PORT EVERGLADES HARBOR
BROWARD COUNTY, FLORIDA

Civil Works Review Board (CWRB)

Feasibility Report and
Environmental Impact Statement

Presented by:
Colonel Alan Dodd
Jacksonville District

27 February 2015
PORT EVERGLADES
BOTTOM LINE UP FRONT

- Strategic location for international freight and domestic distribution
- #32 in U.S. for overall tonnage: ~21 million tons
- #13 in U.S. for container traffic
- Consistently among the top 2 to 3 busiest cruise ship ports worldwide
- South Florida’s main port for receiving petroleum products (serving 12 counties)
- USCG Station: Commissioned 40 years ago; primary missions are search, rescue, drug interdiction
- U.S. Navy South Florida Ocean Measurement Facility

RECOMMENDED PLAN

- 48-foot deepening with widening in select areas (Locally Preferred Plan – LPP)
- 2.9 BCR (at 3.375%)
- Minimal increase in O&M
- Total Federal Cost: $190 million
- Total Non-Federal Cost: $184 million
- Mitigation Cost: $53 million
PORT EVERGLADES
VITAL PORT/STRATEGIC LOCATION

LOGISTICS
- Transportation nexus (highway, rail, air) for international, national and regional access
  - Rail: New Florida East Coast Railway provides direct access to the Intermodal Container Transfer Facility
  - Interstates: I-595, I-75, I-95, Florida Turnpike

DEMAND
- S.E. U.S. most rapidly growing region

MULTIPLE USES/VITAL PORT
- #13 in container traffic nationwide
- Leading cruise port worldwide
- U.S. Coast Guard & U.S. Navy presence

New near-dock Intermodal Container Facility (ICTF) in Southport to transfer international cargo
**PORT EVERGLADES**

**EXISTING CONDITIONS**

- **North Turning Basin (NTB)**
- **Main Turning Basin (MTB)**
- **South Turning Basin (STB)**
- **Southport Access Channel (SAC)**
- **Inner Entrance Channel (IEC)**
- **Outer Entrance Channel (OEC)**
- **Dania Cut-off Canal (DCC)**

**PROBLEMS**

- Inadequate depths & widths
- Navigation restrictions
- Strong unpredictable currents (opposing Gulfstream & nearshore currents)
- Vessel light-loading
- More frequent trips
- Vessel delays
- Congestion

**OPPORTUNITIES**

- Forecasted volume of goods on fewer, larger ships
- Reduce vessel delays
- Reduce transportation costs

**FUTURE WITHOUT-PROJECT**

- **Objectives**
- **Constraints**

**PLAN FORMULATION**

**RECOMMENDED PLAN**
Authorization: House Document 126, 103rd Congress, 1st Session, and House Document 144, 93rd Congress, and by a resolution of the House Committee on Transportation dated May 9, 1996:
“...to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of navigation and related purposes, with particular reference to navigation into and within the part of the project known as the Southport Channel.”

Non-federal Sponsor: Broward County, Florida

STUDY HISTORY

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Study Authorized</td>
</tr>
<tr>
<td>1997</td>
<td>FCSA Study Initiated</td>
</tr>
<tr>
<td>1999</td>
<td>Sponsor Requests</td>
</tr>
<tr>
<td>2002</td>
<td>1st Draft Report Submitted</td>
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<tr>
<td>2004</td>
<td>Draft EIS Review</td>
</tr>
<tr>
<td>2007</td>
<td>WRDA 2007</td>
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<tr>
<td>2008</td>
<td>Draft EIS Review</td>
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<tr>
<td>2009</td>
<td>Sponsor Requests Re-scoping (Per Master Plan)</td>
</tr>
<tr>
<td>2011</td>
<td>Draft EIS Review</td>
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<tr>
<td>2012</td>
<td>SMART Planning Charrette &amp; Rescoping</td>
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<tr>
<td>2013</td>
<td>Revised Draft Feasibility Report</td>
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<td>2014</td>
<td>Final Report</td>
</tr>
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<td>2015</td>
<td>CWRB</td>
</tr>
</tbody>
</table>

Environmental Coordination with Resource Agencies

Plan Re-formulation, Reviews, Ship Simulation Revisions, Pilot Concerns, & Economic Revisions

Draft EIS Released

STUDY COST: $12.2M

BUILDING STRONG®
BROWARD COUNTY

Mr. Steven Cernak, P.E., PPM
Chief Executive & Port Director
Port Everglades
The Need To Go Deep
Port Everglades by the Numbers

- #1 Seaport in Florida by revenue - $153 million FY2014
- #1 Container port in Florida by volume 1,013,344 TEUs FY2014
- #1 Seaport for exports in Florida - $13.4 billion CY2013
- #1 Refrigerated cargo port in Florida - 125,272 TEU’s FY2014
- #2 Petroleum port in Florida - 112.4 million barrels FY2014
- #1 U.S. gateway for trade with Latin America FY2014
  (15.3 percent of all Latin American & Caribbean trade in the U.S.)
- #3 Foreign-Trade Zone (warehouse/distribution exports) in the U.S. CY2013
- #7 Refrigerated cargo port in the U.S. FY2014
- #2 Cruise port for multi-day passengers in the World - 4 million pax FY2014
The Big 3: Petroleum, Cargo, Cruise

Port Everglades = Job$
11,433 direct jobs (FY2013)

Average salary $38,500: cargo • $45,300 • cruise $30,000

- A total income of more than $440 million is generated by Port activities
- 202,709 Florida jobs are supported, earning approximately $7.8 billion in wages
- More than $733 million in state and local taxes generated by Port activities
Key Stakeholder Groups

