



## To Our FSBPA Members and Friends

FSBPA is excited to announce the publication of the 2023 National Conference on Beach Preservation Technology program. It is an impressive program thanks to the outstanding abstracts from presenters and hard work by the planning committee. The program addresses many of the pressing issues of 2022, most notably hurricane impacts and damage assessments to Florida's coastline. There are also presentations about strategies and lessons learned on coastal construction projects, coastal resilience efforts, and environmental resources, just to name a few. Please take a few minutes to peruse the program and punch your ticket to attend. Early registration is open.

There is also excitement in FSBPA's office as we prepare to welcome in the new year. Reflecting back on 2022 is a tale of two stories for Florida's beaches, bookended by a year beginning with resounding support by the Legislature for the statewide beach management program, to a year ending with devastation on numerous shorelines along the peninsula. And the year is not over yet. Florida's Legislature will meet next week in a special session where damages from Hurricanes Ian and Nicole will be discussed. FSBPA will be there championing beach and dune preservation and the critical need to repair storm battered shorelines quickly. Information on the outcome of this special session will be shared in January.

Last but not least, we would like to thank members for joining the annual member business meeting and agency post-hurricane workshop last month. The turnout was impressive, the presentations – incredible, and the camaraderie – invaluable. A very special thanks to Andy Studt and Palm Beach County for hosting us, and to Trisston Brown, Greg Garis, and Bob Glassen for your presentations.

*Happy  
Holidays*

## Inside this Edition



National Conference  
on Beach Preservation  
Technology

**February 1-3, 2023  
Fort Myers, Florida**

- ◆ **Conference Program**
- ◆ **Registration & Hotel Info**

....page 2

## **SR-A1A Innovative Buried Bulkhead/Seawall Tested During Hurricanes Ian and Nicole**

**by the University of Miami - School of  
Civil Architecture & Environmental  
Engineering, Florida Department of  
Transportation and  
Mott McDonald Florida, LLC**

....page 9



US Army Corps  
of Engineers®

## **The Damaging Effects of Countless Nor'easters, Tropical Storms, and Hurricanes along Florida's First Coast in 2021-2022**

**by Jason Harrah, USACE**

....page 15

**36<sup>th</sup> NATIONAL CONFERENCE ON BEACH PRESERVATION TECHNOLOGY**

February 1-3, 2023 ♦ Luminary Hotel, Fort Myers, Florida

**Wednesday, February 1****OPENING GENERAL SESSION****1:00 p.m. to 5:15 p.m.****DRAFT PROGRAM****1:10 p.m.****Hurricane Ian's Impacts to Southwest Florida's Barrier Islands****Michael Poff, P.E., Coastal Engineering Consultants, Inc., Bonita Springs, FL****1:35 p.m.****Impact of Hurricane Ian on Southwest Florida Coast****Ping Wang, Ph.D., Elizabeth Royer, Sophia Gutierrez, and Kendal Jackson, University of South Florida, Tampa, FL and Tiffany Roberts Briggs, Ph.D., Department of Geosciences, Florida Atlantic University, Boca Raton, FL****2:05 p.m.****The Impact of Hurricane Ian on the Beaches and Dunes of Florida****Guy Weeks, Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, Tallahassee, FL****2:25 p.m.****Use of UAV-flown LIDAR and Georadar to Assess the Geomorphological Impact of Hurricane Ian Along the Southwest Florida Coast****Michael Savarese, Ph.D., Dhruvkumar Bhatt, Christopher Daly, Ph.D, Felix Jose, Ph.D., and Rachel Rotz, Ph.D., The Water School, Florida Gulf Coast University, Fort Myers, FL and Ilya Buynevich, Ph.D., Temple University, Philadelphia, PA****2:45 p.m.****Emergency Assessment of Coastal Changes Caused by Hurricane Ian****Quin Robertson, Ph.D., P.G., Coastal Protection Engineering, Boca Raton, FL, Zhifei Dong, Ph.D., APTIM, Boca Raton, FL, and Charlene Sylvester and Jennifer Wozencraft, Joint Airborne Lidar Bathymetry Technical Center of Expertise, U.S. Army Engineer Research and Development Center, Kiln, MS****3:05 p.m.****Professional Exchange Break (30 Minutes)****3:35 p.m.****The Impact of Hurricane Ian on Coastal Development in Florida****Ralph Clark, P.E., Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, Tallahassee, FL****3:55 p.m.****USACE Emergency Operations Mission to Assess Failing Coastal Infrastructure Caused by Hurricane Ian****Will Reilly, P.E., U.S. Army Corps of Engineers, Jacksonville District, FL****4:15 p.m.****Captiva Island Coastal Impacts from Hurricane Ian and the Path to Recovery****Nicole Sharp, P.E., APTIM, Boca Raton, FL and Daniel Munt, Captiva Erosion Prevention District, Captiva, FL****4:35 p.m.****Simulating Coastal Flooding due to Extreme Storms: Lessons Learned from Hurricane Ian****Lindino Benedet, Ph.D., Coastal Protection Engineering, Boca Raton, FL****4:55 p.m.****Surge and Rainfall Compound Flood Modeling Using Gridded Rainfall from Bi-Variate Joint Surge-Rainfall Pairings****Michael Kabiling, Ph.D., P.E., CFM, Taylor Engineering, Inc., Jacksonville, FL****5:15 p.m.****Adjourn****Next Page**

**Thursday, February 2, 2023****CONCURRENT SESSION A1****8:05 a.m. to 9:45 a.m.****8:05 a.m.**

**Johnson Tract Lagoon Tidal Connectivity Study**  
Todd DeMunda, P.E. and Matthew Starr, P.G. Stantec Consulting Services, Rockledge, FL and Laurel, MD and Taylor Kroll, Florida Fish and Wildlife Conservation Commission, Newberry, FL

**8:25 a.m.**

**Wave and Storm Surge Modeling of Island Breakwaters for Hurricane Protection of Florida's Largest Marina**  
Leonard Barrera Allen, P.E., CFM, Jannek Cederberg, P.E., and Jason Cummins, P.E., Cummins Cederberg, Inc., Coral Gables, FL

