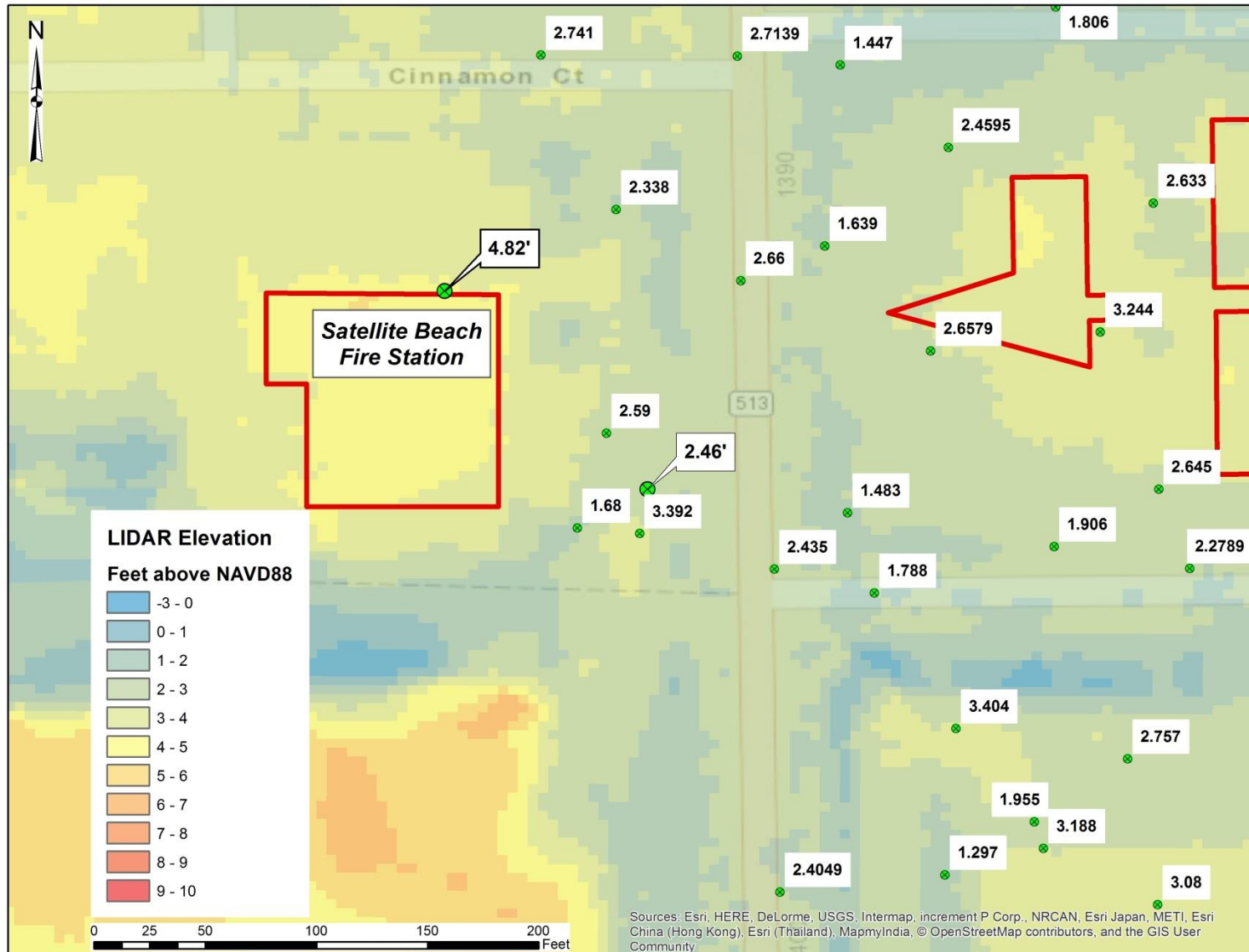
September 6, 2017



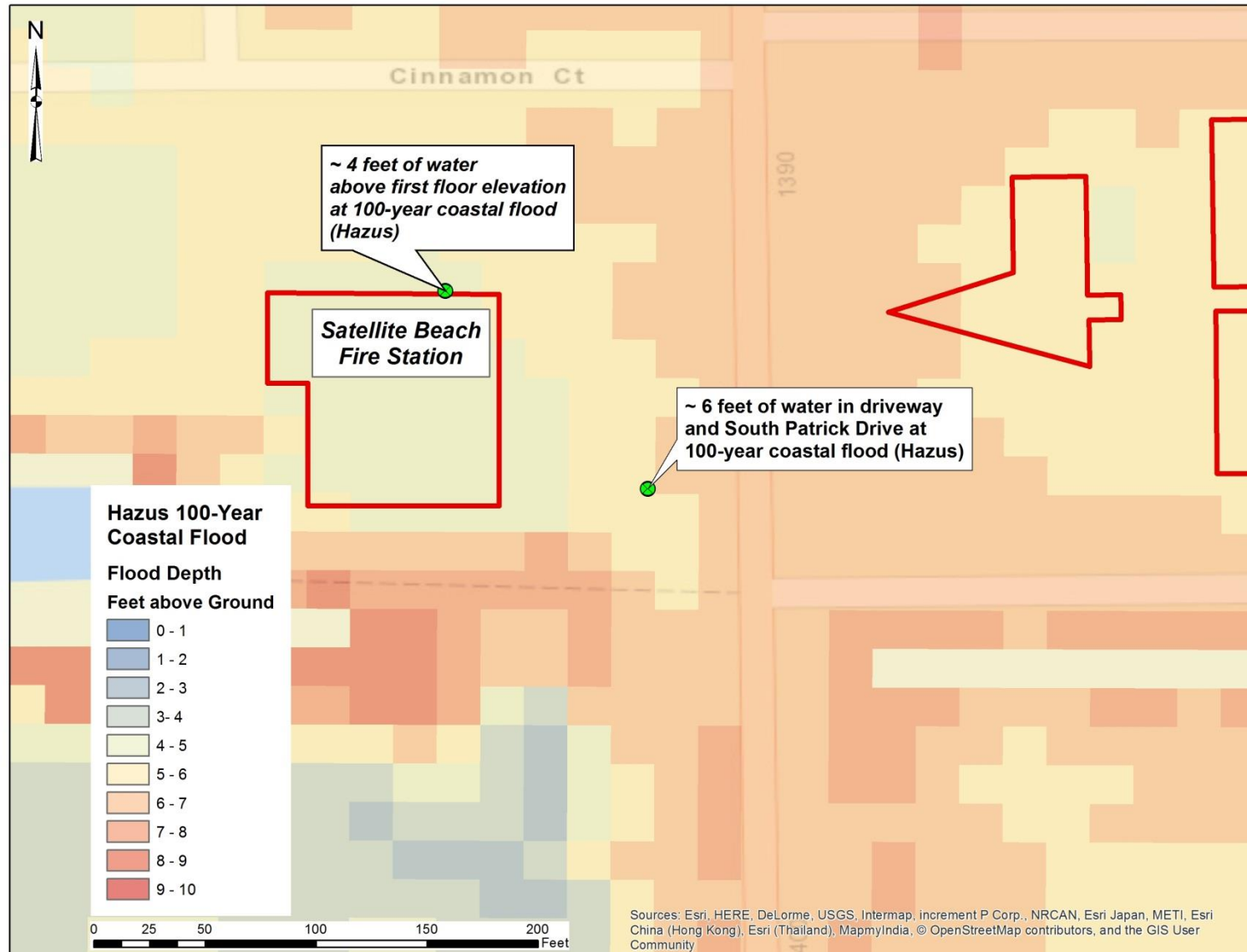
Nothing pictured is currently in a flood zone



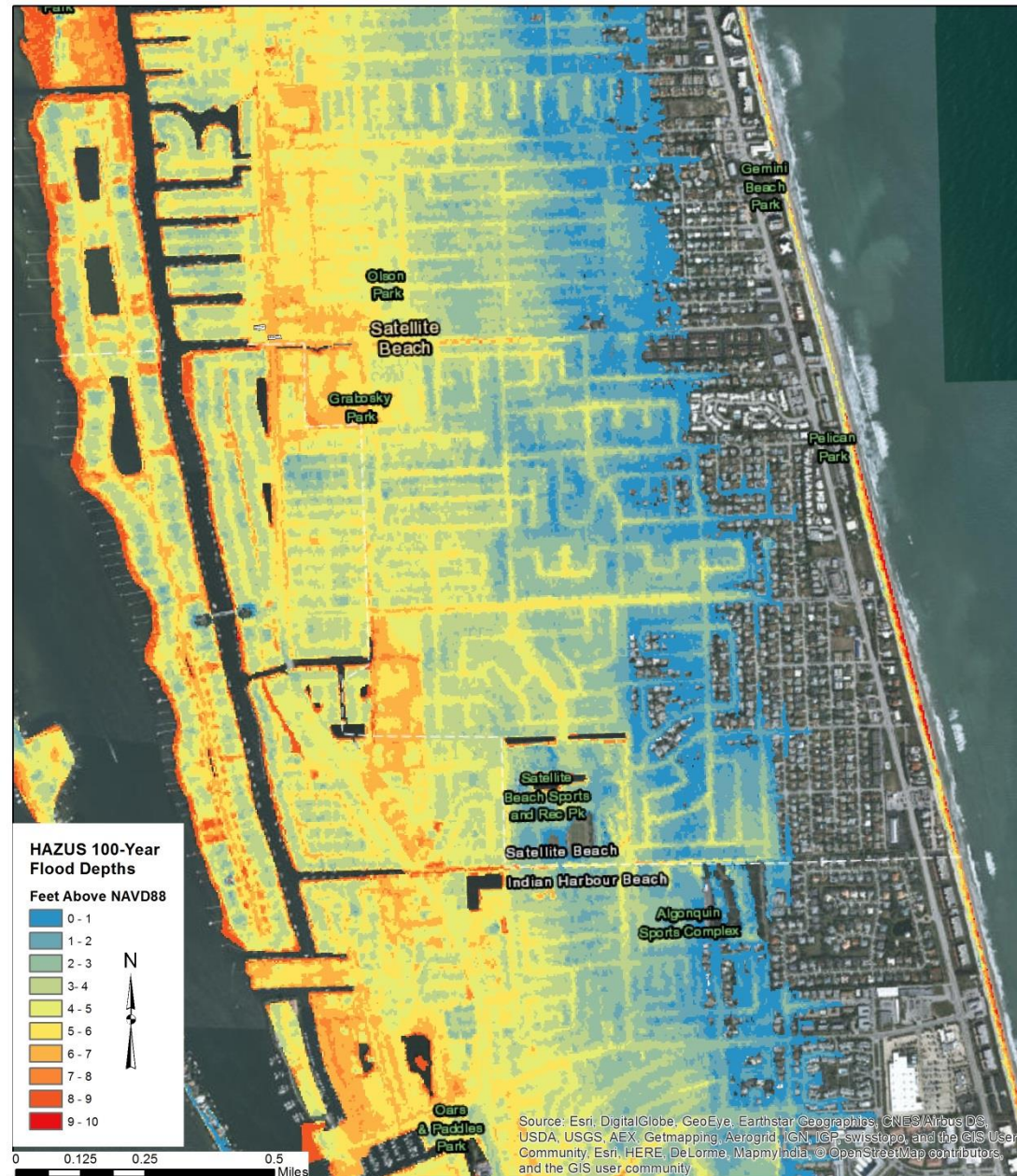
LIDAR Elevations with survey control points and OPUS GPS