Port Everglades
Association

Hollywood Chamber
of Commerce

Audubon Society &
Other Environmental
Groups

Greater Fort Lauderdale
Chamber of Commerce

Port Everglades
Pilots Association

Local Colleges and
Universities

Greater Fort Lauderdale
Alliance

Dania Beach Chamber
of Commerce

Port Everglades
Advocacy Team
Environmental Stewardship
Revenues of $29.4 million in FY2014
112.4 million barrels in FY2014
564 ship calls in FY2014
Revenues of more than $32.5 million
20+ ocean carriers, 12 terminal operators
1860 ship calls in FY 2014
Cruise - Smooth Sailing Ahead
4 million passengers in FY2014

- Revenues of $59.4 million in FY2014
- 10 cruise lines, 30 homeported ships
- 877 ship calls in FY 2014
Vital Port- Strategic Location
How We Connect Internationally
150 Ports 70 Countries 20 Ocean Carriers

Moved 1.01 million TEUs in FY2014
Crossroads of North-South & East-West Trade
Rapidly Growing Population

Huge consumptive year round market quadruples in the winter months.

- Permanent State population 19.5 million
- Florida's growth rate is one of the faster in the country (ranked 7th) at 1.36%.
- If growth continues at roughly the same rate, by the time that the next Census is undertaken in 2020, numbers should have comfortably burst through 20 million, and probably even past 21 million.

- Seasonal/visitor population of 94.3 M in 2013
5-Year Master Plan Projects

FY15-19 CIP Totals $635M

Neobulk Storage Yard

Foreign Trade Zone Relocation

McIntosh Road Gate Lane Addition

Southport Turning Notch Extension

Southport Phase 9B Container Yard

New Crane Rails (Berths 30, 31, 32)

Berths 1, 2, 3 New Bulkheads

USACE Deepening & Widening Design

Slip 2 Westward Lengthening

Slip 1 New Bulkheads & Reconfiguration

CT#25 Improvements/Expansions

Super Post-Panamax Cranes (2)

West Lake Mitigation
Southport Turning Notch Extension
100% SPONSOR FUNDED
Petroleum: Slip 1 (inside dotted line) expansion includes new bulkheads and reconfiguration of Berths 9 and 10 (Est. Completion 2018). Slip 3 is in our 10+ year work plan.
Intermodal Container Transfer Facility
100% SPONSOR FUNDED
(FEC public–private partnership)

Atlanta/Charlotte = 2 days by rail
Nashville/Memphis = 3 days by rail
70% of U.S. Population = 4 days by rail
PORT EVERGLADES NAVIGATION: PRESENTED BY CAPTAIN SAM STEPHENSON
Ellie Lady visited Port Everglades in 2013
Port Everglades
A Strong Financial Partner

Moody's Investors Service recently upgraded the rating on the Broward County Seaport Enterprise Port Facilities Revenue. The rating upgrade reflects:

- THE PORT'S STRONG FUNDAMENTALS WITH RESPECT TO ITS SIZE AND REGION OF OPERATION,
- CONTINUED STABLE FINANCIAL PERFORMANCE,
- REVENUE DIVERSITY WITH ESTABLISHED CRUISE AND CARGO ACTIVITIES,
- A STRONG MANAGEMENT TEAM,
- AND COMPETITIVE POSITION.

The rating also incorporates the port's adequate liquidity, several long-term agreements ensuring medium term financial stability and a declining debt profile which can absorb additional debt through prudent management of the capital program. This is one of the reason that Port Everglades is a strong financial partner and fully capable of funding the non-federal share of this very important project.
### ECONOMICS
- **Annual Tonnage:** 21 million (2nd in Florida)
- **South Florida’s main port for petroleum products**
- **Annual Containers:** 640,000 (13th in Continental U.S.)
- **Trade Routes:** Increase in cargo throughput on major Transatlantic and South American routes

### ENGINEERING
- **Strong Unpredictable Currents in the Entrance Channel**
- **Congestion in Channel**
- **Upland Disposal Sites:** limited capacity
- **Expanded ODMDS**
- **Infrequent O&M**

### ENVIRONMENTAL
- **Threatened and Endangered species** (e.g., corals, manatees, sea turtles, smalltooth sawfish)
- **Essential Fish Habitat** (e.g., corals, mangroves, seagrasses)
### Objectives

- Sub-Panamax
  - TEU* Capacity: ~2500
  - LOA: 675
  - BEAM: 98
  - DRAFT: 37.6
  - DWT: 34,000

- Panamax
  - TEU* Capacity: ~3500 - 4800
  - LOA: 794-845
  - BEAM: 106
  - DRAFT: 40.3-44.3
  - DWT: 24,000 - 65,000

- Post-Panamax Gen 1 (PPX-1)
  - TEU* Capacity: ~6500
  - LOA: 960
  - BEAM: 131
  - DRAFT: 46.1
  - DWT: 80,600

- Post-Panamax Gen 2 (PPX-2)
  - TEU* Capacity: ~8700
  - LOA: 1106
  - BEAM: 146
  - DRAFT: 47.6
  - DWT: 106,800

* Intermodal Shipping Container Measured as a Twenty-foot Equivalent Unit (TEU)

### Constraints

- Existing Conditions

### Plan Formulation

- Future Without-Project

### Recommended Plan

- Panamax Tankers:
  - LOA: 600-750
  - Beam 106
  - Draft: 41.1-46.2
  - Liquid Capacity: 52,100 - 79,200 kg/m³

- Afammax Tankers:
  - LOA: 806
  - Beam 140
  - Draft: 49.1
  - Liquid Capacity: 120,315 kg/m³

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Population in South Florida projected to grow increasing demand for petroleum & other products.
Objectives:

- **Federal Objective:** Contribute to national economic development (NED) consistent with protecting the nation's environment