**8:45 a.m.**

**Application of the Longshore Transport Curve for Coastal Structure Improvements at Coquina Beach in Manatee County, Florida**  
Thomas Pierro, P.E., D.CE, Coastal Protection Engineering, Boca Raton, FL, Charlie Hunsicker, Natural Resources Department, Manatee County, Bradenton, FL, and Morjana Signorin, APTIM, Boca Raton, FL

**9:05 a.m.**

**Coastal Structures Alternatives Analysis for Shoreline Stabilization Using the Delft3D Model – Coquina Beach and Longboat Pass Jetty Case Study**  
Morjana Signorin, APTIM, Boca Raton, FL and Charlie Hunsicker, Natural Resources Department, Manatee County, Bradenton, FL

**9:25 a.m.**

**Lessons Revisited on the Interaction of Beach Nourishment and Terminal Structures**  
Douglas Mann, P.E., D.CE, Nicole Sharp, P.E., and Morjana Signorin, APTIM, Boca Raton, FL

**9:45 a.m.****Professional Exchange Break (30 Minutes)****CONCURRENT SESSION B1****8:05 a.m. to 9:45 a.m.****8:05 a.m.**

**Hydrodynamic Dredging in the US – Challenges and Opportunities**  
Joe Wagner, P.E., D.NE, and Robert Lewis, HDR Engineering, Inc., Jacksonville, FL and Corpus Christi, TX

**8:25 a.m.**

**Navigating Borrow Area Challenges in Palm Beach County**  
Steven Howard, P.E., D.CE, Olsen Associates, Inc., Jacksonville, FL, and Andy Studt and Reubin Bishop, Palm Beach County Department of Environmental Resources Management, West Palm Beach, FL

**8:45 a.m.**

**Southeast Florida Regional Sediment Morphodynamics Study – A Summary of the Lake Worth Inlet Metocean and Sand Tracer Study, Lake Worth, FL**  
Jon Marsh, Ph.D., Environmental Tracing LLC, St. Augustine, FL and Laurel Reichold, U.S. Army Corps of Engineers, Jacksonville District, FL

**9:05 a.m.**

**A Hydro-Sediment-Morphodynamical Modeling Framework for Southeast Florida**  
Nathanaël Geleynse Ph.D. and L. Perk, WaterProof Marine Consultancy LLC, Lelystad, The Netherlands, L.C. van Rijn, Ph.D., P.E., LVRS-Consultancy, The Netherlands, Jon Marsh, Ph.D., Environmental Tracing LLC, St. Augustine, FL, and Laurel Reichold, U.S. Army Corps of Engineers, Jacksonville District, FL

**9:25 a.m.**

**Advanced Methods for Dredging and Hurricane Ian Response**  
Matthew Starr, P.G., Stantec Consulting Services, Tampa, FL

**9:45 a.m.****Professional Exchange Break (30 Minutes)**

**Thursday, February 2, 2023****CONCURRENT SESSION A2****10:15 a.m. to 12:00 p.m.****10:15 a.m.****Innovative Stormwater Solutions for Use in Coastal Areas**  
Johnny Martin, P.E., Moffatt and Nichol, Inc., Raleigh, NC**10:35 a.m.****Coastal Outfalls – Stormwater Resiliency for Coastal Communities**  
Nicholas Muzia, P.E., Martin County Public Works, Stuart, FL**10:55 a.m.****Lake Worth Inlet Sand Transfer Plant Integrity Assessment**  
Michael Barnett, P.E., D.CE, Craig Kruempel, Matthew Trzcinski, Nicholas Bragaia, and Charles Card, GHD, Mobile, AL, Wellington, FL, Tampa, FL, West Palm, FL, and Harrisburg, PA and Dave Hoffman, Ballard Marine Construction, Neenah, WI**11:15 a.m.****The Use of Wave Trip Walls to Reduce Storm Vulnerability**  
Marc Gold, P.E., CFM and Francis Way, P.E., CFM, ATM a Geosyntec Company, Charleston, SC**11:35 a.m.****Matheson Hammock Park Seawall Project**  
Melissa Burns, P.E., Jesse Davis, P.E., and Craig Kruempel, GHD, Altamonte Springs, FL, Miami, FL, and Wellington, FL, and Duane Kopp, P.E., Miami-Dade County, Miami, FL**12:00 p.m.****Lunch (1 Hour)****CONCURRENT SESSION B2****10:15 a.m. to 12:00 p.m.****10:15 a.m.****CHEERS: Lessons from the Great Lake's most Ambitious Multi-Phase Resiliency Plan**  
Chris Price and Joe Wagner, P.E., D.NE, HDR Engineering, Inc., Jacksonville and Tampa, FL**10:35 a.m.****A True Regional Effort – Lessons Learned from a 9-County Vulnerability Analysis**  
Jenna Phillips, Cummins Cederberg, Inc., St. Petersburg, FL and Sean Lahav, Half Associates, Inc., Jacksonville, FL**10:55 a.m.****Martin County Four Mile Beach Resilience**  
Wendy Laurent, P.E. and Angela Schedel, Ph.D., P.E., Taylor Engineering, Philadelphia, PA and Jacksonville, FL**11:15 a.m.****Miami-Dade County RER-DERM, Coastal Modeling, Planning, Permitting, and Design Services for Miami-Dade County Shorelines**  
Alberto Pisani, P.E. and Marina Blanco-Pape, P.E., Miami-Dade County Department of Regulatory and Economic Resources, Miami, FL, Jesse Davis, P.E. and Nicholas Bragaia, GHD, Inc., Miami, FL and West Palm Beach, FL**11:35 a.m.****Reclamation of the Coastal Edge through Offshore Construction**  
Brian Cook, PLA, Applied Sciences, Tampa, FL**12:00 p.m.****Lunch (1 Hour)**

**Thursday, February 2, 2023****CONCURRENT SESSION A3****1:00 p.m. to 3:00 p.m.****1:00 p.m.****Flagler County, Florida – Beach Management**