HAZUS results (current sea level)



HAZUS 100-Year Coastal Flooding Depth Grid Satellite Beach, FL



HAZUS Coastal
Flood Risk
Zones (also a
FEMA tool)

Current
conditions
(i.e., no sea
level rise)

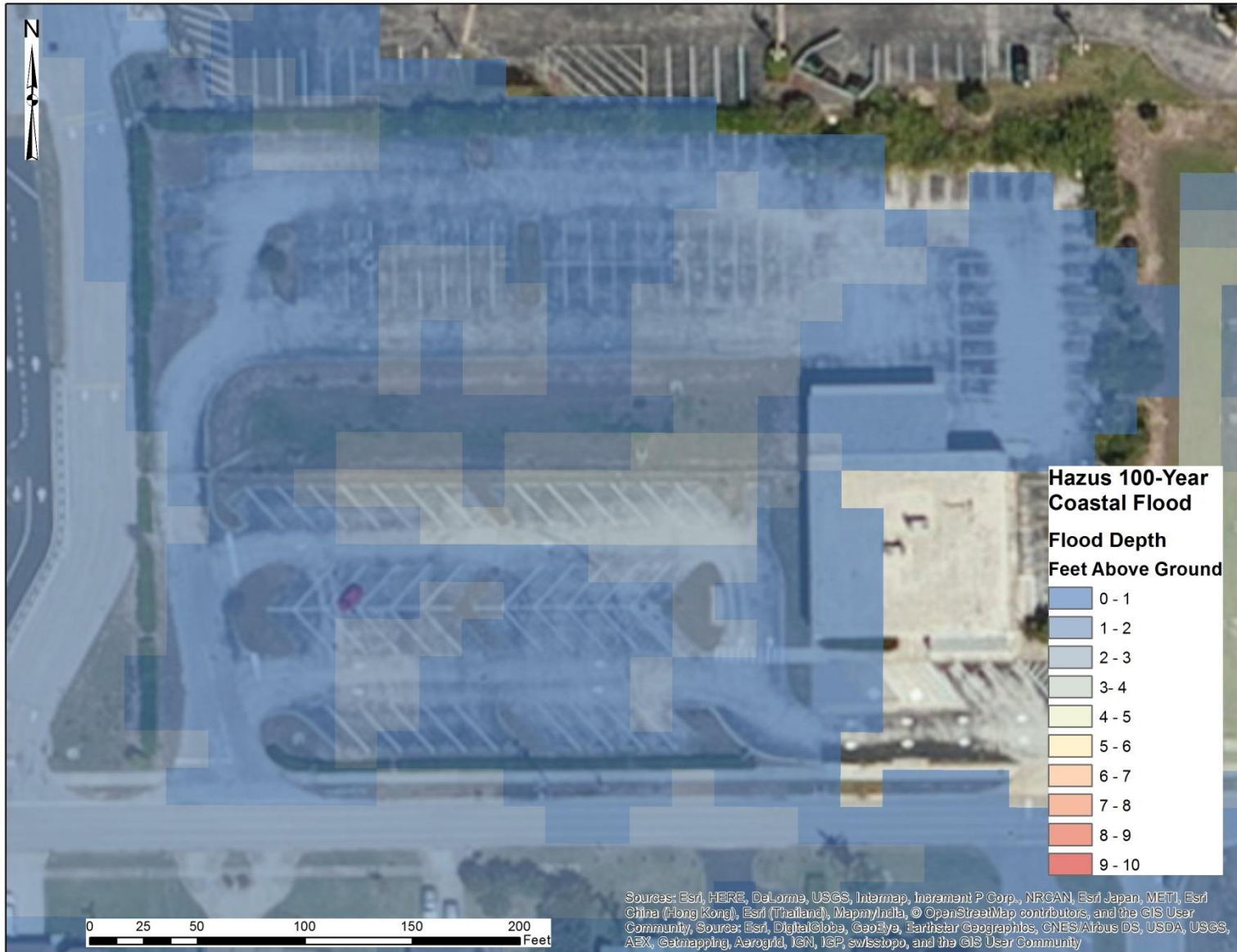
Between initial request and September 6... Hurricane Harvey



Alternative fire station site...



Alternative fire station site...



Satellite Beach's new firehouse will be higher and drier

Written by: *George White* November 09 2017



Satellite Beach Fire Department officials, surrounded by recent flood waters at their current location at 1390 South Patrick Dr., now know their new home will be located on a two-acre site that was formerly the parking lot of the U.S. Post Office at 210 Jackson Ave.

But it wasn't just Hurricane Irma or the followup Oct. 1 no-name storm that has city officials ready to move the facility built in 1971.

"The building did not flood but all the roads around it did. It's definitely getting worse," said City Manager Courtney Barker.

The city is planning for the eventual expected impact from sea level rise, not coming over the dunes from the Atlantic Ocean, but coming up from the west and rising waters in the Banana River and Indian River Lagoon. The current fire station is shown in recent flood maps to be near the areas to be first impacted by rising waters, areas near canals and low-lying roadways, she said.

Finding an alternative location for the fire station actually involved several different criteria, she said.

"We spent a lot of time looking at different properties at different locations and that (the Jackson Avenue parcel) was definitely the best. It's got the best timing because it's centrally located throughout the city, it's near State Road A1A at a high elevation and it's on a street with a stoplight (at Jackson Avenue and SR A1A and South Patrick Drive). It's definitely the best location," Barker said.

"We're looking more down the road. We're just securing the property now because you know property prices are not going down."

The \$730,000 contract for the property contemplates the note being repaid with revenues from a utility tax.

The old fire station will be considered for other city purposes or offered for sale, she said.

It wasn't current or future flooding that prompted the discussions for a new fire station, it was the crowded conditions that originally started the conversation," Barker said.

"We were looking at expanding by adding a floor to the fire station, because they are so cramped in there now, but then we realized, do we really want to invest in a building that will be sitting in a foot of water? We started looking at the elevations and getting the data and deciding whether we wanted to do it," she said.

The city tries to build for 100 years or more, she said.

Risk-averse (and financially sound) decision to move the fire station to higher ground rather than retrofit a low-lying site!



COURTNEY H. BARKER, AICP CITY MANAGER

PLANNING for RESILIENCY and SUSTAINABILITY

TAKING ACTION

- **DATA GATHERING/PUBLIC INVOLVEMENT**
 - Getting the best facts we can-DONE ☒
- **ADOPTED SUSTAINABILITY PLAN AND GREEN ACHIEVEMENT TARGETS**
 - Many ongoing Sustainability projects ☒
- **DEFINING COMMUNITY RESILIENCE**
 - Planning- Sustainability Action Plan and Comprehensive Plan ☒
 - Implementing Resiliency techniques through the Planning and Regulatory Process

<https://www.facebook.com/GoGreenSB>

SUSTAINABILITY PLANNING

- **Sustainability Board** established in 2015
- R&D of SAP began in 2016
- Started with a **Sustainability Assessment Report**: SAR was used to guide the direction of the SAP
- **Identified specific indicators, 121 in total**, which were broken down into five categories ...
- **Recommendations** made for each category based on indicators formed the basis for the SAP
- **Joint effort between City officials, the Sustainability Board, and Florida Institute of Technology students**

- **121 INDICATORS**
- **88 were listed as near term high priority**, with action steps for each principle
- **88 broken into group of 20**
- **These 20 became the GREEN ACHIEVEMENT TARGETS (GATS)**

The basic goal: To create a user friendly *Sustainability Action Plan* that could set meaningful and attainable targets for the city to follow so as to lead by example well into the 21st century.

SUSTAINABILITY PLANNING

Sustainable
Satellite
Beach

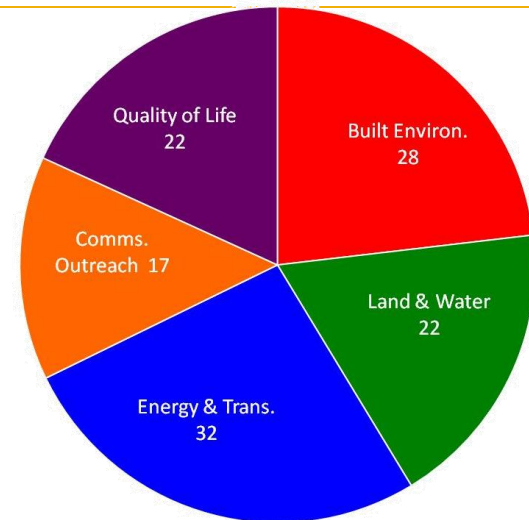
City of Satellite Beach Sustainability Action Plan 2017

Report to the
City of Satellite Beach

May 3, 2017

Z. Eichholz and K. Lindeman
Dept. of Education & Interdisciplinary Studies
Florida Institute of Technology
Edited by Rochelle W. Lawandales, AICP

- Sustainability Assessment Report
- Sustainability Action Plan
- Principles and Practice Sustainability Report



City Council adopted the Plan in March, 2017, to lead by example in the next five years.