- **Project Objective:** Reduce navigation transportation costs and increase maneuverability in channel

Constraints:

- Avoid, minimize, and mitigate impacts on environmental resources and the U.S. Coast Guard Station
1) Analyze structural & non-structural measures that reduce transportation costs & increase maneuverability (meet project objectives)

2) Determine benefitting channel segments for combinations of depth and width alternatives

### Initial Project Footprint

- **NTB**: North Turning Basin
- **MTB**: Main Turning Basin
- **STB**: South Turning Basin
- **SAC**: Southport Access Channel
- **TN**: Tining Notch
- **IEC**: Inner Entrance Channel
- **OEC**: Outer Entrance Channel
- **DCC**: Dania Cut-off Canal

### MEASURES

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>MEET PROJECT OBJECTIVES?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>Additional Tugs</td>
<td></td>
</tr>
<tr>
<td>Clear Berthed Vessels</td>
<td></td>
</tr>
<tr>
<td>Trucking</td>
<td></td>
</tr>
<tr>
<td>Off-loading Cargo</td>
<td></td>
</tr>
<tr>
<td>Light-loading Vessels</td>
<td></td>
</tr>
<tr>
<td>Lightering</td>
<td></td>
</tr>
<tr>
<td>Off-shore Petroleum</td>
<td></td>
</tr>
<tr>
<td>Widen OEC &amp; IEC</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Widen MTB</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Deepen MTB</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Deepen NTB</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Deepen STB</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Widener</td>
<td>✓</td>
</tr>
<tr>
<td>Widen SAC</td>
<td>✓</td>
</tr>
<tr>
<td>Deepen SAC</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Widen TN</td>
<td>✓</td>
</tr>
<tr>
<td>Deepen TN</td>
<td>✓  ●</td>
</tr>
<tr>
<td>Dania TB</td>
<td></td>
</tr>
<tr>
<td>Widen/Deepen Dania</td>
<td></td>
</tr>
</tbody>
</table>

● Meets objectives if combined with other measures
• Discussion with Coast Guard & Harbor Pilots, & ship simulation optimized project footprint to minimum required dimensions:
  - Outer Entrance Channel extension & widening
  - MTB Widener
  - SAC widening
  - Turning Notch (minimal widening)

• Incremental Analysis: Widening increments evaluated independently & with deepening; deepening evaluated at 1-foot increments
**ECONOMIC ANALYSIS**

*FY15 Discount Rate 3.375% & October 2014 Price Level*

<table>
<thead>
<tr>
<th>Depth</th>
<th>Average Annual Costs*</th>
<th>Average Annual Benefits</th>
<th>Average Annual Net Benefits</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>46 feet</td>
<td>$15,000,000</td>
<td>$45,100,000</td>
<td>$30,100,000</td>
<td>3.0</td>
</tr>
<tr>
<td>NED Plan: 47 feet</td>
<td>$15,900,000</td>
<td>$46,900,000</td>
<td>$31,000,000</td>
<td>2.9</td>
</tr>
<tr>
<td>LPP &amp; Recommended Plan: 48 feet</td>
<td>$16,860,000</td>
<td>$48,240,000</td>
<td>$31,400,000</td>
<td>2.9</td>
</tr>
<tr>
<td>49 feet</td>
<td>$17,800,000</td>
<td>$48,300,000</td>
<td>$30,500,000</td>
<td>2.7</td>
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</table>

*Costs include IDC and O&M

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**AVERAGE ANNUAL NET BENEFITS**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Average Annual Net Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>44' + Widening</td>
<td>$35,000,000</td>
</tr>
<tr>
<td>45' + Widening</td>
<td>$30,000,000</td>
</tr>
<tr>
<td>46' + Widening</td>
<td>$25,000,000</td>
</tr>
<tr>
<td>47' + Widening</td>
<td>$20,000,000</td>
</tr>
<tr>
<td>48' + Widening</td>
<td>$15,000,000</td>
</tr>
<tr>
<td>49' + Widening</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>50' + Widening</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>51' + Widening</td>
<td>$0</td>
</tr>
</tbody>
</table>

**BUILDING STRONG®**
Existing Project Footprint

- **Outer Entrance Channel (OEC)** - extend, widen, and deepen from 45 to 55 feet
- **Inner Entrance Channel (IEC)** - deepen from 42 to 48 feet
- **Main Turning Basin (MTB)** - deepen from 42 to 48 feet
- **Widener** - widen by 300 feet, deepen to 48 feet; and reconfigure USCG Station to the east
- **Southport Access Channel (SAC)** - widen by 250 feet at the knuckle; shift channel easterly 65 feet from berth 23 to 29; deepen from 42 to 48 feet from berth 23 to south end of 32
- **Turning Notch (TN)** - deepen from 42 to 48 feet plus minor widening features (~100 feet)

**Berths**

- **Changes to O&M:** Volume increase ~20% from existing ~21,000 cy to ~27,000 cy
## RECOMMENDED PLAN (LPP) 48 FEET
### SUMMARY OF PROJECT COST
(FY 15 Discount Rate 3.375% and October 2014 Price Level)