Chris Creed, P.E., D.CE. and Ben Gross, P.E., Olsen Associates, Jacksonville, FL and Faith Alkhatib, P.E., MBA, Flagler County, Bunnell, FL

**1:20 p.m.****Indian River County Sector 3 Beach and Dune Restoration Project: 2021-22 Project and Post-Ian Update**

James Austin and Nicole Sharp, P.E., APTIM, Boca Raton, FL and Eric Charest, Coastal Division, Indian River County Public Works, Vero Beach, FL

**1:40 p.m.****Two FCCE Projects from One Unnamed Storm: St. Johns County's Upcoming Beach Renourishments**

Patrick Snyder, P.E., U.S. Army Corps of Engineers, Jacksonville District, FL, Damon Douglas and Stephen Hammond, St. Johns County Public Works Department, St. Augustine, FL

**2:00 p.m.****St. Johns County, Florida Hurricanes Matthew and Irma FEMA Emergency Berm Restoration Project**

Damon Douglas and Stephen Hammond, St. Johns County Public Works Department, St. Augustine, FL, Thomas Gillespie, Michael Barnett, P.E., D.CE, and Melissa Burns, P.E., GHD, Savannah, GA, Mobile, AL, and Altamonte Springs, FL and Patrick Kenning, CHC, Ponte Vedra Beach, FL, and Mark Zanardi and David Juelle, CHC, Miami, FL

**2:20 p.m.****Quantifying the Impact of Hurricane Ian on Dune Morphology at Matanzas Inlet, Florida**

Matheus de Assis Bose, Peter Adams, and Copeland Cromwell, Department of Geological Sciences, Orlando Cordero, Center for Coastal Solutions, and Christine Angelini, Ph.D., Department of Environmental Engineering Sciences, University of Florida, Gainesville, FL

**2:40 p.m.**

**Analysis of Morphological Change at Ponte Vedra, FL caused by Hurricane Ian Using Drone Imagery and RTK GPS Surveys**  
Copeland Cromwell, Peter Adams, Matheus de Assis Bose, Department of Geological Sciences, Orlando Cordero, Center for Coastal Solutions, Andrew Ortega, Geomatics Program, and Christine Angelini, Ph.D., Department of Environmental Engineering Sciences, University of Florida, Gainesville, FL

**3:00 p.m.****Professional Exchange Break (30 Minutes)****CONCURRENT SESSION B3****1:00 p.m. to 3:00 p.m.****1:00 p.m.****Darker Beaches and Brighter Minds – Using Hot Spot Analyses to Monitor Lighting Compliance and Spark Change in Palm Beach County, FL**

Teal Kawana, Colette Biondi, Matt Mitchell, and Emma Rimmer, Palm Beach County Department of Environmental Resources Management, West Palm Beach, FL

**1:20 p.m.****Seabird Nesting Habitat Restoration in Charleston Harbor, South Carolina**

Steven Jachec, Ph.D., P.E., and Marc Gold, P.E., CFM and Francis Way, P.E., CFM, ATM a Geosyntec Company, West Palm Beach, FL and Charleston, SC

**1:40 p.m.****Living Shorelines and Oyster Reef Balls in Jupiter, Florida**

Jordon Cheifet, P.E., CFM, Colton Manning, P.E., and Danielle Irwin, CFM, PWS, Cummins Cederberg, Inc., Jupiter, FL

**2:00 p.m.****The Development of Conceptual Nature-based Shorelines for Captiva, FL**

Cheryl Hapke, Ph.D., Matt Jamieson, and David Revell, Ph.D., Integral Consulting, Inc., St. Petersburg, FL

**2:20 p.m.****Nature-Based Coastal Resiliency for Barrier Islands in Southwest Florida, Case Study on Marco Island Post-Hurricane Ian**

Mohamed Dabees, Ph.D., P.E., D.CE, Humiston & Moore Engineers, Naples, FL

**2:40 p.m.****Flora Dunes: Ecology, Protection and Restoration of Florida's Dunes**

Fritz Wettstein, RLA, Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, Tallahassee, FL

**3:00 p.m.****Professional Exchange Break (30 Minutes)**

**Thursday, February 2, 2023****CONCURRENT SESSION A4****3:30 p.m. to 5:10 p.m.****3:30 p.m.****Sharing Collier County's Strategies in Implementing Truck Haul Beach Nourishment Projects & Immediate Post-Hurricane Ian Observations of the Newly Constructed Project Areas****Tara Brenner, P.G., P.E., Coastal Protection Engineering, Boca Raton, FL and Andrew Miller, P.E., Collier County Coastal Zone Management Section, Naples, FL****3:50 p.m.****Coastal Impacts and Recovery Plans for Collier County, Florida from Hurricane Ian****Stephen Keehn, P.E. and Nicole Sharp, P.E., APTIM, Boca Raton, FL and Andrew Miller, P.E., Collier County Coastal Zone Management Section, Naples, FL****4:10 p.m.****The Morphological Evolution of Little Estero Island, Fort Myers Beach, Florida****Ralph Clark, P.E., Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, Tallahassee, FL****4:30 p.m.****Natural and Anthropogenic Influences on National Beach Nourishment Activities****Jyothirmayi Palaparthi and Tiffany Roberts Briggs, Ph.D., Department of Geosciences, Florida Atlantic University, Boca Raton, FL****4:50 p.m.****Listening to the Data, Non-Linear Concepts in Coastal Processes and Monitoring Data Analytics****Matthew Fleming, P.E., Humiston & Moore Engineers, Naples, FL****5:10 p.m.****Adjourn****CONCURRENT SESSION B4****3:30 p.m. to 5:10 p.m.****3:30 p.m.****Red Tide and HAB Mitigation****Kevin Claridge, Mote Marine Laboratory, Sarasota, FL****3:50 p.m.****The Reefline – Snorkel Trail and Artificial Reef in Miami Beach, Florida****Gina Chiello and Jordon Cheifet, P.E., CFM, Cummins Cederberg, Inc., Jupiter, FL****4:10 p.m.****Extensive SAV Data Collection for South Florida Beach Project Points to Value of Maintained Database for Longterm Analysis**  
**Sandra Walters, Resource Environmental Solutions, LLC, Fort Myers, FL****4:30 p.m.****Florida's Coral Reef: Developing Innovative Flood and Shoreline Protection Projects in South Florida****Joanna Walczak, Coral Protection and Restoration Program, Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, Dania Beach, FL****4:50 p.m.****Application of Unmanned Aerial System (UAS) to Evaluate High-Frequency Changes in Intertidal Wormreef and Nearshore Reef at Bathub Beach Park, Martin County, Florida****Greg Ward and Cheryl Miller, Coastal Eco-Group, Deerfield Beach, FL, Jessica Garland, Martin County, and Kathy FitzPatrick, P.E., Stuart, FL****5:10 p.m.****Adjourn**