'GATS' Green Achievement Targets

- Community Garden
- Desoto Stormwater Park
- Bat Houses
- Shade House
- Irrigation Restriction
- Lagoon Friendly Lawns
- SolSmart
- PACE: Property Assessed Clean Energy

Solutions Start Right In Our Backyards



Through the Lagoon Friendly Lawns program, we can all be part of a commercial solution by making positive behavior changes when it comes to the care and keeping of our lawns.

Help prevent algal blooms and fish kills!

Follow these lawn management core concepts:

- Minimize Nitrogen Fertilizer
- Reduce Turf Area
- Reduce Stormwater Runoff
- Reserve Ecosystem Benefits

Get Recognized For Your Efforts!

Homeowners who follow these practices can certify their yards to gain benefits like:

- Beautiful landscape lawn signs
- Photos of your lawn on program web & social media
- Top landscapes featured in Spaceport Living Magazine!

The program also offers a cost-effective certification system for landscape contractors, which offers:

- Exclusive advertising listings and marketing benefits
- Use of certified contractor quality homeowners for certification, thereby creating business demand

Homeowner Certification



There are three levels of Lagoon Friendly Lawns certification for homeowners, which include the following criteria:

Bronze LEVEL CRITERIA: (must meet all below)

- Fertilizer law: June-September
- Only use 50% or more slow release nitrogen fertilizer
- No phosphorus without soil test showing need
- Fertilizer-free buffers along water and curbs
- Regularly pick up pet waste
- Keep lawn clippings out of storm drains and water
- Don't wash cars in driveway
- Minimal pesticide application (spot treat only)

Silver AWARD CRITERIA: (must meet three criteria + all standard requirements)

- 50% or more slow-release, permeable pad
- Maintenance-free buffer along water & curbs
- Use of sustainable mulch
- Drain grate painted at permeable surface
- Rain barrels and/or water capture
- Efficient: minimal or no irrigation

GOLD AWARD CRITERIA: (must meet three criteria + standard and silver requirements)

- No Category 1 exotic, invasive plants
- 50% or more shade plants
- 50% or more native plant species
- Flowering or fruiting plants for wildlife
- Living shoreline

Apply online under the "Certify Your Yard" section at: <http://spaceportbeach.org/lagoonfriendlylawns>

Contractor Certification



Contractor applications are reviewed and approved by review board committees, which also handle any violations reported through the Lagoon Friendly Lawns website.

CRITERIA FOR CERTIFICATION ARE AS FOLLOWS:

FERTILIZATION REQUIREMENTS:

- No fertilization, June-September
- Soil should be tested for nitrogen, phosphorus and P1 before fertilizer application for all new accounts, and once per year for established accounts, with results provided to Lagoon Friendly Lawns coordinator
- No phosphorus without soil test indicating need
- Apply only 50% or more slow release nitrogen, and plan to switch to 100% slow release (organic) in two years
- Fertilizer-free buffers along water bodies and curbs
- Do not exceed 100/1000g/lb per application and two applications per year
- Employ a certified fertilizer applicator

OTHER REQUIREMENTS:

- Keep fertilizer & grass clippings of impervious surfaces
- End of water bodies/shorelines clear
- Brush and debris application spot treat only with license

EDUCATION REQUIREMENTS:

- Encourage customers to seek advice of licensed irrigation contractor to ensure efficiency of system
- Attend a required UFWED/USDA extension course
- Leave behind program material for customers

Apply online under the "Contractor's Corner" section at: <http://spaceportbeach.org/lagoonfriendlylawns>

"Open for solar business"!

Satellite Beach earns SolSmart badge of honor



Home is sustainability based co-founder John Pense.

Last year he installed a 30-panel photovoltaic array with Sun Systems on his Paradise Street home with about 10,000 watts of power, requiring no energy costs. Since then he devoted full time from an average \$150 to just a \$10 per month fee.

The savings are nice, which came to pay from electricity channeled back into the grid, offset the loan payment over a period of about six years, he said. Other benefits include an increase in property value and home equity, he said.

He has a web-based program that shows exactly how much electricity his system creates and how much it offsets the carbon footprint.

"The bottom line is it's a lot cheaper to have solar than it is to not have it. The goal is to not have an electric bill. It's all about the money when you have somebody an electric bill that is basically zero, but there are important environmental benefits as well," Pense said.

When Satellite was launched in 2011, it was a goal for solar energy to be cost-competitive with traditional forms of electricity by 2020 without subsidies, and trends are moving in that direction.

Besides being the only Florida city named in the first group of 12 municipalities, Satellite Beach was one of only 14 cities nationwide achieving the Gold designation.

Other Gold cities included Austin, Boulder, Colo.; Columbia, Miss.; Fresno, Calif.; Fort Collins, Colo.; Glendora, Miss.; Milwaukee, Wis.; Minneapolis, Minn.; San Carlos, Calif.; Santa Monica, Calif.; and Santa Rosa, Calif.

SolSmart Bronze cities included Bismarck, N.D.; Claremont, Calif.; Denver, Colo.; Philadelphia, Pa.; Redwood City, Calif.; Salt Lake City, Utah; and Springfield, Mass.

The city charges minimum permitting fees (\$140 for the installation of photovoltaic solar panels, and has enacted regulations to allow installations only by experienced contractors approved by the City Council.

"We've been interested in putting solar panels on our city buildings for years with the objective of generating enough electricity to achieve a net electric bill," Stone said.

Recently achieving this goal in his

JOYS
Gifts • Accessories • Accent Furniture

Invites you to be...
Unique

Let's... Sat. 11am - 4pm
3030 S Hwy A1A, Suite 10
D'Wood (Public) Plaza
Melbourne Beach
Joy Kappeler, Interior Designer
A.S.I.D. 800001000

321.729.0005

LOGOS Community Garden



Thank you to all our supporters

1. Eagle Scout Troop 305
2. Lowes, Indian Harbour Beach
3. Balance For Earth
4. Florida Institute of Technology
5. Keep Brevard Beautiful
6. Satellite Beach Volunteers & Public Works
7. Satellite Beach Sustainability Board

The City of Satellite Beach is proud to be part of the growing Community Garden Network #CGN

For more information please email: nsanzone@satellitebeach.org

Purpose of the garden

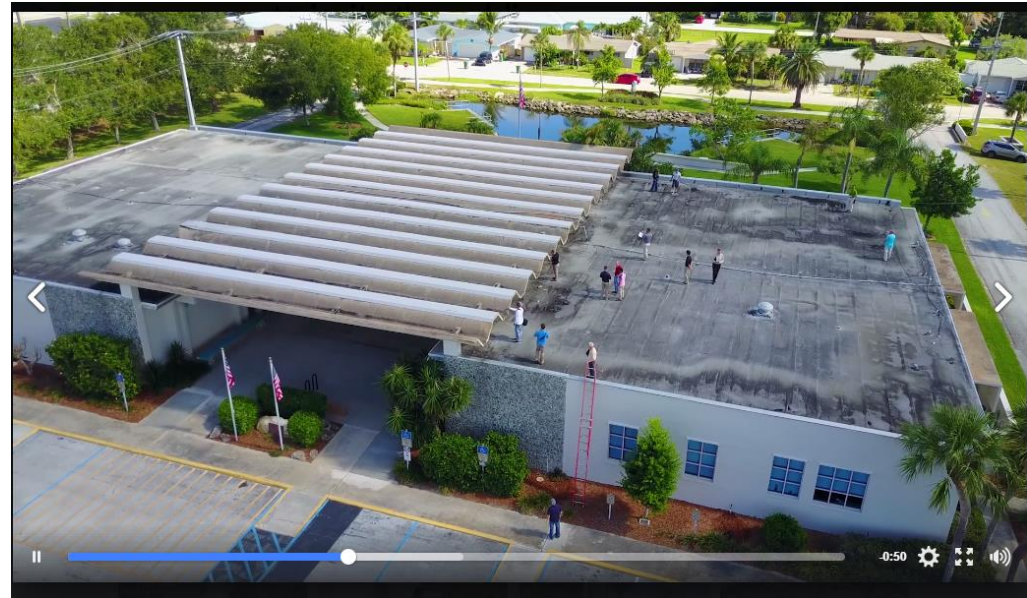
The LOGOS Community Garden is the first Green Achievement Target (GAT) of the Sustainability Action Plan, learn more at: www.satellitebeachfl.org

PROJECT IMPLEMENTATION

BAT HOUSES(VIDEO)

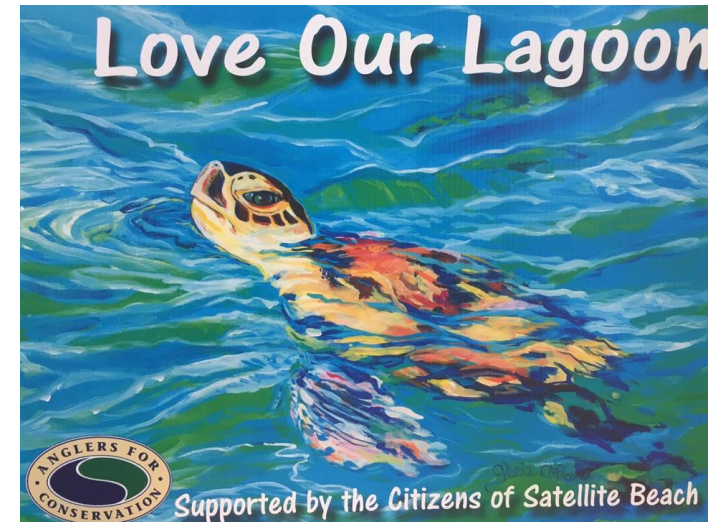
<https://www.facebook.com/GoGreenSB/videos/1425065237575310/>

Florida's bat population is in alarming decline because of habitat disturbance and the wide-spread use of pesticides. Bats are critical to both habitat health and human health; they are the primary predator of night-flying insects, with many species consuming nearly their own weight in bugs each night.