<table>
<thead>
<tr>
<th>NED Plan (47 feet)</th>
<th>Recommended Plan/LPP (48 feet)</th>
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</thead>
<tbody>
<tr>
<td><strong>First Cost (902 Basis):</strong> $305,300,000</td>
<td><strong>First Cost (902 Basis):</strong> $322,700,000</td>
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<tr>
<td><strong>Associated Costs:</strong> $50,700,000</td>
<td><strong>Associated Costs:</strong> $51,400,000</td>
</tr>
<tr>
<td><strong>Total Cost:</strong> $356,000,000</td>
<td><strong>Total Cost:</strong> $374,100,000*</td>
</tr>
<tr>
<td><strong>Federal Share:</strong> $189,900,000</td>
<td><strong>Federal Share:</strong> $189,900,000</td>
</tr>
<tr>
<td><strong>Non-federal Share:</strong> $166,100,000</td>
<td><strong>Non-federal Share:</strong> $184,200,000</td>
</tr>
<tr>
<td><strong>Mitigation:</strong> $50,900,000</td>
<td><strong>Mitigation:</strong> $52,800,000</td>
</tr>
<tr>
<td><strong>BCR:</strong> 2.9</td>
<td><strong>BCR:</strong> 2.9</td>
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</tbody>
</table>

Average annual increase in O&M cost: $55,500

### Notes:
- Associated Costs Include: Non-Federal Costs (Local Service Facilities and Berthing Area Costs) and Aids to Navigation
- General Navigation Features (GNF) & First Costs are the same as there are no LERR costs associated with the project
- Federal Share (75% of 45 feet and 50% from 45 to 47 feet) *
- Non-Federal Share (25% to 45 feet and 50% from 45 to 47 feet) + $18,000,000 (100% of additional cost for the LPP) *
**CONTAINERS**

ADDITIONAL TEU CAPACITY: 37% PROJECT BENEFITS

**TANKERS**

ADDITIONAL LIQUID CAPACITY: 58% PROJECT BENEFITS

**ECONOMICS**

REDUCTION IN TOTAL VESSEL CALLS

- **# Calls 42 foot-depth**
- **# Calls 48 foot-depth**

**WITHOUT PROJECT**

- FOREIGN-FLAGGED FLEET
- CONTAINERS: 52,100 - 79,200 kg/m³
- TANKERS: 120,315 kg/m³

**WITH PROJECT (48-FT)**

- FOREIGN-FLAGGED FLEET
- CONTAINERS: 5,500 TEU
- TANKERS: 58% PROJECT BENEFITS

**NEW PPX-1 CAPACITY (48-FT DEPTH)**

**NEW PPX-2 CAPACITY (48-FT DEPTH)**

**PRODUCT FORMULATION**

- Product Tanker
- Aframax
- Panamax

**ECONOMICS**

- REDUCTION IN TOTAL VESSEL CALLS
- # Calls 42 foot-depth
- # Calls 48 foot-depth

**OBJECTIVES**

- Constraints
- Without-Project Objectives

**PLAN FORMULATION**

- Recommended Plan
- Formulation

**FUTURE**

- Tanker Panamax
- Aframax

**EXISTING CONDITIONS**

- Problems
- Opportunities
ENGINEERING

Project Datums: In compliance with current regulations (vertical: MLLW tied to NAVD 88; horizontal: NAD 83)

Dredging:
- Quantities: ~5.5 million cubic yards of material
- Materials: Subsurface material including shallow sands and massive rock units
- Placement: ODMDS and Reef/Hardbottom mitigation areas

Outer Entrance Channel: Additional 7 feet of underkeel clearance required due to cross currents in the entrance channel

Widening Areas: Optimized to minimum required dimensions through ship simulation

Operations and Maintenance: No discernible difference between 47 and 48 feet
**SEA-LEVEL CHANGE**

- **Used current guidance (ER 1110-2-8162)**
- **Results of analysis for the 50-year period, 2017-2067:**
  - Baseline: 0.39 feet
  - Intermediate: 0.84 feet
  - High: 2.25 feet
- **Conclusion for Navigation:**
  - Based on these sea-level change projections and elevations of current and planned port facilities, minor impacts on port facilities and no impacts on navigation
Coast Guard Reconfiguration

- A permit for real property use by other Federal agencies will be executed between USCG and the Department of the Army for construction purposes.
ENVIRONMENTAL: REDUCED IMPACT (ACREAGE) OVER TIME

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>2000 (ac)</th>
<th>2004 (ac)</th>
<th>2008 (ac)</th>
<th>2012 (ac)</th>
<th>2013 (ac) DRAFT EIS</th>
<th>2015 (ac) FINAL EIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seagrasses</td>
<td>40.28</td>
<td>1.38</td>
<td>*4.3</td>
<td>*4.01</td>
<td>4.01</td>
<td>4.21</td>
</tr>
<tr>
<td>Mangroves</td>
<td>52.89</td>
<td>12.3</td>
<td>10.44</td>
<td>1.2</td>
<td>1.16</td>
<td>1.16</td>
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<tr>
<td>Hardbottom High Relief</td>
<td>25.61</td>
<td>10.82</td>
<td>10.5</td>
<td>11.09</td>
<td>10.10</td>
<td>9.87</td>
</tr>
<tr>
<td>Hardbottom Low Relief</td>
<td>13.97</td>
<td>14.89</td>
<td>4.57</td>
<td>5.55</td>
<td>5.07</td>
<td>4.74</td>
</tr>
<tr>
<td>Hardbottom (Below Dredge Depth) 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>* .71</td>
</tr>
<tr>
<td>Indirect Effects w/ in 150m of channel during construction (3yrs)</td>
<td>2.27</td>
<td>2.27</td>
<td></td>
<td></td>
<td>2.19</td>
<td></td>
</tr>
</tbody>
</table>

* Primarily due to changes in bed coverage

SUBMERGED BULKHEAD WITH RIPRAP CAP allows for continual flushing of mangrove habitat inland of structure.
Impacts

- Direct removal of ~14.62 acres of hardbottom/reef habitat
- Vegetated/unvegetated project-related impacts to seagrass habitat: ~7.41 acres (4.21 vegetated)
- Impacts to mangroves: ~1.16 acres

Mitigation (based on functional analysis conducted jointly with NMFS*)