**Friday, February 3****CLOSING GENERAL SESSION****8:05 a.m. to 12:00 p.m.****8:05 a.m.****Vibrations & Excitations...what the Beach Boys didn't tell you****Dave Swigler, P.E., Department of Environmental Resources Management, Palm Beach County, FL****8:25 a.m.****Low-Cost Method Using a Laser Level to Collect Pre/Post Storm Surveys to Estimate Sand Loss****John Bishop, Ph.D., Environmental Management Division, Pinellas County, Clearwater, FL****8:45 a.m.****Tropical Cyclones: A Global Perspective****Michael Jenkins, Ph.D., P.E., ATM a Geosyntec Company, West Palm, FL****9:05 a.m.****A Sinking Feeling: Using Nature to Calculate Offshore Transport Rates****Zachary Westfall and John Bishop, Ph.D., Environmental Management Division, Pinellas County, Clearwater, FL****9:25 a.m.****Flood Prediction and Inundation Mapping at Large-scales using a Multidisciplinary Machine Learning Approach****Chris Mack, P.E., D.CE, PMP, Stantec Consulting Services, North Charleston, SC****9:45 a.m.****Professional Exchange Break (30 Minutes)****10:15 a.m.****Responsible Sediment Management at Pensacola Pass****Krista Egan, P.E., Albert Browder, Ph.D., P.E., D.CE, and Sergio Peña, Olsen Associates, Inc., Jacksonville, FL****10:35 a.m.****Federal Funding for Beaches: Recent Decisions and Implications****Robert (Bob) Glassen, FEMA Region IV, and Jackie Keiser, P.G., U.S. Army Corps of Engineers, South Atlantic Division, Jacksonville, FL****10:55 a.m.****The Influence of Interannual Sea Level Changes on Shoreface Sand Volume and Decadal Scale Sediment Budget Calculations****Gary Zarillo, Ph.D., P.G., Florida Institute of Technology, Melbourne, FL****11:15 a.m.****November 2021 Nor'easter, Determination of Extraordinary Storm Classification****Drew Condon, Ph.D., P.E. and Kevin Hodgens, P.E., U.S. Army Engineer Research and Development Center, Vicksburg, MS****11:35 a.m.****The Measured Fate of Beach Nourishment Sand at Panama City****James Houston, Ph.D., U.S. Army Engineer Research and Development Center, Vicksburg, MS****12:00 p.m.****Adjourn****Next Page**

**Thank you to the  
2023 National Conference on Beach Preservation  
Technology Conference Planning Committee and  
Lisa Armbruster!**

**Executive Members**

**Chris Creed, P.E., Olsen Associates, Inc.  
Lauren Floyd, Coastal Protection Engineering  
Michael Poff, P.E., Coastal Engineering Consultants, Inc.**

**Planning Committee**

**Michael Dombrowski, P.E., MRD Associates, Inc.  
C. Scott Hardaway, Jr., Virginia Institute of Marine Science  
James Houston, Ph.D., USACE Research and Development Center  
Mike Jenkins, Ph.D., P.E., ATM - A Geosyntec Company  
John Ramsey, P.E., Sustainable Coastal Solutions, Inc.  
Will Reilly, P.E., USACE Jacksonville District  
Nicole Sharp, P.E., APTIM  
Lee Weishar, Ph.D., PWS, Woods Hole Group**

**CONFERENCE & HOTEL RESERVATIONS**



**National Conference  
on Beach Preservation  
Technology**

**Register Now!**

**Hotel Reservations**

**Back to Main Page**



## SR-A1A Innovative Buried Bulkhead/Seawall Tested During Hurricanes Ian and Nicole

Christian C. Steputat, PhD, PE<sup>1</sup>, Steven Nolan, PE<sup>2</sup>, Stefan Levine, EI<sup>2</sup>, Lowry J. Denty, PE<sup>3</sup>, Antonio Nanni, PhD, PE<sup>1</sup> and Landolf Rhodes-Barbarigos PhD, PE<sup>1</sup>

(1: University of Miami – School of Civil, Arch. & Environ. Engineering; 2: Florida Department of Transportation, 3: Mott McDonald Florida, LLC)

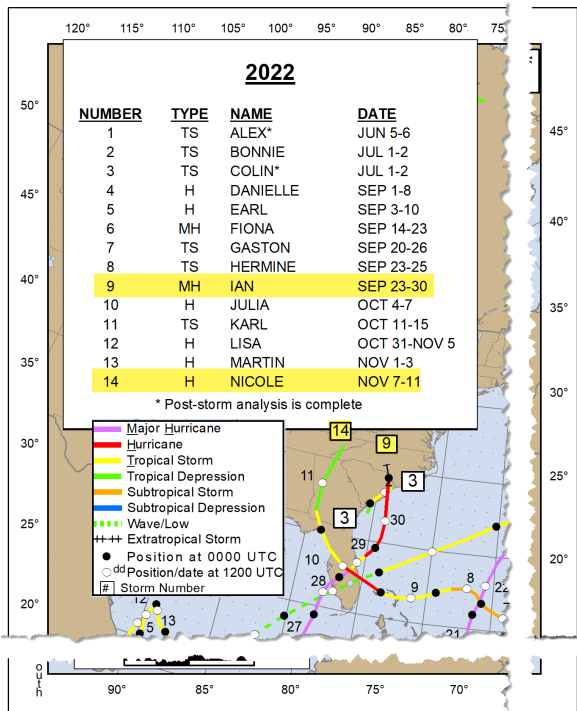
...as the story continues...