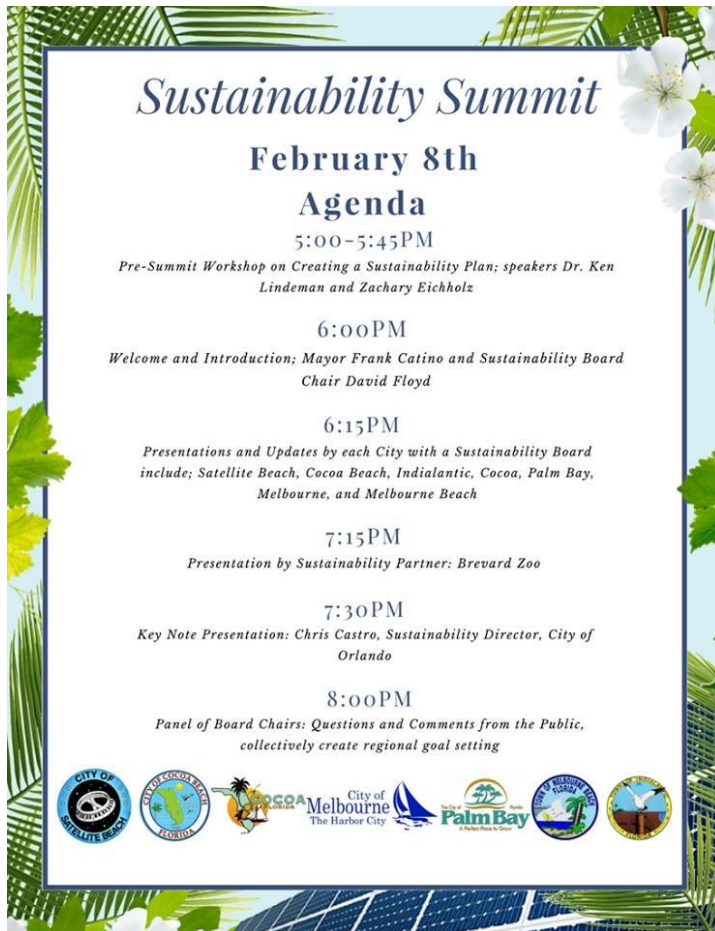


City Hall Goes Solar

PROJECT IMPLEMENTATION



SUSTAINABILITY PLANNING



February, 2018

Initiated the first
SUSTAINABILITY SUMMIT,
with surrounding Cities,
County, lay-people, with
Orlando's Chris Castro,
Sustainability Guru, as the
headliner

Never doubt that a small group of
thoughtful, committed citizens can change
the world; indeed, it's the only thing that
ever has.

Margaret Mead

Next steps

- Working with our Climate Ambassador Committee on
- Potential Code and Charter Changes and taking those into
- Public Workshops
- Charter Changes





**ROCHELLE W.
LAWANDALES, AICP**
IMPLEMENTATION
SUSTAINABILITY + RESILIENCY=
THE FUTURE

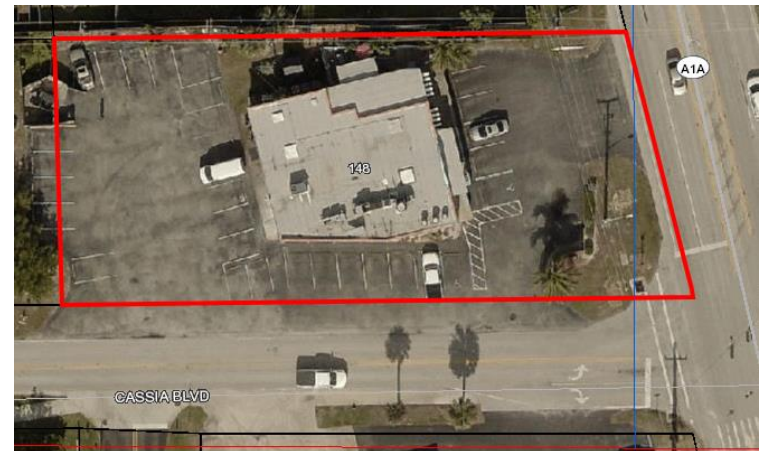
ENVIRONMENTAL ISSUES

- 90% built out
- Mostly reuse/redevelopment
- Older parcels contribute heavily to **environmental problems**
 - lack of stormwater,
 - Little green space,
 - No landscape,
 - Over parking on vast impervious surfaces
- New regulations create **usability problem** on small platted lots:
 - Existing lot coverage,
 - Impervious %,
 - Stormwater regulations,
 - Breezeways,
 - Height and density requirements generally **LIMIT OR ELIMINATE** project feasibility



ENVIRONMENTAL and ECONOMIC SUSTAINABILITY

- Lack of development has led to **economic decline and environmental degradation** and **Increased Residential tax burden**...
- So, to **protect the environment**: fix aging infrastructure, protect our public investments, make it easier and more financially feasible to develop aging sites to get retention/detention/treatment of stormwater, promote green building, low impact development, etc.;
- And, to **create a sustainable economy**: create better development patterns, offer incentives, take some of the risk off development, add value to make development feasible



RESILIENT REGULATORY FRAMEWORK

RESULT:

Increase tax revenue to finance improved public infrastructure, protect public facilities, replace aging utilities, so that we have... **better environment and healthy economic future!**

- Correct environmental degradation occurring from old development patterns!
- Create Economic Sustainability
- Promote Social Equity and Quality of Life
- Human and animal safety(priceless)



PHILOSOPHY/PREMISE

4 KEY URBAN DESIGN SUSTAINABILITY PRINCIPLES

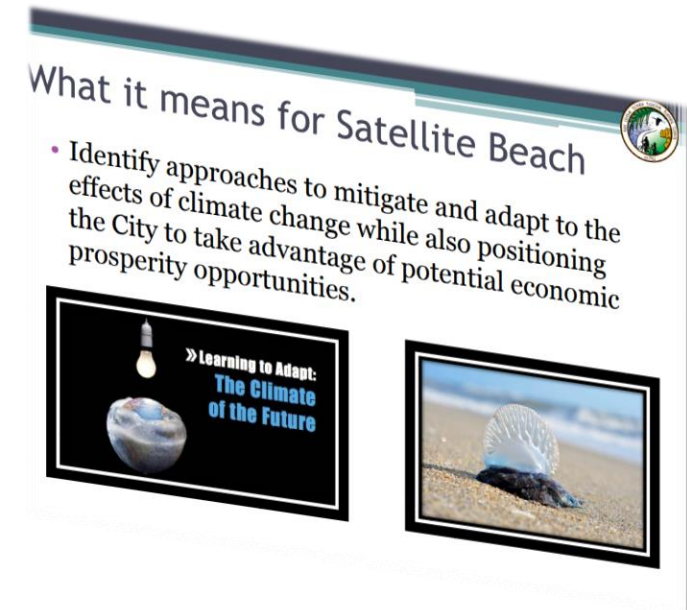
- Promote density and mixed use
- Create spaces of value
- Connect places
- Invite pedestrians



GOAL: PROTECT OUR CITY'S ASSETS AND OUR PRIVATE INVESTMENTS. MAINTAIN SENSE OF PLACE, FOSTER (RESTORE) ENVIRONMENTAL INTEGRITY AND DIVERSIFY ECONOMY

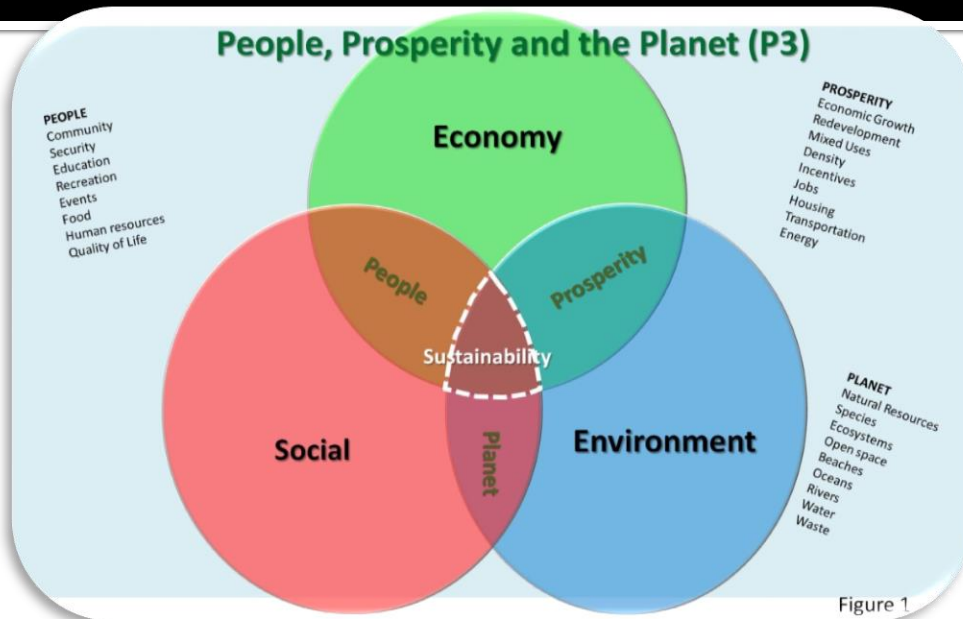
COMPREHENSIVE(ly) PLANNING

- Adaptation Action Areas
- Redevelopment Areas
- Coastal land use and sea level rise (**Line in the Sand literally-CCCL**)
- Creating a new **Sustainability Element**
- Community Health and Wellness, and local food source initiatives



NLC: "Land Use is the most visible of the sustainability topics. Cities with sustainable land use create an obvious balance of environmental preservation, commerce, and livability. And of course, land use and transportation are intricately connected."

IMPLEMENTATION



The 5-sustainability categories within those 3:

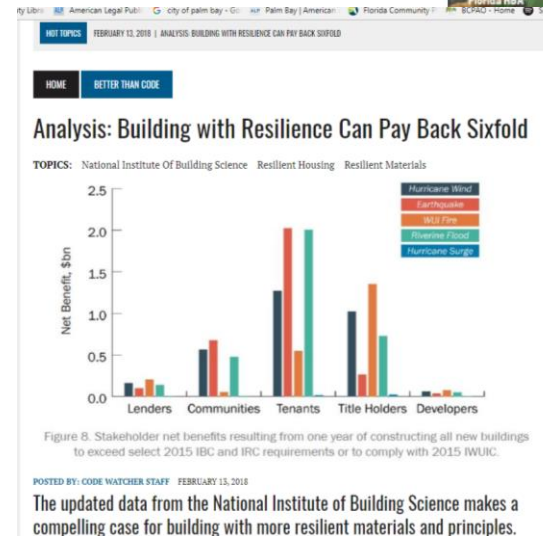
- **Built Environment**
- **Land and Water Systems**
- **Energy and Transportation**
- Community Outreach
- Quality of Life



CODE CHANGES: BUILT ENVIRONMENT

BUILDING AND ZONING CODES

- GREEN BUILDING STANDARDS- LEED/USGBC, Energy Star, MANY OTHERS
- Finish Floor Elevations/BFE/Crown of the road-RAISING LIMITS to get out of the water
- Solar Panels-siting, shade, orientation, (check your tree requirements may inhibit)
- Do you allow stilting?
- Washout first floors?
- Does this count in your height regulations?