- Creation of ~5 acres of artificial reef with relocation of ~11,500 corals
- Outplanting of ~103,000 nursery raised corals to existing reef enhancement areas of ~18 acres
- ~2.4 seagrass functional units (~24-29 acres) and ~1 mangrove functional unit (~3-3.6 acres)

* Accounting system to determine mitigation needs based on resource characteristics and project impacts (resource type, site conditions, project impact on resource function, recovery time, etc.).
ENVIRONMENTAL MONITORING: HARBOTTOM RESOURCES

1) Post-construction (Effects of dredging and indirect effects of turbidity and sedimentation along the channel): 5 years conducted

2) Artificial reef construction (boulders with relocated corals from impact site): 5 years

3) Coral mitigation propagation (enhancement of existing reef): 3 years of monitoring for each component totaling 10 years for all outplanting

TIMELINE: CORAL MITIGATION PROPAGATION

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Start up nursery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>Outplant area 1</td>
</tr>
<tr>
<td>Year 3</td>
<td>Monitor area 1  Outplant area 2</td>
</tr>
<tr>
<td>Year 4</td>
<td>Monitor area 1  Monitor area 2 Outplant area 3</td>
</tr>
<tr>
<td>Year 5</td>
<td>Monitor area 1  Monitor area 2 Monitor area 3 Outplant area 4</td>
</tr>
<tr>
<td>Year 6</td>
<td>Monitor area 2  Monitor area 3 Monitor area 4 Outplant area 5 Monitor area 5 Outplant area 6</td>
</tr>
<tr>
<td>Year 7</td>
<td>Monitor area 3  Monitor area 4 Monitor area 5 Monitor area 6</td>
</tr>
<tr>
<td>Year 8</td>
<td>Monitor area 4  Monitor area 6</td>
</tr>
<tr>
<td>Year 9</td>
<td>Monitor area 5  Monitor area 7</td>
</tr>
<tr>
<td>Year 10</td>
<td>Monitor area 6  Monitor area 8</td>
</tr>
</tbody>
</table>

Bare Boulder (Miami Harbor) Boulder w/Transplanted Coral Seven Years of Growth on Boulder
ENVIRONMENTAL MITIGATION: MANGROVES/SEAGRASSES

Westlake Park: Last remaining natural mangrove ecosystem in Broward County.

- Ongoing county restoration project (USACE permit)
- USACE permit makes credits available to Broward County
- The West Lake restoration project is the most cost-effective mitigation alternative and the most consistent with mitigation policy
- Ongoing county restoration project (USACE regulatory permit)

The PPA will include sponsor commitment to guarantee seagrass and mangrove mitigation for the life of the project.

Construction, monitoring and adaptive management to be performed by the non-federal sponsor.

Existing Conditions

Without-Project

Future

Objectives

Constraints

Plan Formulation

Recommended Plan
ENIRONMENTAL COMPLIANCE

☑ DEIS prepared and coordinated
☑ Endangered Species Act Coordination (USFWS)
☑ Endangered Species Act Coordination (NMFS)
☑ Essential Fish Habitat Coordination (NMFS)
☑ Cultural Resources Coordination
☑ Coastal Zone Consistency
PUBLIC/AGENCY INVOLVEMENT
FROM 1999 TO 2014: OVER 30 MEETINGS

Scoping

- Scoping letters issued, 2001
- Notice of Intent (NOI) to prepare a Draft Environmental Impact Statement (DEIS) published in Federal Register, 2001

Agency Coordination

- Cooperating Agency Letters: September 11, 2007
- Meetings and Site Visits: 1999 to 2014
- Endangered Species Act (ESA) coordination with USFWS (August 20, 2013) and NMFS (May 1, 2014)
- Magnuson-Stevens Fishery Conservation and Management Act (EFH) coordination with NMFS (April 17, 2014)
<table>
<thead>
<tr>
<th>Environmental Operating Principles</th>
<th>National Priorities</th>
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<tbody>
<tr>
<td>Foster sustainability</td>
<td>Reduce deficit</td>
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<td>Proactive consideration of</td>
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<td>Mutually supporting economic and</td>
<td>Improve resiliency and safety</td>
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<td>Accountability for activities</td>
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<td>which may impact human and</td>
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<td>Collaborative leveraging of</td>
<td>Improve quality of life</td>
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<td>individuals and groups</td>
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<td>interested in Corps activities</td>
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**BUILDING STRONG®**
Tentatively Selected Plan (TSP) Milestone Meeting: May 2013
Draft Report DQC/Legal Certification: June 2013
ECO-PCX and HQ Approval for Use of Ecological Models: February 2015
Cost Certification: October 2014
LPP ASA(CW) Approval: October 2014
Final ATR/DQC/IEPR/Legal Cert: November/December 2014
DE Transmittal Notice: January 2015
Resolution of IEPR Non-Concurs with Vertical Team Alignment

**Engineering**

- **Shoaling Rate Estimates**
  - Sediment Transport analysis (independent expert) supports conclusion in feasibility report
  - Sensitivity analysis determined higher estimates of Panel member do NOT impact BCR

- **Cumulative Impacts to Shoreline/Sediment Transport**
  - Entrance Channel already acts as a sediment trap, preventing bypassing of material; no change to erosion rate expected under the with-project condition

- **Blasting/Cost Risk**
  - Comprehensive review found associated cost risk analysis compliant with all USACE policies

**Economic**

- **Commodity Forecasts**
  - Economics Appendix updated

- **Transportation Benefits**
  - Economics Appendix updated

**Environmental**

- **Additional Information on Coral Propagation**
  - Information provided, including a summary of an analysis to be completed during PED
RISK MANAGEMENT

STUDY PHASE
- The Walla Walla MCX completed a CSRA and determined that a 26.3% contingency should be included
- VE Study, DQC, ATR and IEPR completed with improvements incorporated

