Critical Infrastructure Resilience at Port Everglades

Hydrographic Services Review Panel
Coastal and Maritime Community Resilience Session
April 4, 2018

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Assistant Director
Officially Opened 1928
Powerhouse for Cruise & Cargo

- #1 Container Port in Florida, #10 in U.S.
- #3 Cruise Port in the World
- #2 Petroleum Port in Florida
Area Boundaries

- Port Everglades
- Artificial Reef
- Anchorage
- ODMDS
- US Navy Area
- Lloyd-Mizell-Johnson State Park
- West Lake Park
Population Growth And Cargo Vessel Growth

Source: Broward County Planning and Development Management Division
Harmony of the Seas
Currently the largest passenger ship in the world
226,963 GT / 6,780 passengers at maximum capacity

Cruise Vessel Growth
Since 1930s
5.1 Billion Gallons Annually
FLL and MIA Pipelines
Former Crude Pipeline
Serve 12 Counties
Daily Throughput 14 Million Gallons
Midport Upland Enhancement Project

- Southport Turning Notch Extension Project
- 16.5-Acre Wetland Enhancement Replaced 8.7-Acres in Conservation
- Planted 70,000 Mangroves
- “Trending for Success”
- IHS Maritime and Trade Magazine’s “Dredging and Port Construction Innovation Award”
- Broward County’s “GoGreen Seal of Sustainability”
West Lake Natural Area Restoration

- Broward County Park
- USACE Navigation Improvements Project
- Joint-Project with FLL Runway Extension
- 168 Acres of Flushing, Mangrove and Seagrass Mitigation
- Purchase Wetland Parcels
- More Improvements Scheduled (Segment 4)
Coral Reef Restoration

- USACE Navigation Improvements Project
- 103,000 new nursery-raised corals will be outplanted on 18 acres of existing reef
- Relocation existing corals in the project area to another 5 acres of existing reef
Manatees Aggregation Area

- 2nd Largest in Broward
- FPL Cooling Canal
- 455 Manatees in 2010
- Year-Round Presence
- Manatee Protection Plan and Tariff Requirements
- 4’ Manatee Fenders on 26,000’ of Bulkhead
- Manatee Exclusion Devices on Stormwater Outfalls
- Enhanced “Nursery Area”
Sea Turtle Nesting and Stranding

- Nesting Beach ¼-Mile
- Critical Loggerhead Breeding Habitat Offshore
- Occasionally Enter Port
- FWC Stranding Response
- Shields on Garage Lights
- High Mast “Turtle-Friendly” LED Lighting Evaluation
- Evaluating Tree Screening, False Crawls and Hatchling Disorientation

Legend
- High Mast Lights
- Sea Turtle Nests
- Sea Turtle Standings
- Sea Turtle False Crawls
Upland Habitat Restoration

- Certified Wildlife Habitat
- Native Landscaping
- Removing Florida Exotic Pest Plant Council Categories I-II Plants
- Planting Native Broward County Species for Replacement Landscaping
First Seaport to Voluntarily Partner with EPA

Categories
- Ocean Going Vessels
- Harbor Craft
- Cargo Handling Equipment
- Onroad Vehicles
- Locomotives

Will be used for air quality restoration
- Energy Costs
- Offsite Emissions
- NHS, OSHA, FAA and FDOT Requirements
- New Lighting Ordinance
- Impacts to Sea Turtle Nesting Beaches
Sustainable Facilities

- $4.4 Million Energy-Efficient Building Upgrades
- USGBC LEED Certifications
- Broward County’s “GoGreen Seal of Sustainability”
- “Green Supply Chain” Award
- “Green Marine” Certification
- Vehicle and Boat Engine Energy-Efficient Retrofits
- Florida Recycling Partnership 75% Recycling Goal
- Climate Change Programs
- Freight Mobility Research Institute
- Department of Homeland Security
- Studied Assessment and Planning for Resiliency of Ports
- Modeled Storm Surge/Flooding on the East Coast of Florida

Based on Archived AIS Data

![Graphs showing resiliency levels for different time periods.](chart.png)
Assessment & Measurement of Port Disruptions

“Following a disruption of port operations, what are the secondary and tertiary effects of the port disruption on other modes of transport (trucking, rail, pipeline, etc.) and what are the economic impacts of such an incident?”

- Model baseline operations at Port Everglades
- Develop cyber-physical disruptions catalog
- Simulate the effect of cascading disruptions

Critical Infrastructure Resilience Institute

Container Yard – TOS

Container Locations

Baseline at 5000

- Disruption
- Baseline at 5,000
Internal Assessments

- LiDAR Data
  - Fort Lauderdale
  - FDOT due in April
- Security Network Junction Box Survey
- Building Base Floor Elevation Survey
Infrastructure Design Adaptations

- Slip 1 Modifications
Hurricane Irma Response

- Fuel Reserves
- Physical Damage
- Vegetation Loss
- Port Reopening
- Ocean Turbidity
Environmental Restoration Collaboration

- Interagency Working Groups
- American Association of Port Authorities Environment Committee
- Florida Ports Council Environmental Committee
- Green Marine/GreenTech 2017
- Southeast Florida Coral Reef Initiative
- Southeast Florida Regional Climate Change Compact
- Broward County Sustainability Stewards
- Broward County Critical Infrastructure and Future Flood Risk Workgroup
- Florida Shorebird Alliance
- South Florida Audubon Society
- FAEP/SFAEP