CODE CHANGES: BUILT ENVIRONMENT

BUILDING AND ZONING:

- Are 2 car garages required?
- High Performance building techniques and systems?
- Heat island reduction?
- LED/Smart batteries
- Yikes, the list is exhaustive!



CODE CHANGES: LAND and WATER

■ USES:

- Vertical and horizontal mixed use
- New Mixed Use District
- Adaptive Re-use/Redevelopment
- Density: is it enough to make a site feasible development or redevelopment?
- Transferring unused density from areas prone to flooding near the lagoon to west side of AIA-create developable properties-better for environment and economics

■ SITES:

- Require complete demolition of old parking lots and impervious surfaces
- Parking requirements-Do you have maximums? Change from minimums
- Connectivity for pedestrians and Linkage into the neighborhoods
- Upgrade to new environmental standards
- Upgrade with new sustainability and low impact design



CODE CHANGES: LAND and WATER

Sites continued...

- Fertilizer and Pest Control (reduce nitrogen other chemicals)
- Swales near the lagoon; collection systems for pre-treatment
- Rain Barrels, Rain Gardens
- Green Roofs, Blue Roofs
- Drainage—do you require Single Family to drain to the street? What happens to it?
- Do you allow or require Swales/bioswales?
- Landscaping—do you limit the amount of natives?
- Do you allow Low Impact Design methods?
- Lagoon Friendly?
- Grow FOOD not lawns! Fleet Farming?



Low-impact development (LID)

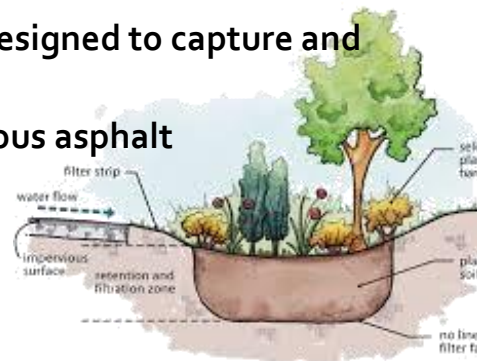
Low-impact development (LID) can be a lucrative option for new development, urban retrofitting, and redevelopment projects wanting to invest in LID as a stormwater management tool.

Basic principles

- Water is a resource
- Reduce impervious surfaces to allow water to soak into the ground where it lands
- Use natural systems to promote infiltration of water
- Protect ecologically important areas of proposed developments

Examples

- Vegetated filter strips at the edges of paved surfaces
- Residential or commercial rain gardens designed to capture and soak in stormwater
- Porous pavers, porous concrete, and porous asphalt
- Narrower streets
- Rain barrels and cisterns
- Green roofs



Benefits of Low Impact Development

How LID Can Protect Your Community's Resources

What Is Low Impact Development (LID)?

LID includes a variety of practices that mimic or preserve natural drainage processes to manage stormwater. LID practices typically retain rain water and encourage it to soak into the ground rather than allowing it to run off into ditches and storm drains where it would otherwise contribute to flooding and pollution problems (see www.epa.gov/lid).

Why Should My Community Adopt LID?

LID Reduces Stormwater Runoff by Emphasizing Infiltration

As a community grows, so does the amount of surface area covered by parking lots, roads and rooftops (Figure 1). Rainfall cannot soak through these hard surfaces; instead, the rain water flows quickly across them—picking up pollutants along the way—and enters ditches or storm drains, which usually empty directly and without treatment into local waterways. Local streams in urban areas are overwhelmed by frequent urban flash flooding and stream habitats are smothered by sediments carried by the excessive flows.

Contrast this to an undeveloped watershed, where vegetation-covered soil soaks up rainfall rather than allowing it to run off the land (Figure 2). Water filters through the soil before reaching the groundwater table or being released slowly into streams. An undeveloped watershed provides clean, safe water.

Fortunately, by adding LID solutions, communities can help their watersheds act more like undeveloped watersheds—despite the ever-expanding numbers of roads and rooftops. LID practices such as natural or man-made swales, depressions and vegetated areas capture and retain water onsite, allowing time for water to soak into the soil where it is naturally filtered.

Figure 1: When roads, rooftops and parking lots cover much of the land, more than half of the rainfall runs off and flows directly into surface waters. In highly developed areas, such as in Seattle, Washington (above left), only 15 percent of rain water has the opportunity to soak into the ground.

Figure 2: When vegetation and natural areas cover most of the land, such as in Oregon's Upper Willamette Bay watershed (above left), very little water (only 10 percent) runs off into surface waters. Nearly half of the rainfall soaks into the soil. The remaining water evaporates or is released into the soil by vegetation.

LID Provides Many Environmental and Economic Benefits

- Improved Water Quality.** Stormwater runoff can pick up pollutants such as oil, bacteria, sediments, metals, hydrocarbons and some nutrients from impervious surfaces and discharge these to surface waters. Using LID practices will reduce pollutant-laden stormwater reaching local waters. Better water quality increases property values and lowers government clean-up costs.
- Reduced Number of Costly Flooding Events.** In communities that rely on ditches and drains to divert runoff to local waterways, flooding can occur when large volumes of stormwater enter surface waters very quickly. Holistically incorporating LID practices reduces the volume and speed of stormwater runoff and decreases costly flooding and property damage.
- Restored Aquatic Habitat.** Rapidly moving stormwater erodes stream banks and scours stream channels, obliterating habitat for fish and other aquatic life. Using LID practices reduces the amount of stormwater reaching a surface water system and helps to maintain natural stream channel functions and habitat.
- Improved Groundwater Recharge.** Runoff that is quickly shunted through ditches and drains into surface waters cannot soak into the ground. LID practices retain more rainfall on-site, allowing it to enter the ground and be filtered by soil as it seeps down to the water table.
- Enhanced Neighborhood Beauty.** Traditional stormwater management infrastructure includes unsightly pipes, outfalls, concrete channels and fenced basins. Using LID broadly can increase property values and enhance communities by making them more beautiful, sustainable and wildlife friendly.

When implemented broadly, LID can also **mitigate the urban heat island effect** (by infiltrating water running off hot pavements and shading and minimizing impervious surfaces), **mitigate climate change** (by sequestering carbon in plants), **save energy** from green roofs, tree shading, and reduced/avoided water treatment costs, **reduce air pollution** (by avoiding power plant emissions and reducing ground-level ozone), **increase property values** (by improving neighborhood aesthetics and connecting the built and natural environments), and **increase groundwater recharge**, potentially slowing or reversing land and well field subsidence.

LID Techniques Can Be Applied at Any Development Stage

- In undeveloped areas,** a holistic LID design can be incorporated in the early planning stages. Typical new construction LID techniques include protecting open spaces and natural areas such as wetlands, installing bioretention areas (vegetated depressions) and reducing the amount of pavement.
- In developed areas,** communities can add LID practices to provide benefits and solve problems. Typical post-development LID practices range from directing roof drainage to an attractive rain garden to completely retrofitting streets with features that capture and infiltrate rainwater.

A landscaped curb extension calms traffic, and captures and infiltrates street runoff in Portland, Oregon.

Rainfall soaks through permeable pavement and into the ground below in this parking area in west Des Moines, Iowa.

Street runoff collects in bioretention planters in Portland, Oregon.

LID TECHNOLOGIES

■ Some examples

- **Engineered systems** that filter storm water from parking lots and impervious surfaces, such as bioretention cells, filter strips, and tree box filters;
- **Engineered systems** that retain (or store) storm water and slowly infiltrate water, such as sub-surface collection facilities under parking lots, bioretention cells, and infiltration trenches;
- **Modifications to infrastructure** to decrease the amount of impervious surfaces such as curbless, gutterless, and reduced width streets;
- **Low-tech vegetated areas** that filter, direct, and retain storm water such as rain gardens and bio-swales;
- **Innovative materials** that help break up (disconnect) impervious surfaces or are made of recycled material such as porous concrete, permeable pavers, or site furnishings made of recycled waste;
- **Water collection systems** such as subsurface collection facilities, cisterns, or rain barrels; and
- **Native or site-appropriate vegetation.**

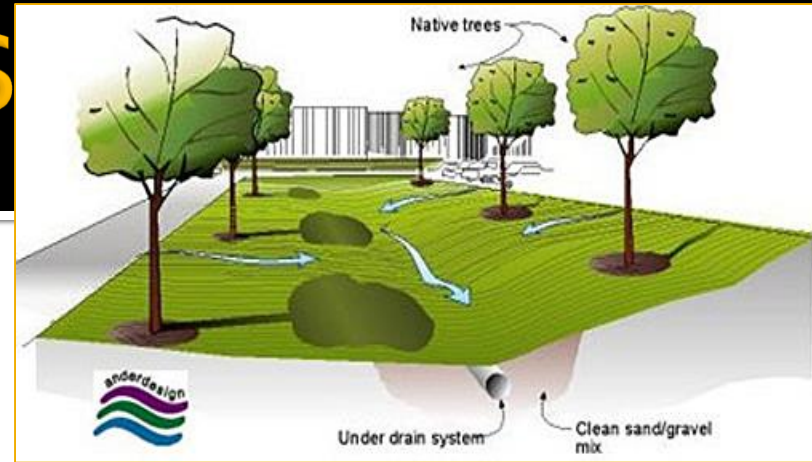
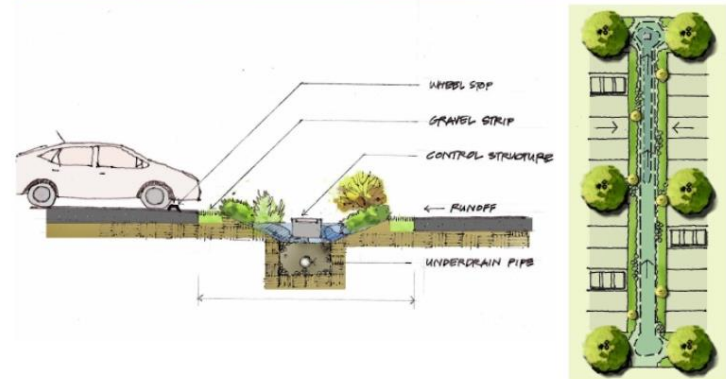


Figure 1: Bio-swale schematic
Courtesy Pierce County, Washington /
WSU Extension

Florida Field Guide to Low Impact Development

UF UNIVERSITY of
FLORIDA
IFAS Extension

Bioswales/Vegetated Swales



This bioswale cross section (left) depicts the swale with an underdrain, which may not be necessary in naturally well drained soils. Surface runoff from the adjacent impervious area enters the swale diffusely through an energy reducing gravel strip and then flows through vegetative buffers along the edge of the bioswale. Swales can be designed with swale blocks (dashed lines perpendicular to flow arrows in plan view (right)) if there is a significant slope or by setting the discharge elevation of the control structure higher than the swale bottom if the swale has little relief.