CONSTRUCTION PHASE
- Risk register and risk management plan are living documents
- PED activities will include data collection, VE, and Industry Days
- Implement Lessons Learned from previous deepening contracts
- Best acquisition strategies developed to minimize costs and increase quality (e.g., structure, scope and number of contracts)
- Plans & Specifications for all contracts will undergo DQC, ATR, and BCOES reviews
PROJECT IMPLEMENTATION
(Key Dates)

Feasibility Phase:
- Chief of Engineers Report: May 2015
- Administration Review (ASA and OMB)
- ASA Transmittal to Congress

Preconstruction Engineering and Design (PED) Phase:
- Subject to Funding: 2015-2017

Construction Phase:
- Subject to Authorization and Appropriations: 2017-2022
CONCLUSIONS

National Infrastructure Improvements

- Recommended Plan: Deepen 6 feet from 42 to 48 feet
- Direct return on investment (BCR 2.9)

Economic Benefit

- Project Cost at FY15 price levels yields $31M in net annual benefits

Comprehensive Mitigation Plan:

- Includes ~2.4 seagrass functional units and ~1 mangrove functional unit and creation of ~5 acres of artificial reef, transplantation of ~11,500 corals, outplanting of ~103,000 nursery raised corals/ ~18 acres
- Coordinated extensively with stakeholders
- Monitoring

Project Support

- Study support and participation by local community, state, and Federal agencies
- Committed stakeholders and non-federal sponsor (Broward County)
CLOSING COMMENTS
SAD Division Commander

**BLUF:** Approve final report, release State/Agency review, complete Chief's Report, and submit for authorization.

**Strategic Value:**
- Main port for supplying petroleum to South Florida
- Leading cruise port worldwide
- Federal Investment of $190 million returns over $31 million in average annual net benefits
- Economic benefit (BCR 2.9)...allows larger ships, reduces transportation costs, improves efficiency, supports economic growth for the region and nation
- Study received extensive support and participation by local community, state, and Federal agencies
- Mitigation and Monitoring Plans prepared in partnership with National Marine Fisheries Service

**Feasibility Report is legally and policy compliant:**
- Two ATRs conducted by DDNPCX, all comments resolved, and ATR certified
- IEPR completed. 42 comments over 2 IEPRs. 6 comments closed as a non-concur. Corps vertical team aligned on agency responses to all comments.
- Cost DX certified/VE completed/ HarborSym used for Economic modeling / Environmental UMAM Model Certified for use.

**Quality Assurance:**
- Continuous involvement in development of economic methodologies throughout Feasibility Study.
- Extensive engagement with the federal resource agencies to resolve problems / issues

  **A team effort.... thanks to the entire team (internal/external, horizontal/vertical)**
USACE National Deep Draft Navigation Planning Center of Expertise

Port Everglade Harbor Feasibility Study

Review Management

Agency Technical Review and Independent External Peer Review

Todd Nettles
Technical Director
South Atlantic Division
Mobile District
Deep Draft Navigation PCX – Review Verifications

- Economic Analysis conducted with DDNPCX oversight
- Corps certified model HarborSym used to calculate economic benefits - Model certified by HQUSACE Model Certification panel – June 2012
- Final Agency Technical Review – 5 Nov 14
- Independent External Peer Review – 9 Dec 14

  - 143 total comments received mostly in the area of Cost, Environmental, Plan Formulation and Geotechnical
  - No significant technical deficiencies identified.
  - Key comments on:
    - Providing a more details on study methodologies, assumptions, and conclusions.
    - Cost Schedule Risk Analysis
    - Justification of additional channel depth in the outer entrance channel
      - Engineering comment – resolved using Engineering guidance (Corps and PIANC) along with ship simulation to determine the additional channel depth required
  - All comments closed and no outstanding issues.
Agency Technical Review Final Report

- ATR of the Final Report completed 5 November 2014
  - 43 comments posted during final review
  - 4 comments were checked critical – all Real Estate
    - PDT addressed comments by providing additional clarity regarding what is expected of the Non-Federal sponsor, how land is going to be acquired, and who is responsible for the activities involved in the process
  - Operations, Geotechnical, Environmental, and Plan Formulation comments focused on the need to add additional information for document clarity
  - Environmental comments were related to the ODMDS and the need for a backup plan if the proposed site was not approved by the EPA for placement of sediment
    - PDT resolved the comment by identifying a one time site for construction material should it become necessary
  - Hydraulics & Hydrology confirmed that issues in draft report had been addressed

All comments closed and no outstanding issues.
Independent External Peer Review

- Draft Report October 2013 IEPR
  - 22 Comments
    - 2 non-concurs – both engineering related

- Final Report December 2014 IEPR
  - 20 Comments
    - 4 non-concurs (2 Economic*, 1 Environmental and 1 Engineering)

* These are the two discussed in detail. NDDNPCX is responsible for economic analysis
Comment: Commodity forecasts are not sufficiently documented, and the approach appears to overstate the forecast for key benefitting commodities.

Response: LPP – Liquid Bulk and Containerized cargo generate approximately 95% of total benefits during the period of analysis

- Commodity forecast growth rates – used IHS Global Insight south Atlantic forecast
- Benefits based on 3 “trade concepts” evaluating empirical data from 2008 through 2011
  - Container tonnage has exceeded forecasted growth as of 2014 by 17%
  - Liquid Bulk tonnage for 2014 is within 5% of forecasted tonnage
  - Dry Bulk/General Cargo tonnage in 2014 exceeded forecasted tonnage by 13%

- Long term growth rates
  - Container tonnage – 2029 thru 2040 @ 2.5% annually; 2040 thru 2060 @ 0.8% annually
  - Liquid Bulk tonnage – 2029 thru 2060 @ 0.2% annually
  - Dry Bulk/General Cargo tonnage – 2029 thru 2060 @ 0.8% annually

Consultation: PDT discussions with vertical chain (HQUSACE, IWR, SAD). All agreed to with PCX response.
IEPR – Economics Comment Transportation Benefits

- **Comment**: The estimates of transportation cost benefits do not provide a breakdown by benefitting vessel type or by commodity, nor do they distinguish between benefits due to larger vessel size, heavier vessel loading, and reduced delays.