Following up for a second time on the presentation at the 2019 National Conference on Beach Preservation Technology (NCBPT) and the subsequent Shoreline articles in the 2019 May/June and October, the 5,000-ft. long Low-Impact Buried Secant-Pile Bulkhead/Seawall north of Flagler Beach has survived its first real test. Subsequent to the beach and sand dune erosion experienced from Hurricane Dorian, which only skirted the east coast of Florida in early September 2019, recent Hurricanes Ian and Nicole wreaked havoc along the SR-A1A beaches in Volusia and Flagler counties causing significant sand dune erosion with extensive adjacent property and highway damage.

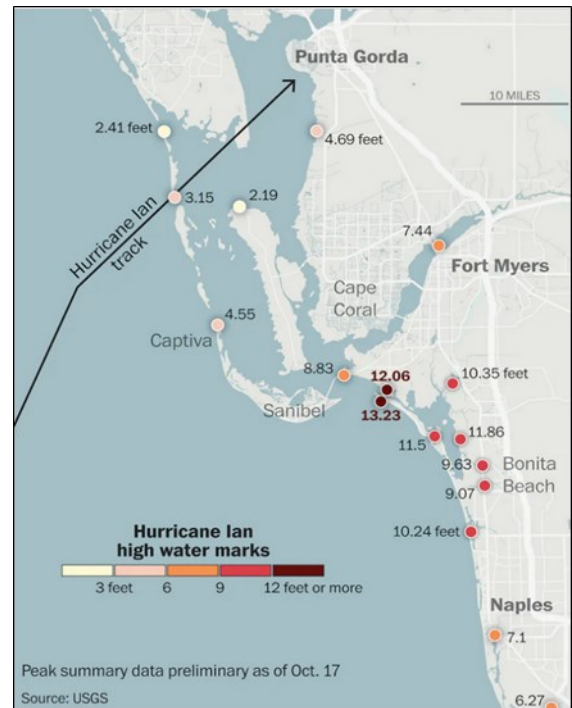
Recall that the purpose of the 2019 north Flagler Beach revetment project was to provide storm related protection and fortification for SR-A1A from future storm related wave action and erosion activity. The protection of the highway is especially important since Flagler Beach is designated as an Evacuation ZONE “A” and SR-A1A integrity is critical for rapid response and recovery efforts. Significant sand dune erosion was observed after Hurricane Dorian, with almost 13-feet of erosion height documented at some locations by the lead author. However, no sections of the buried secant-pile bulkhead face were ever exposed due to the early re-establishment of a protective dune system.

On September 28th, 2022, Hurricane Ian made landfall near Cayo Costa in southwestern Florida as a Category 4 storm with estimated sustained winds of 155 mph. Ian was downgraded to a Tropical Storm on September 29th as it crossed the Florida peninsula before once again entering the Atlantic Ocean near Cape Canaveral. As Ian reached open water on September 30th and turned north, it strengthened back to a Category 1 hurricane as it continued towards South Carolina. At least 125 people died in Florida because of Ian [1], most attributed to drowning from the 12-feet of storm tide surge. **Figure 1** shows the 2022 Hurricane track impacting Florida, while **Figure 2** shows measured depths of storm tide surge along the coastline west of Fort Myers.

On the east coast of Florida more than 5-feet of storm tide surge and wave action was experienced along many Flagler, St Johns, and Volusia County beaches. This compounded the previous beach and sand dune erosion and subsequently exposed many sections of the buried secant-pile bulkhead, which has now begun to function as a true seawall as shown in **Figures 3 & 4**. A post storm comment from Governor DeSantis on October 7th stated, “The core infrastructure did very very well, by and large ... And I would say the same thing with some of the roads, some of the bridges. The stuff that was new, you do see the impact of that. And so, I think we were right to do things like we have, with the resilient coastline.” [2]



**Figure 1:** Preliminary 2022 Hurricane Tracking Map (source: Modified from NOAA, 11/17/2022 <https://www.nhc.noaa.gov/data/tcr/>).



**Figure 2:** Storm surge from Hurricane Ian (source: USGS and Washington Post).

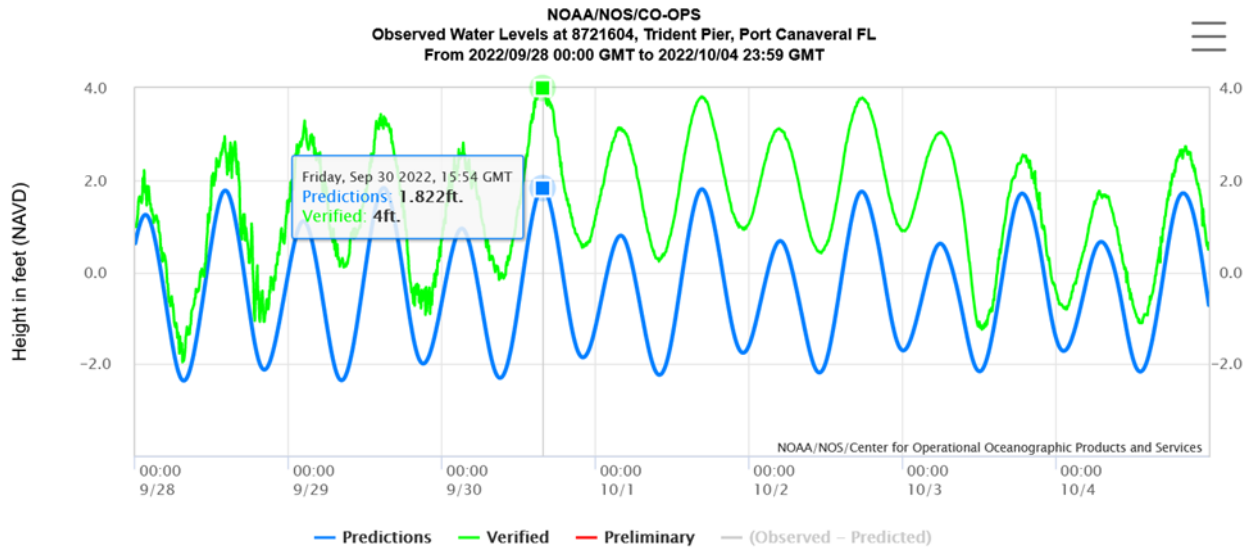


**Figure 3:** Scour from Hurricane Ian exposed up to 13-feet at the face of buried secant-pile bulkhead/seawall (source: Lead author's photo).