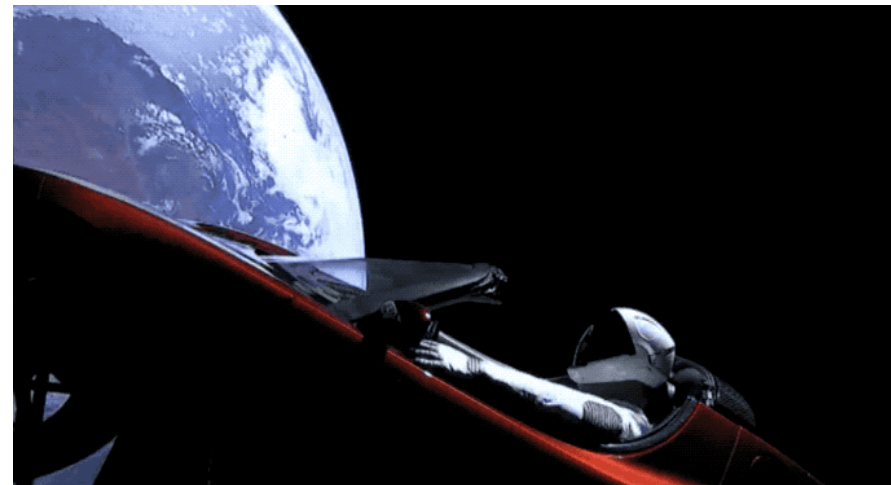
CODE CHANGES

ENERGY AND TRANSPORTATION

- Transportation services/connectivity (affects Vehicle Miles Travelled)
- Install Energy-Efficient Traffic and Street Lights (TIME THEM CORRECTLY)
- Electric Cars, bicycle friendly, golf carts
- Complete Streets
- Transit-SHELTERS?
- Rent-a-bike for more urbanized areas
- Interconnectivity/throughways between uses for internal capture; Reduce emissions
- Reduce street (or lane sizes)
- Street Edges: (new, redevelopment, public or private): Bioswales, Ribbon curb, No curb

Example: Sec. 30-425. - General requirements for off-street parking facilities.

Paved and unpaved area. An area equal to $\frac{2}{3}$ of the total required parking area must be paved and striped. The remaining $\frac{1}{3}$, upon the recommendation of the planning and zoning advisory board and approval by city council based on proposed uses of the facility, may **MUST** be unpaved and placed in grass available for future paving either left in a grassy state or be stabilized with pervious materials and use parking stops.



TRANSPORTATION RELATED



For more examples of communities implementing green infrastructure practices, please check-out The Conservation Fund's Green Infrastructure Leadership Program, which has assembled an online database of green infrastructure projects being planned and implemented across the country.

<http://www.greeninfrastructure.net/content/projects>

Seattle, Washington

Since the late 1990s, the Seattle Public Utilities (SPU) agency has undertaken a variety of green infrastructure pilot programs including the well-known Street Edge Alternative (SEA) project. This and similar programs aim to reduce and treat runoff impacting water quality and aquatic habitat in the Puget Sound watershed by managing stormwater more effectively at a localized level. With this and other pilot programs, Seattle has collected performance data and made the case for substituting green infrastructure practices for traditional grey infrastructure in urban and suburban areas. For example, SPU estimates that a local street converted to the SEAStreet design saves \$100,000 per block (330 linear feet) compared to a traditional street design, while achieving the same level of porosity (35 percent impervious area). In addition to these avoided-cost savings, the program claims these designs have provided additional community benefits such as traffic calming, improved neighborhood aesthetic and bioremediation (SPU 2010).



WHAT IS A COMPLETE STREET?



PERFORMANCE/FORM

Create a Performance based bonus system based on sustainable principles to keep us resilient...

- **Using the broad categories of :**

- Land
- Buildings
- Innovation
- Transportation
- Architectural Design, Site Amenities and Aesthetics

Reliable land use patterns to sustain the Communities' tax base over time and over cycles

MATRIX EXAMPLE

If you DO (X AMOUNT OF) this you will get X amount of additional stories or height in feet and X amount of additional units from the bowl

LAND	BUILDING	INNOVATION	TRANSPORTATION	ARCHITECTURAL DESIGN, AMENITIES, AND AESTHETICS(SEC 30-422)
PARKING ON GROUND FLOOR (DOESN'T COUNT TOWARD STORIES OR HEIGHT)	GO LEED V-4 (OR SILVER, PLATINUM), RIGHT OFF THE BAT-_____ FEET AND _____ UNITS (?)	TOTAL SITE REDEVELOPMENT (RIGHT OFF THE BAT GETS ____ FEET AND _____ UNITS)	PREFERRED PARKING FOR LOW-EMISSION, HYBRID, AND ELECTRIC VEHICLES/CHARGING STATIONS	FLORIDA VERNACULAR OR MEDITERANIAN
PROVIDE'S CITY WITH 25% PUBLIC PARKING SPACES (ADDITIONAL TO REQUIRED PARKING)	RESIDENTIAL BUILDING ON STILTS/ COMMERCIAL BUILDING ON PILINGS OVER PARKING AND STORMWATER AREAS	PARTIAL TEARDOWN	PROVIDES TRANSIT SHELTER AND ENCOURAGES USE OF TRANSIT AMONG OCCUPANTS	Canopies or porticos, integrated with the building massing and style;
PERVIOUS PARKING AREA FOR 50% OR MORE OF YOUR REQUIRED PARKING	SOLAR PANELS FOR ENERGY AND POWERED HOT WATER SYSTEM FOR APPLIANCES, FACILITIES, AND AMENITIES	FAÇADE AND MATERIALS OR SITE UPGRADE	BIKE, PED, GOLF CART AND SOLAR PANEL CAR CHARGING STATION/ACCESS AND LOCATIONS ON SITE AND PROMOTION IN BUSINESS	Arcades, a minimum of six feet in width;
USE OF BIOSWALES AND/OR RAIN GARDEN STORMWATER SYSTEMS	PERFORMANCE BASED VIA TECHNOLOGY SYSTEMS	LAND ASSEMBLAGE FOR LARGER PROJECT	INTERCONNECTED DRIVEWAY/SIDEWALK/AND TRAIL NETWORK	Sculptured art work;
INTEGRATE LOW IMPACT DESIGN FOR LANDSCAPING AND USE MORE THAN 50% NATIVE PLANT MATERIALS; IRRIGATION IS FROM AN ONSITE CIRCULATION SYSTEM	WATER REDUCTION PIPES, TOILETS, SEWER, RAIN BARRELS, RECIRCULATE	INTEGRATE A MIX OF USES		
FIRST FLOOR UNINHABITED OR PLACE HOUSE ON STILTS	HEAT ISLAND REDUCTION SYSTEMS APPROACH	ALL SIGNAGE LED BASED SYSTEM		

