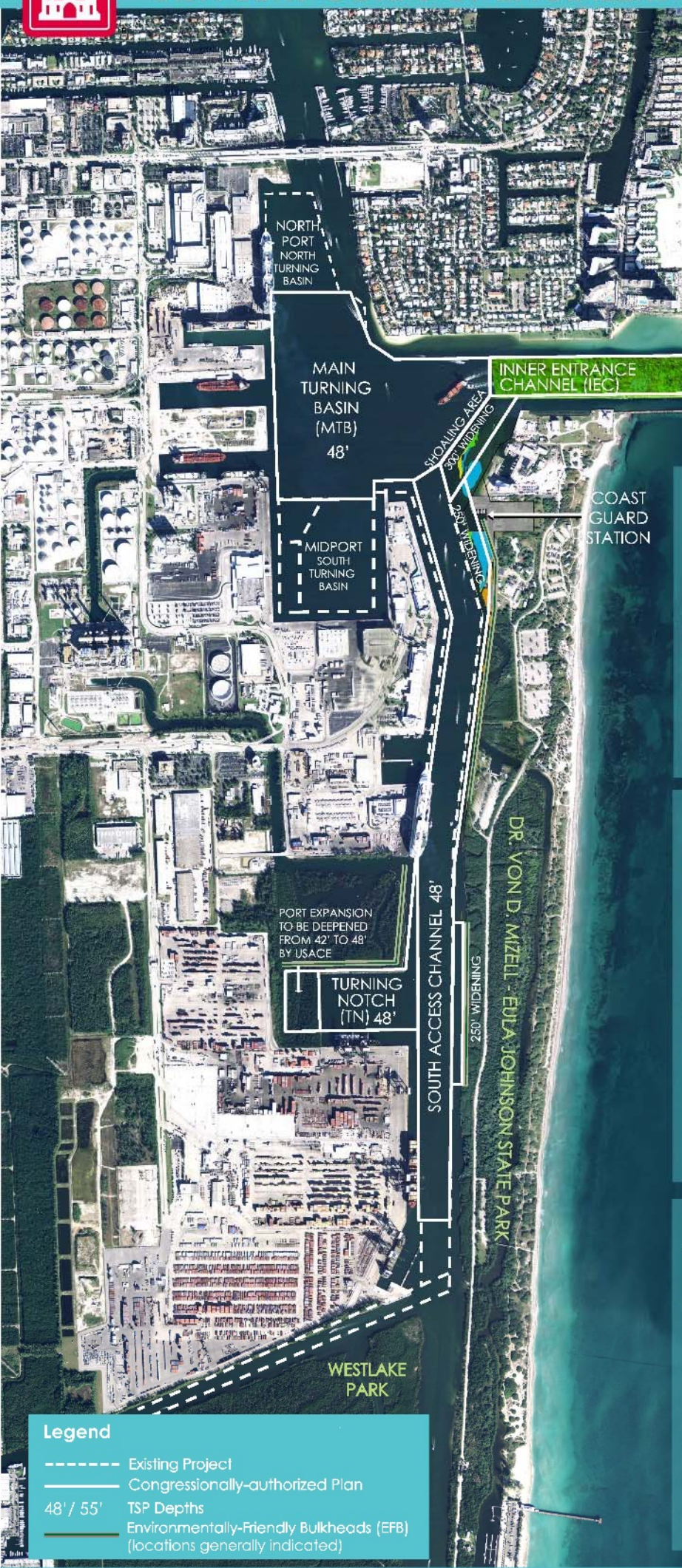




# ENVIRONMENTAL CONSIDERATIONS ASSESSMENT, AVOIDANCE AND MINIMIZATION



**LEGEND: RESOURCE IMPACTS**

- Colonized Hardbottom Pavement (5.084 ac)
- Linear Reef (9.170 ac)
- Spur and Groove Reef (0.934 ac)
- Johnson's Seagrass (3.156 ac)
- Mixed Seagrass (3.156 ac)
- Paddle Grass (0.442 ac)
- Mangrove Wetland (1.155 ac)
- Upland included developed lands (5.377 ac)

## ASSESSING THE HABITAT

Numerous surveys were conducted between 2000 and 2011 that were used to assess habitat with the potential to be impacted by the project. Additional surveys will be done during Planning, Engineering and Design.

### HARDBOTTOMS/CORALS

Numerous surveys of the Outer Entrance Channel and surrounding habitats have been conducted to characterize hardbottom and reef communities. The graphic above is a summary of the survey efforts conducted by the U.S. Army Corps of Engineers.