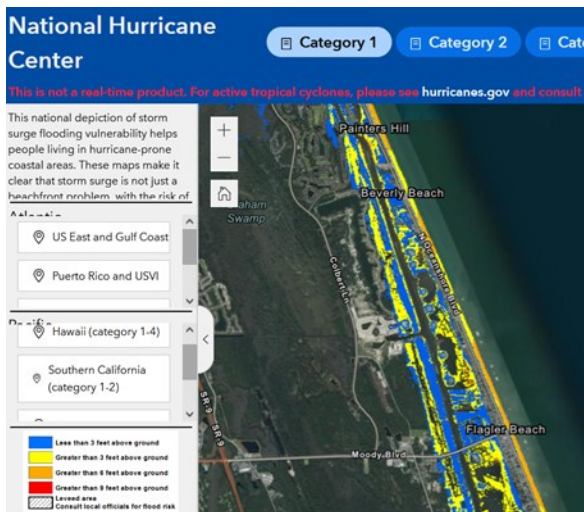


**Figure 4:** Scour from Hurricane Ian exposed up previously buried rubble boulder near the toe of the wall (source: Lead author's photo).

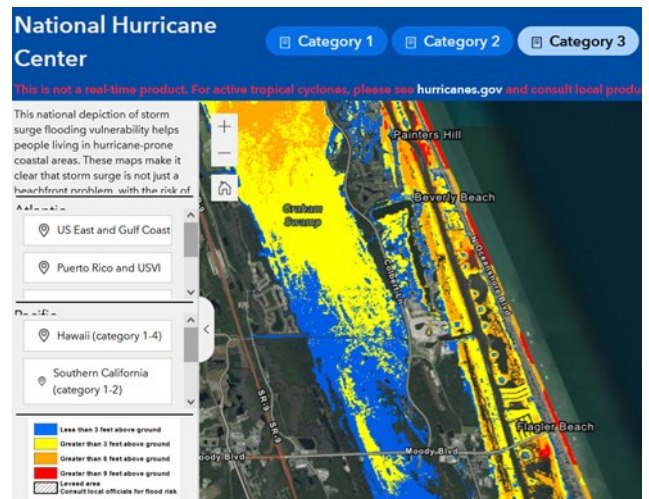
**Figure 5** shows real time water level measurements from Trident Pier in Port Canaveral, which is the closest available Atlantic coast NOAA station with verified data. **Figure 6** shows projected storm surge inundation from NOAA models of a Category 1 Hurricane, while **Figure 7** show inundation expected from a Category 3 Hurricane at the same location. Less than six weeks later Hurricane Nicole made landfall on November 9th south of Vero Beach as a Category 1 hurricane with estimated sustained winds of 75 mph. Like Ian, this storm pushed more than 5-feet of storm tide surge and oblique wave action in a northwesterly direction, resulting in significant beach erosion and longshore drift in Volusia and Flagler counties. **Figure 8** shows preliminary real time water level measurements from Port Canaveral.



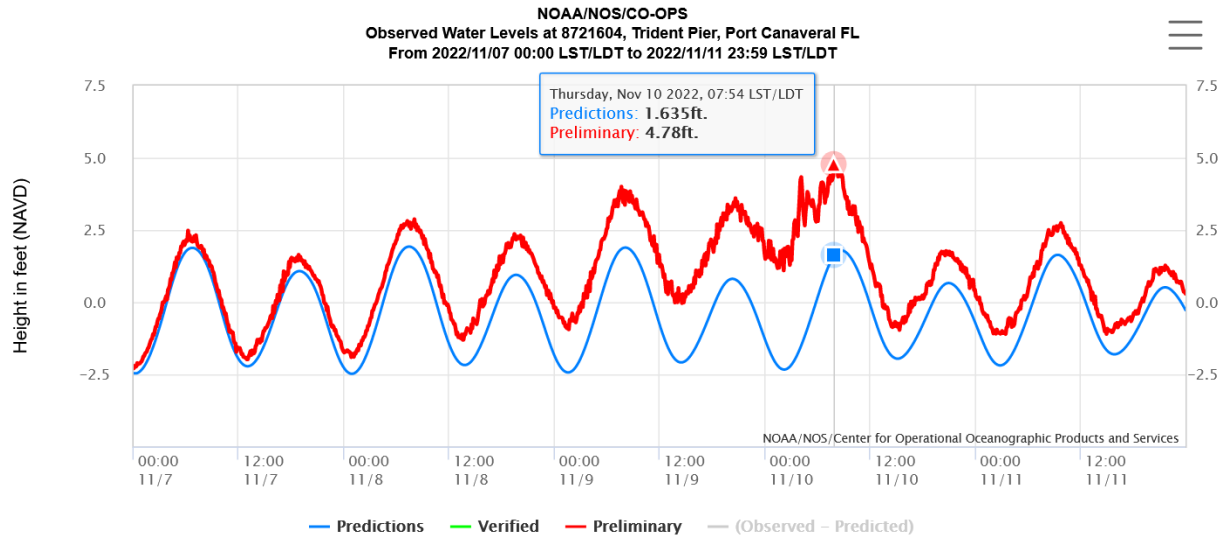
**Figure 5:** NOAA water level observations at Port Canaveral during Hurricane Ian (source: NOAA <https://tidesandcurrents.noaa.gov/waterlevels.html?id=8721604>).