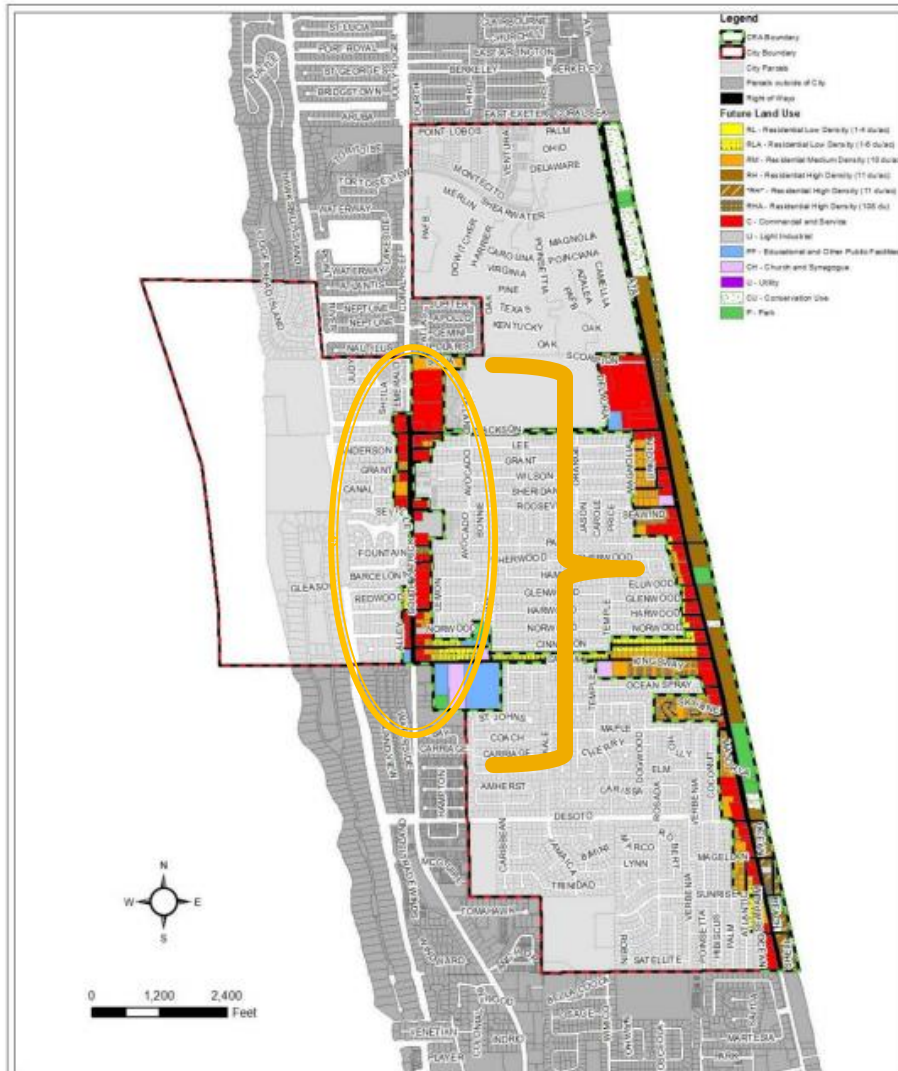
Sample, not complete

LAND	BUILDING	INNOVATION	TRANSPORTATION	ARCHITECTURAL DESIGN, AMENITIES, AND AESTHETICS(SEC 30-422)
NO LAWN/ ALL XERISCAPE	HVAC/WATER SAVING TECHNOLOGY SYSTEMS	AREAS TO STORE, COLLECT, AND RE-USE OR DISTRIBUTE RECYCLABLES, (BATTERIES AND ELECTRONICS TOO) CONSTRUCTION WASTE, AND BUILDING LIFE CYCLE NEEDS		Arches;
COMPOSTING AND OTHER WASTE MANAGEMENT REDUCTION METHODS AND PROGRAMS	SMART APPLIANCES IN RESIDENTIAL PORTIONS	PROGRAM FOR BUSINESSES TO USE GREEN CLEANING PRODUCTS, RECYCLABLE/GREEN UTENSILS, BAGS, OR TO GO PRODUCTS; NO PLASTIC PRODUCTS INCLUDING STRAWS, BAGS, PLATES, CUPS, ETC.		Display windows;
USE UNDERDRAINS	ALL LED LIGHTING			Ornamental and structural architectural details, other than cornices, which are integrated into the building structure and over all design;
USE PASSIVE SOLAR DESIGN; ORIENT, SIZE, AND SPECIFY WINDOWS TO BALANCE DAYLIGHTING VERSUS HEAT LOSS; AND LOCATE LANDSCAPE ELEMENTS WITH SOLAR GEOMETRY AND BUILDING LOAD REQUIREMENTS IN MIND.	EMPLOY A GREEN ROOF (VEGETATIVE), BLUE ROOF (RETAINS WATER), OR ROOF COATED WITH A LIGHT COLORED, SOLAR REFLECTIVE MATERIAL			Gazebos;
	USE HIGH-PERFORMANCE BUILDING ENVELOPES; SELECT WALLS, ROOFS, AND OTHER ASSEMBLIES BASED ON LONG-TERM INSULATION, AIR BARRIER PERFORMANCE, AND DURABILITY REQUIREMENTS.			
	ENERGY STAR RATINGS			
	Airated slabs for water to pass through			

INCENTIVE BASED CODE CHANGES

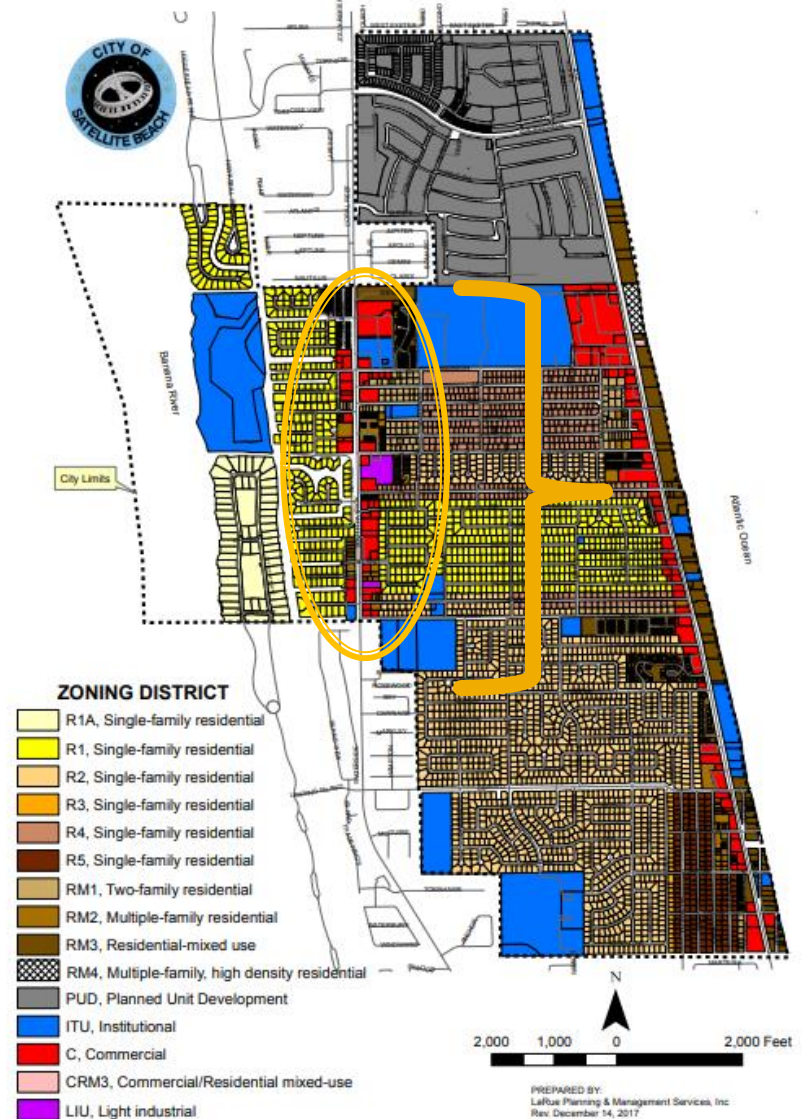
- **Proposals:** Removing unused density (units) from the 'riverside' portion of the City, to select locations along the west side of AIA, and creating a 'jelly-bean' bowl.
- **Proposals:** Lowering the height from East of AIA (now 65') to use on west side of AIA which is limited to 35', in select locations.
- **"Minimum"** requirements for integrating sustainability and low impact design features.
- Creating a **sliding scale**. For example, if you do 3 'elements', you will get 'x' amount of units and 'x' feet of height.
- Placing a **maximum cap on number of units and maximum height; plus**, other incentives (lot coverage, FAR, fee structures, etc).

Map 4. Redevelopment District Future Land Uses



Redevelopment District
Future Land Uses

ZONING MAP
City of Satellite Beach
2017



PREPARED BY:
LaRue Planning & Management Services, Inc.
Rev. December 14, 2017

FOR EXAMPLE...

- If you go full LEED-V4 (new maximum in LEED), you'll get the max bonus/incentives allowed.
- If you do parking on ground floor, use LID standards, (underdrains or exfiltration), you'll get bonuses.
- Complete 'fold-up' of old parking lots on re-do; and you may get a larger bonus of density or height to make it feasible.
- Must do minimum green building techniques, but the more you do, you'll get bonuses of units or height or both depending on the use.
- Almost like a Chinese menu: One from Column A, Two from Column B

“Green’ means good stewardship of land, water, buildings, and environment. So, Satellite is going **Sustainable and Green, by Design** naturally.”RWL

IMPEDIMENT

We have an added problem! We need to change the City's Charter to allow incentives of:

- **Density (but we're just moving it, not raising it)**
 - Mix, Mass and Mesh for Economic Sustainability
- **Height (reducing one side, adding to other side and the max is not yet determined)**
- **If it doesn't pass, we'll have find other ways of adding value like Density and Height. Not nearly as effective!**

SUMMARY SOLUTIONS

Low Hanging fruit:

- Enforce the CCCL(move forward)
- No Minimum Parking—create Max Parking and % non paved
- Increase lot coverage when use swales, bioswales
- Allow to build on stilts
- First floor non-habitable like low country
- Regional Stormwater (City \$\$\$)
- Swale program (City \$\$\$) and Swales on private lots(Rain Gardens, etc.)
- Encourage sustainable site redevelopment by adding value via codes

Major potential solution:

Increase project feasibility via density and height bonuses and new design standards requiring green development technologies and standards

FOR YOU:

MPA American Planning Association
Making Great Communities Happen

3. Resilient Economy

Ensure that the community is prepared to deal with both positive and negative changes in its economic health and to initiate sustainable urban development and redevelopment strategies that foster green business growth and build reliance on local assets.

MPA American Planning Association
Making Great Communities Happen

For more info:
www.planning.org/sustainingplaces/compplanstandards/

Please take our survey by Monday!
<https://www.surveymonkey.com/s/compplanstandards>

David Rouse, Research Director
American Planning Association
drouse@planning.org
202.3491010



**SUSTAINING PLACES:
BEST PRACTICES FOR
COMPREHENSIVE
PLANS**

CONCLUSION

Remember 'Green' takes 'Green',
so you have to take off some
risk and help add value and in
the end, you get what you
want...

A

SUSTAINABLE
and
RESILIENT
community.



Real change occurs from the bottom up; it occurs person to person, and it almost always occurs in small groups and locales and then bubbles up and aggregates to larger vectors of change.

Paul Hawken, Author, Drawdown

Read more at: https://www.brainyquote.com/authors/paul_hawken

FOR YOUR COMMUNITY....

- *WHAT IS THE 1 THING THAT SHOULD BE REQUIRED FOR ALL PROJECTS (Public and Private) TO DO?*
- *WHAT ARE YOUR TOP 3 MOST IMPORTANT ITEMS YOU HAVE AVAILABLE TO USE AS INCENTIVES?*
- *RANK THE REST IN ORDER OF IMPORTANCE.*
- *ADD OTHER ITEMS AS NEW TECHNOLOGIES OR IDEAS COME ALONG.*

**Prepare, Plan, and Implement
Sustainability and Resilience!**

WHY?

...because the future matters

.... For them...