- **Response**: Additional information was included in the economic appendix.
  - **Liquid Bulk – Petroleum products**
    - 58 percent of total project benefits
    - With project vessel fleet shifts to 100,000 to 120,000 DWT vessels
  - **Containerized Cargo**
    - 37 percent of total project benefits
    - With project vessel fleet shifts to Post Panamax Generation II vessels
      - Post Panamax Generation I/Panamax vessels become more efficient
  - **Fleet forecast assumptions developed with assistance from IWR**
  - **Remaining 5 percent of benefits associated with Dry Bulk/General Cargo**
  - **Non-disclosure agreement, provided Vessel Operating Costs to panel reviewer**

- **Consultation**: PDT discussions with vertical chain (HQUSACE, IWR, SAD). All agreed to with PCX response.
The NDDNPCX recommends the release of the report
Independent External Peer Review (IEPR)  
Port Everglades Harbor Feasibility Study, Broward County, Florida  

Presented to the USACE CWRB on February 27, 2015
## IEPR - Panel and Schedule

<table>
<thead>
<tr>
<th>Port Everglades Panel Members</th>
<th>Panel Discipline</th>
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<tbody>
<tr>
<td>Daniel Smith (Panel Lead)</td>
<td>Economics</td>
</tr>
<tr>
<td>William McAnally, P.E., Ph.D.</td>
<td>Hydraulic or Civil Engineering</td>
</tr>
<tr>
<td>Robert Gilbert, P.E., Ph.D.</td>
<td>Geotechnical Engineering</td>
</tr>
<tr>
<td>Kenneth Casavant, Ph.D.</td>
<td>Plan Formulation</td>
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<tr>
<td>Walter Jaap</td>
<td>Biology</td>
</tr>
<tr>
<td>Felicia Rein, Ph.D.</td>
<td>Biology</td>
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<tr>
<td>Ronald Vann</td>
<td>Real Estate</td>
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</tbody>
</table>

Port Everglades IEPR was conducted in two phases:

- **Phase 1**: June – October 2013. The Panel reviewed the draft Feasibility Report and draft Environmental Impact Statement (EIS) (and associated appendices).

- **Phase 2**: September 2014 - January 2015. The Panel reviewed selected revisions to the EIS, the revised Socio-Economic Appendix to the Feasibility Report, and the public and agency comments.
IEPR Bottom Line Up Front

Of the 42 Final Panel Comments, the Panel concurred with all but six of the PDT Evaluator Responses.

The IEPR Panel has unresolved concerns about the project costs, the project benefits, and the shoreline erosion potential of the project and believes that the final Feasibility Report and EIS must address these concerns before proceeding to the design phase.

• Phase 1:
  ▪ the Panel believes that the PDT has used an incorrect method to estimate the sediment budget, thereby underestimating future channel sedimentation.
  ▪ the Panel found that considerable uncertainty remains on the amount of rock that will require blasting and they do not believe that this uncertainty is accounted for in the cost and schedule.

• Phase 2:
  ▪ the Panel is unable to assess the reliability or reasonableness of the commodity forecast results due to a lack of additional documentation
  ▪ the Panel is unable to determine if the estimated transportation cost savings are valid because information was not provided on actual tonnages, benefit amounts, and details on the sources of benefits for specific commodities and vessel classes.
  ▪ the Panel disagrees with the PDT’s conclusion that there will be no cumulative adverse effect from the removal of material from the littoral zone and its placement offshore.
  ▪ the Panel believes that the PDT has not fully explained how coral nursery costs were determined.
# IEPR - Results

## PHASE 1

**Final IEPR Report submitted on August 15, 2013**

**Results:**
- 22 Final Panel Comments
  - 1 high significance
  - 11 medium
  - 10 low

**Comments/Response Results documented on:**

**October 21, 2013**

**Results:**
- PDT Evaluator Responses
  - 20 concurs, 2 non-concurs
- Panel BackCheck Responses
  - 20 concurs, 2 non-concurs

## PHASE 2

**Addendums to Final IEPR Report submitted on October 20, 2014 and December 1, 2014**

**Results:**
- 20 Final Panel Comments
  - 1 high significance
  - 4 medium/high
  - 7 medium
  - 4 medium/low
  - 4 low

**December 15, 2014**

**Results:**
- PDT Evaluator Responses
  - 6 concurs, 14 non-concurs
- Panel BackCheck Responses
  - 16 concurs, 4 non-concurs
IEPR - Notable Findings (Phase 1)

1. Projected maintenance dredging requirements for the channels and berthing areas may be underestimated and do not appear to have been included in the life-cycle cost of the Tentatively Selected Plan (TSP). (Medium Significance; Non-concur)

2. Alternatives to blasting for hard rock excavation, as well as the project cost risks associated with blasting, have not been examined fully. (Medium Significance; Non-concur)

3. The cost, schedule, and overall implementation of the Port Everglades project would have been affected if the U.S. Environmental Protection Agency’s (EPA's) designation of an expanded ocean dredged material disposal site was not completed in time for project construction. (Concur)

4. Opportunities for upland disposal, beneficial use, and multiple placement of dredged material were not examined fully; therefore, potential costs and benefits were not necessarily realized. (Concur)