**Figure 6:** Inundation estimates for a Category 1 Hurricane similar to Nicole a full strength (source: NOAA-National Hurricane Center).



**Figure 7:** Inundation estimates for a Category 3 Hurricane similar to Ian at full strength (source: NOAA-National Hurricane Center).



**Figure 8:** NOAA water level observations at Port Canaveral during Hurricane Nicole (source: NOAA <https://tidesandcurrents.noaa.gov/waterlevels.html?id=8721604>)

Nicole exposed additional sections of the previously buried revetment with a minimum of 3.5 feet height now exposed along most of its 5,000-foot length. The depth of scour measured during a post-storm survey by the lead author indicates there was some deposition of coarse sand and seashells at the base of the wall in the deepest previously scoured sections, with now only a maximum of 10.6-feet exposed height measured at critical locations. The reduction in scoured depth likely resulted from longshore drift, with this section of the beach benefitting from the recent sand replenishment projects to the south. **Figure 9** shows typical exposed sections of the wall several days after Nicole. It is suspected that scour depths at the base of the wall were several feet deeper during the peak of the storm with in-fill sand deposition occurring as the storm surf moderated.



**Figure 9:** Scour from Hurricane Nicole exposing 3.5-foot to 10-foot height at face of buried secant-pile bulkhead/seawall (source: Lead author's photo).

Additional observations and conclusions by the authors after both Ian and Nicole reveal no signs of lateral wall movement or highway pavement settlement in the three-year old structure. The structure continues to provide additional assurance for continued local mobility and safe access for post-storm recovery assistance by FDOT after both events. When funding and resources become available for the county the sand dunes could be easily reestablished, once again burying the revetment without affecting its structural integrity. However, until sufficient funding is available and environmental permits approved, the structure will continue to provide the necessary protection from inevitable future storm erosion.

This protection will become increasingly important as sea levels continue to rise and accelerate, recently confirmed by the February 2022 multi-agency report from NOAA, NASA, USGS, et al.: "... accelerating rate of sea level rise detected in satellite measurements from 1993 to 2020 – and the direction of those trends – suggest future sea level rise will be in the higher range of estimates for all regions. The trends along the U.S. Southeast and Gulf coasts are substantially higher than for the Northeast and West coasts." [3][4]



**Figure 10:** Florida Governor Ron DeSantis assessing damage in Flager Beach after Hurricane Nicole. Joining him was FDOT key players, Speaker of the House Paul Renner, and Florida Emergency Management Director Kevin Guthrie (*source: Flagler County Emergency Management Office*).

Looking towards the future, a task team has been formed between FDOT, Flagler County, and the City of Flagler Beach to evaluate long term solutions for areas to the south that continue to experience significant erosion from storm activity. The extension of the existing buried secant-pile wall to the south will be one of the options to be evaluated and discussed with local stakeholders.

As previously reported, the development of an associated shoreline revetment system (SEAHIVE) continues at the University of Miami and is considered by the authors to have potential synergy with this buried bulkhead/seawall and similar structures. The SEAHIVE system combines both wave attenuation and ecological habitat characteristics combining structural complexity with sustainable structural materials. Initial development and testing conducted under National Highway Cooperative Research Program's IDEA Project #213 was also presented at the February 2019 NCBPT in St Augustine and has now been completed, with three currently ongoing pilot projects in Southeast Florida. The projects include: (1) a riprap installation, in

collaboration with the City of North Bay Village; (2) a hybrid coral reef installation, in partnership with the City of Miami Beach and the University of Miami Laboratory for Integrative Knowledge; and (3) a seawall–mangrove planter installation, in collaboration with Shipwreck Park (a nonprofit organization), the City of Pompano Beach, and Broward County. All three installations will be monitored to assess the engineering and ecological performance of the system and make improvements.

[1] Florida Medical Examiners Commission Hurricane Ian deaths: Update October 13, 2022. [http://www.fde.state.fl.us/News/2022/October/Update-Florida-Medical-Examiners-Commission-H-\(17\)](http://www.fde.state.fl.us/News/2022/October/Update-Florida-Medical-Examiners-Commission-H-(17))

[2] Bruggers, J. and Green, A. "Florida Commits \$1 Billion to Climate Resilience. But After Hurricane Ian, Some Question the State's Development Practices", Inside Climate News, October 8, 2022. <https://insideclimatenews.org/news/08102022/florida-commits-1-billion-to-climate-resilience-but-after-hurricane-ian-some-question-the-states-development-practices/>

[2] Younger, S. "NASA Study: Rising Sea Level Could Exceed Estimates for U.S. Coasts", NASA Jet Propulsion Laboratory, Climate Newsletter, November 15, 2022. <https://climate.nasa.gov/news/3232/nasa-study-rising-sea-level-could-exceed-estimates-for-us-coasts/>

[3] Sweet, W.V., B.D. Hamlington, R.E. Kopp, C.P. Weaver, P.L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A.S. Genz, J.P. Krasting, E. Larour, D. Marcy, J.J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K.D. White, and C. Zuzak, 2022: Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD, 111 pp. <https://oceanservice.noaa.gov/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf>

**Back to Main Page**

## The Damaging Effects of Countless Nor'easters, Tropical Storms, and Hurricanes along Florida's First Coast in 2021-2022

By Jason Harrah, Senior Project Manager, USACE



US Army Corps  
of Engineers®

The Jacksonville District, U.S. Army Corps of Engineers (USACE) manages approximately 23 miles of federally authorized beach projects in northeast Florida. These projects work to minimize the impacts coastal storms have on the people and upland development in many northeast Florida beach communities including Fernandina Beach in Nassau County, Atlantic Beach, Neptune Beach, Jacksonville Beach in Duval County, Vilano Beach, South Ponte Vedra Beach, and St. Augustine Beach in St. Johns County and Flagler Beach in Flagler County.