### SEAGRASSES

Seagrass survey transect locations to characterize seagrass communities throughout the project area.

### MANGROVES

National Marine Fisheries Service Mangrove assessment of areas of the Southport Access Channel and Dania Cutoff Canal (DCC).

## PROTECTED AND LISTED SPECIES

The U.S. Army Corps of Engineers has standard requirements in our project specifications to minimize and avoid impacts to protected species during the construction, operation and maintenance of our projects. Protected species found in the project vicinity include:



## AVOIDING AND MINIMIZING IMPACTS

### REDUCED OUTER CHANNEL FLARE

Initial Plan Layout for Outer Entrance Channel

Additional ship simulations indicated that the 1,000-foot wide entrance channel flare initially included in the plan could be reduced to an 800-foot channel flare. In addition, geotechnical investigations provided information allowing for the outer channel extension and flare to include vertical channel walls rather than side slopes. These changes minimized direct impacts to hardbottom areas (from 39.38 acres to 15.17 acres).

### ENVIRONMENTALLY-FRIENDLY BULKHEADS

The image above is a typical cross section of a submerged bulkhead with a permeable cap to allow for tidal exchange and habitat enhancement. The general locations of the environmentally-friendly bulkheads (EFB) are illustrated in the project map.

### REDUCED FEDERAL PROJECT FOOTPRINT

In addition to reducing the Outer Entrance Channel flare and the Southport Access Channel width, improvements to both the Dania Cutoff Canal (DCC) and part of the Turning Notch were eliminated from the federal project.

## REDUCED IMPACTS FROM 2000 to 2013

COMPONENT	2000 (ac)	2004 (ac)	2008 (ac)	2012 (ac)	2013 (ac)	Net change (ac)
SAC Seagrasses (widener area and IEC)	.6	.6	3.7*	4.0*	4.0	+ 3.4*
J.U. Lloyd Park (non-mangrove)	38.9	0.0	0.0	0.0	0.0	-38.9
DCC Seagrasses	0.7	0.7	0.5	0.0	0.0	-0.7
MTB Seagrasses	0.1	0.1	0.1	0	0	-0.1
SAC Mangroves	25.9	1.9	0.3	1.2	1.2	-24.7
DCC Mangroves	18.5	1.9	1.5	0.0	0.0	-18.5
TN Mangroves	8.5	8.5	8.6	0.0	0.0	-8.6
OEC High Relief (Linear, Spur/groove, ridge)	25.6	10.8	10.5	11.1**	10.1	-15.5
OEC Low Rel (pavement/trubble)	14.0	14.9	4.6	5.6	5.0	-8.9

\*due primarily to changes in bed coverage  
\*\* Refinement of required underkeel clearance values

Identified impacts to middle reef tract.

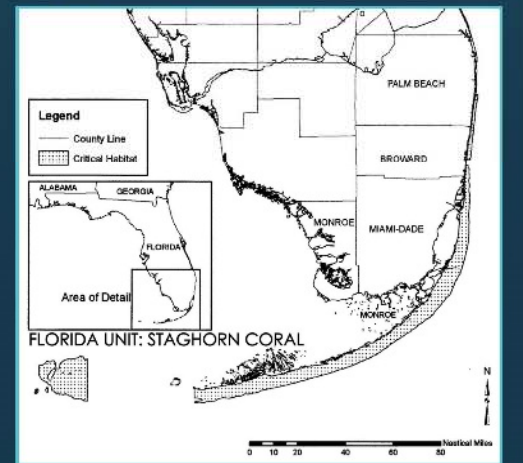
Identified impacts to outer reef tract.

CHANNEL EXTENSION IMPACTS TO DESIGNATED CRITICAL HABITAT

Potential impacts to reef tracts in the outer channel area have been reduced significantly due to the new tentatively selected plan (TSP).

Although to date colonies of Staghorn and Elkhorn coral have not been found within the project footprint, the area is designated critical habitat for both species. Staghorn colonies have been found north and south of the channel. Additional surveys will be done prior to construction and monitoring during construction ensure impacts to this species are minimized and/or avoided.

The potential for critical habitat to be impacted has been reduced to .0026% (middle reef) and .00032% (outer reef) of the available habitat area in the Florida Unit as designated by the National Marine Fisheries Service (map to the right).



**Legend**

- Existing Project
- Congressionally-authorized Plan
- 48' / 55' TSP Depths
- Environmentally-Friendly Bulkheads (EFB) (locations generally indicated)