5. The Broward County sand bypassing project's potential impact on the conditions in the Outer Entrance Channel (OEC) had not been thoroughly evaluated, despite the significant implications for littoral transport rates and maintenance costs. (Concur)

6. There was an inconsistency between the Tentatively Selected Plan (TSP) and the engineering analyses regarding the extent, cost, and schedule of bulkhead work required before fully implementing the TSP. (Concur)
1. Commodity forecasts are not sufficiently documented, and the approach appears to overstate the forecast for key benefiting commodities. (High Significance; Non-concur)

2. The estimates of transportation cost benefits do not provide a breakdown by benefiting vessel type or by commodity, nor do they distinguish between benefits due to larger vessel size, heavier vessel loading, and reduced delays. (Medium/High Significance; Non-concur)

3. The analyses presented in revised Section 4.0 of the Final Environmental Impact Statement (FEIS) do not support the conclusion that "there would be no cumulative adverse effect on the geology or coastal sediment budget/transfer for the area". (Medium Significance; Non-concur)

4. Details about coral nursery development, operation, and evaluation are not provided in the revised FEIS; therefore, the competency of this form of mitigation cannot be verified. (Medium Significance; Non-concur)

5. The sensitivity analysis did not provide sufficient detail and did not consider the uncertainties involved in commodity forecasts prior to the 2023 base year, in the vessel fleet forecasts, or in the realization of projected transportation cost savings. (Concur)
PORT EVERGLADES HARBOUR
BROWARD COUNTY, FLORIDA

Civil Works Review Board (CWRB)

Jeremy LaDart
Office of Water Project Review
Planning and Policy Division
Washington, DC – 27 February 2015
HQUSACE Team Reviews:

- TSP Briefing- 31 May 2013.
- Draft Report Review- July 2013

HQUSACE Team Members:

Jeff Lin  Andrea Walker
John Cline  Terry Stratton*
Mark Matusiak  Anne Sturm
Scott Murphy  Jerry Webb
Mayely Boyce

*MSC resource utilized for HQ Policy Review.
Policy Issues from Draft and Final Report Reviews

- Channel Realignment
- Discount Rate
- Price Level
- Fleet Transition
- Load Factor Analysis
- U.S. Coast Guard Reconfiguration
- Sea Level Change
- O&M Costs
- Screening of Alternatives
- ODMDS Expansion
- Base Year
- Cost Sharing
- Cost Terminology
- Hardbottom Mitigation
- Local Service Facilities
- Sponsor Statement of Financial Capability
CONCERN: The correct application of federal and non-federal costs associated with the widening could not be determined.

BASIS: The recommended plan includes both channel realignment to accommodate berthing areas (non-federal responsibility) and channel widening to accommodate larger vessels (cost shared). It was difficult to determine from the report which dredging quantities and costs were attributable to each action.

RESOLUTION: The district confirmed the appropriate cost share was applied and provided additional narratives within the report.

RESOLUTION IMPACT: Concern is resolved.
U.S. Coast Guard Reconfiguration

**CONCERN:** The report presented inconsistent recommendations and did not clearly document the path forward.

**BASIS:** The widening component of the recommended plan will impact several U.S. Coast Guard (USCG) facilities. The report presented the cost share for the USCG facilities in inconsistent ways and was not explicit about the path forward for USACE to conduct the work on another federal agency’s land.

**RESOLUTION:** The proposed Chief’s Report was revised to document the reconfiguration as a cost shared General Navigation Feature (GNF), and a permit for use of real property by other federal agencies will be executed between the U.S. Coast Guard and the Department of the Army for construction purposes.

**RESOLUTION IMPACT:** Concern is resolved.
ODMDS Expansion

CONCERN: The Expansion of the Ocean Dredged Material Disposal Site (ODMDS) is required for construction.

BASIS: Construction of the recommended plan involves dredging of approximately 5.5 million cubic yards of material. Expansion of the ODMDS will be required, and the EPA will not likely issue the final permit prior to signing of the Chief’s Report.

RESOLUTION: USACE received a letter from the EPA indicating that the ODMDS expansion process is on track and no known issues exist at this time.

RESOLUTION IMPACT: Concern is resolved.
CONCERN: The report recommended an incorrect Project First Cost that included local service facilities (LSF) and aids to navigation (ATONS).

BASIS: While LSF and ATONS are a financial cost, they are costs borne by others and are not included in the Project First Cost to be recommended for authorization and establishment of the 902 Limit (DCW memorandum dated 25 August 2011, subject: Corps of Engineers Civil Works Cost Definitions and Applicability).

RESOLUTION: The report was revised to illustrate the appropriate Project First Cost.

RESOLUTION IMPACT: Concern is resolved.
Hardbottom Mitigation

**CONCERN:** The Draft Report included a hardbottom mitigation recommendation that would not have been policy compliant.

**BASIS:** The Draft Report presented both a Corps developed, policy compliant mitigation plan for hardbottom impacts, as well as a non-policy compliant alternate plan developed by NMFS.

**RESOLUTION:** Extensive additional coordination was conducted with NMFS, leading to a new mitigation plan in the Final report. The new mitigation plan was demonstrated to be cost effective as well as appropriate for the level of impact being incurred.

**RESOLUTION IMPACT:** Concern is resolved.
HQUSACE POLICY REVIEW TEAM RECOMMENDATION

LESSONS LEARNED

- Senior Level Engagement with NMFS
  - Collaborative Effort on the Mitigation and Monitoring Plans
- Use of USACE Corporate Model: HarborSym
  - Implement use of certified models as they become available
- Engage Senior Level of Vertical Team Early
  - Reviews at the senior level to prevent delays later in the study