Each of these federal beach projects have seen significant and progressive erosional effects following mother nature's relentless recent attacks starting in November 2021 when a strong and long-lasting nor'easter impacted northeast Florida between November 5<sup>th</sup> and November 9<sup>th</sup> (~6 months after initial construction of the Vilano Beach federal project). The bulk of the weather included tropical storm force winds and several inches of rainfall that lasted for days along with high astronomical water levels with the New Moon (commonly referred to as King Tides). Based on the observed weather data, USACE concluded this storm event was "extraordinary" per USACE Engineering Regulation 500 -1-1. After further analysis and post storm surveys it was determined that the older 50-year federal projects (i.e., those with multiple years of previous renourishments) particularly in Nassau and Duval counties suffered less significant erosion however the beaches in St. Johns County and Flagler County weren't so lucky. As such, both St. Johns Projects, the Coastal Storm Risk Management (CSR) Project (Vilano Beach & South Ponte Vedra Beach) and St. Johns Shore Protection Project (SPP) (St. Augustine Beach) qualified for Flood Control and Coastal Emergency (FCCE) rehabilitation assistance under Public Law 84-99 paving the way for 100 percent federally funded emergency renourishments. The Flagler County CSR Project unfortunately didn't qualify for FCCE since initial construction of this federal project is still pending certification of all required easements by the non-federal sponsor, Flagler County. All federal beach projects must complete initial construction to be eligible for FCCE under P.L. 84-99.

Following the November 2021 Nor'easter, the beaches of northeast Florida were again directly impacted and further eroded by follow-on storm events including additional Nor'easters, Hurricane Ian, and Tropical Storm Nicole most recently. These most recent storm events severely eroded the sand depleted Duval County Shore Protection Project, eating away at approximately 70 percent of the dunes along the 10-mile federal beach and further degraded the projects in St. Johns County and Flagler County of which portions of State Road A1A was inundated and impassible to emergency vehicles. USACE is currently evaluating FCCE eligibility for the Duval SPP Project and working to update volumes on St. Johns (CSR and SPP) and Flagler County federal projects.

So, what's the good news? The federal beach projects (previously constructed) did exactly what they're designed to do! The design berm and dune systems absorbed wave energy, minimized storm surge inundation, and protected millions in upland infrastructure...essentially, they sacrificed themselves to protect upland property. Yes, some damages did occur however without each of these federal projects, the damages would've been significantly worse with long recovery times for homeowners and businesses.

And the bad news? Now we must rebuild the beach/dune system along northeast Florida and prepare for future storms. As mentioned, both St. Johns County federal projects both qualified for 100 percent federal renourishments and the Duval SPP is currently being evaluated post Tropical Storm Nicole. Flagler is still pending certification of real estate by

Flagler County.

So, what's the timing? The St. Johns SPP and St. Johns CSRSM will both be advertised in March 2023 and awarded in May 2023 (each of these projects required new offshore borrow areas in federal waters that are awaiting federal/state permitting). The Duval County SPP was already gearing up for the last scheduled renourishment of the projects 50-year life with advertisement scheduled for October 2023 and Award in December 2023. The Nassau County SPP is scheduled to be renourished in late 2024; however, due to impacts from Tropical Storm Nicole the timeframe for the next renourishment may be accelerated.

In the words of Albert Einstein "Insanity is doing the same thing over and over and expecting different results". Well, clearly Mr. Einstein wasn't intellectually versed in the science of coastal engineering as we bear witness to the success of our federal beach project renourishments year after year across the great state of Florida. From the local, state and federal level these projects are a direct result of teamwork, partnership and a willingness to do whatever is needed as each storm passes.



**Flagler Beach – Post TS Nicole**





**Vilano Beach – Post TS Nicole**



**Duval County SPP – Post TS Nicole**

**[Back to Main Page](#)**

**Shoreline**

*A monthly electronic publication of the Florida Shore & Beach Preservation Association.*

**Officers****Chair**

Charlie Hunsicker, Manatee County

**Vice-Chair**

Emily Lewis, Charlotte County

**Secretary-Treasurer**

Steve Boutelle, Lee County

**Past-Chair**

Don Donaldson, Martin County

**Directors**

John Bishop, Pinellas County  
 Marina Blanco-Pape, Miami-Dade County  
 Damon Douglas, St. Johns County  
 Tom Harmer, Town of Longboat Key  
 Joshua Revord, St. Lucie County  
 Dan Rowe, Bay County  
 Andy Studt, Palm Beach County  
 Rob Weber, Town of Palm Beach  
 Janet Zimmerman, FIND

**Chair Emeritus**

Allen Ten Broek

**President Emeritus**

Deborah Flack

**Ex Officio**

USACE Jacksonville District, Milan Mora  
 USACE Mobile District, Jenny Jacobson  
 FDEP, Lainie Edwards  
 Chuck Broussard, Weeks Marine  
 Niki Desjardin, Ecological Associates, Inc.  
 Thomas Pierro, Coastal Protection Engineering

**FSBPA Staff**

**President:** Pepper Uchino

**Executive Director:** Jackie Larson

**Technical Director:** Lisa Armbruster

**Office/Conference Manager:** Teri Besse

Florida Shore & Beach Preservation Association  
 PO Box 13146, Tallahassee FL 32317  
 Phone: (850) 906-9227  
[www.fsbpa.com](http://www.fsbpa.com) • [mail@fsbpa.com](mailto:mail@fsbpa.com)

**CALENDAR OF EVENTS****FSBPA Events**

**February 1-3, 2023**

**36<sup>th</sup> National Conference on Beach Preservation  
 Technology**

**Luminary Hotel & Co., Autograph Collection  
 Fort Myers, FL**

**Other Events**

**February 17-18, 2023**

**26th Annual Marine Turtle Permit Holder's Meeting  
 Safety Harbor Resort and Spa**

**March 21-23, 2023**

**ASBPA 2023 Coastal Summit  
 National Association of Counties Building  
 Washington, DC**

Follow us on



[Back to Main Page](#)