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[http://www.stetson.edu/other/
faculty/profiles/jason-
evans.php](http://www.stetson.edu/other/faculty/profiles/jason-evans.php)



















A FEW TAKE AWAYS FOR YOU

- Check out National League of Cities Sustainable Cities Institute
- <http://www.sustainablecitiesinstitute.org/topics/land-use-and-planning/land-use-and-planning-sustainability-principles>
- Download Land Use Sustainability Principles: Action Checklist
- <https://www.wbdg.org/resources/low-impact-development-technologies>
- <http://edis.ifas.ufl.edu/uw364>
- http://buildgreen.ufl.edu/fact_sheet_low_impact_site_preparation.pdf
- www.cnt.org
- www.americanrivers.org
- <http://www.ny-engineers.com/blog/top-10-inventive-green-building-trends-for-2017>
- <http://nahbnow.com/2016/01/10-new-innovations-in-green-building-technology/>
- <https://www.cnt.org/tools/right-size-parking-calculator>
- <http://www.nlc.org/program-initiative/sustainable-cities-institute>
- <https://www.epa.gov/sites/production/files/2015-09/documents/bbfs1benefits.pdf>
- <https://www.pca.state.mn.us/water/stormwater-management-low-impact-development-and-green-infrastructure>
- <https://www.asla.org/stormwatercasestudies.aspx>

GREEN INFRASTRUCTURE

Green Infrastructure Benefits and Practices

This section, while not providing a comprehensive list of green infrastructure practices, describes the five GI practices that are the focus of this guide and examines the breadth of benefits this type of infrastructure can offer. The following matrix is an illustrative summary of how these practices can produce different combinations of benefits. Please note that these benefits accrue at varying scales according to local factors such as climate and population.

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO ₂	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◐	●	◐	◐	●	●
Tree Planting	●	●	●	●	○	◐	○	●	●	●	●	●	●	●	●	◐	●	●
Bioretention & Infiltration	●	●	●	●	◐	◐	○	○	●	●	●	●	●	◐	◐	○	●	●
Permeable Pavement	●	●	●	●	○	◐	●	◐	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◐	○	◐	◐	◐	○	○	○	○	○	○	○	●

● Yes

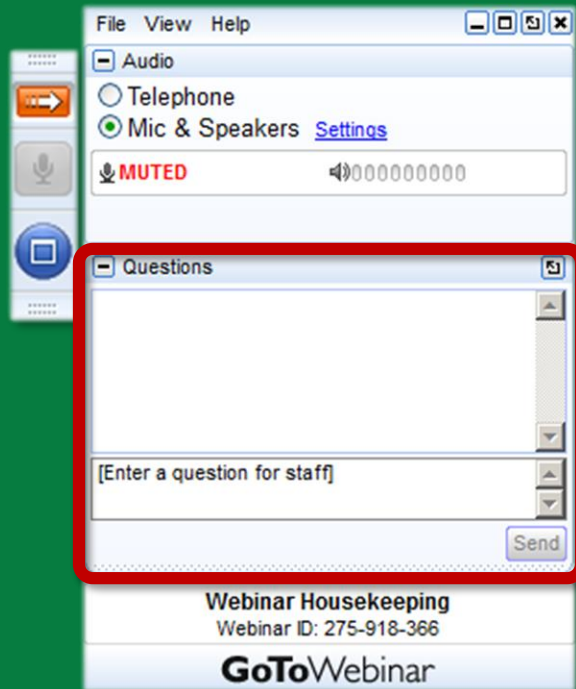
◐ Maybe

○ No

Questions and Answers

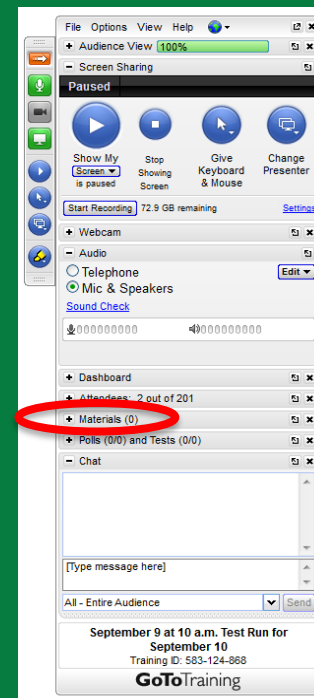
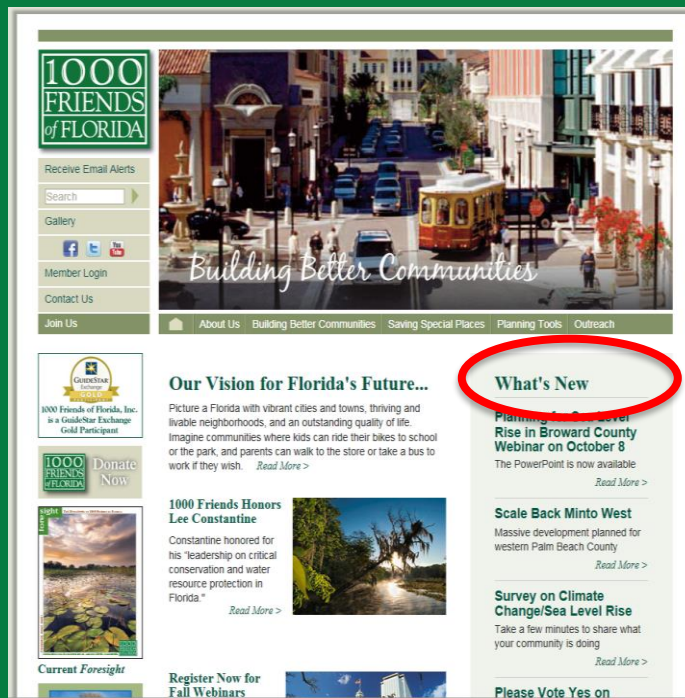


If you have questions:



- Your webinar control panel includes a “Questions” box
- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits

The PowerPoint is available at www.1000friendsofflorida.org



This webinar has been approved for:

- *1.5 AICP CM Credits for planners (#9138851)*
- *1 CEC for Certified Floodplain Managers*
- *2 CLE for Florida attorneys (1708851N - Intermediate)*
- *.125 CEUs for Florida Environmental Health Professionals.*

There is a link to a **BRIEF SURVEY** in the follow-up email you will receive. Please take a few minutes to give us feedback!



Upcoming Dr. John M. DeGrove Webinars

Spring 2017 DeGrove Webinars

Approved for professional certification credits for Planners (AICP CM), Certified Floodplain Managers, Florida attorneys (CLE) and Florida Environmental Health Professionals.

Register Now!

- March 21, 2018, Noon to 1:30 p.m. -- *2018 Florida Legislative Wrap Up*

Visit www.1000friendsofflorida.org/webinar/
to find out more!



Check out our Legislative Webpage!

Available at:

www.1000friendsofflorida.org/2018-florida-legislative-session-custom/

This site is:

- Updated frequently
- Includes Growth Management, Transportation and Conservation Legislation
- Includes links to the bills

The screenshot shows the homepage for the 2018 Florida Legislative Session. The header includes the 1000 Friends of Florida logo and navigation links: Home, About Us, Building Better Communities, Saving Special Places, Planning Tools, Outreach, and Donate Now. The main heading is "2018 Florida Legislative Session" with a subheading "Updated December 5, 2017". Below this, there are links for "Useful Links" (Florida House, Florida Senate, Find Your Legislators) and a "Bill Status" indicator showing "PASSED, DID NOT PASS". A section titled "Register now for FREE 2018 Florida Legislative Preview Webinar" mentions a Wednesday, December 6 from noon to 1:30, approved for professional certification credits for Planners (AICP CM LEGAL), Florida Attorneys (CLE), and Certified Floodplain Managers (CEC) and Florida Environmental Health Professionals. Another section titled "Register now for FREE 2018 Florida Legislative Wrap Up Webinar" mentions a Wednesday, March 21, 2018 from noon to 1:30, approved for professional certification credits for Planners (AICP CM LEGAL). A section titled "Support 1000 Friends of Florida's Legislative Advocacy" is also present. The main content area is titled "GROWTH MANAGEMENT/PLANNING LEGISLATION" and features a search bar. Below the search bar is a table with columns "Bill #/Sponsor" and "Title / Description". The table lists several bills, including SB 84 Lee (SUPPORT Municipal Conversion of Independent Special Districts), SB 292 Rodriguez (SUPPORT Private Property Rights), SB 324 Young / HB 697 Miller (Impact Fees UPDATED 12/5), SB 362 Perry / HB 207 McClain, Clemens (OPPOSE Growth Management/Private Property Rights), SB 432 Lee / HB 17 Raburn (Community Redevelopment Agencies), SB 494 Lee / HB 405 Williamson (Linear Facilities UPDATED 12/5), SB 542 Rodriguez (SUPPORT Public Financing of Construction Projects), and SB 574 Steube / HB 521 Edwards (OPPOSE Tree and Timber Trimming, Removal, and Harvesting). The left sidebar contains links for "Receive Email Alerts", "Search", "Gallery", "Member Login", "Contact Us", and "Join Us". It also features logos for "Charity Navigator", "Goldstar", and "1000 Friends of Florida" with a "Donate Now" button. There are also images for "Current Forestry" and "Annual Reports".

1000 FRIENDS of FLORIDA

Home • 2018 Florida Legislative Session

2018 Florida Legislative Session

Updated December 5, 2017

Useful Links: [Florida House](#) • [Florida Senate](#) • [Find Your Legislators](#)

Bill Status: **PASSED, DID NOT PASS**

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Support 1000 Friends of Florida's Legislative Advocacy

GROWTH MANAGEMENT/PLANNING LEGISLATION

Search:

Bill #/Sponsor	Title / Description
SB 84 Lee	SUPPORT Municipal Conversion of Independent Special Districts Read More
SB 292 Rodriguez	SUPPORT Private Property Rights SUPPORT -- SB 292 exempts property owners who produce renewable energy and distribute it to users on their property from being defined as a public utility. Senate Referrals (SB 292): Communications, Energy, and Public Utilities; Community Affairs, and Rules Committees. Hide
SB 324 Young HB 697 Miller	Impact Fees UPDATED 12/5 Read More
SB 362 Perry HB 207 McClain, Clemens	OPPOSE Growth Management/Private Property Rights OPPOSE -- SB 362/HB 207 require local government adoption of a private property rights element into their comprehensive plan. House Referrals (HB 207): Agriculture and Property Rights Subcommittee; Local, Federal and Veterans Affairs Subcommittee; and Commerce Committee. Senate Referrals (SB 362): Agriculture and Property Rights Subcommittee; Local, Federal and Veterans Affairs Subcommittee; and Commerce Committee. Hide
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