

Deepening the Delaware: Persistence Pays Off

Delaware River Main Channel Deepening

US Army Corps Eastern Regional Dredging Meeting

Philadelphia PA

OCTOBER 28, 2015

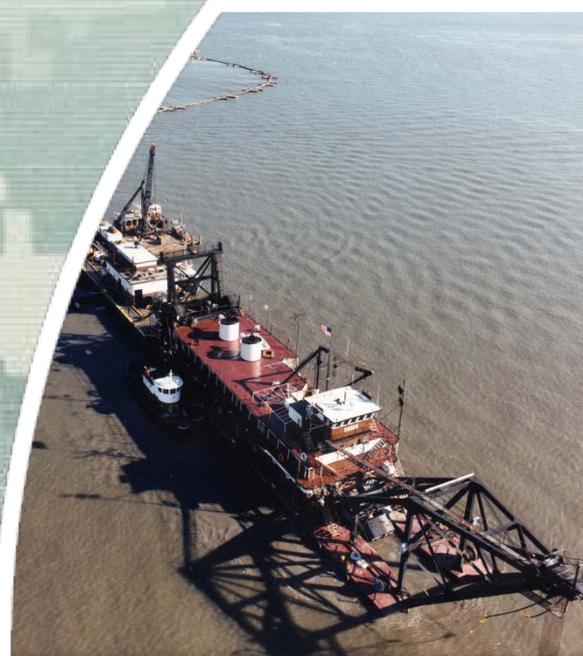
Anthony DePasquale, P.E.
Chief, Operations Division

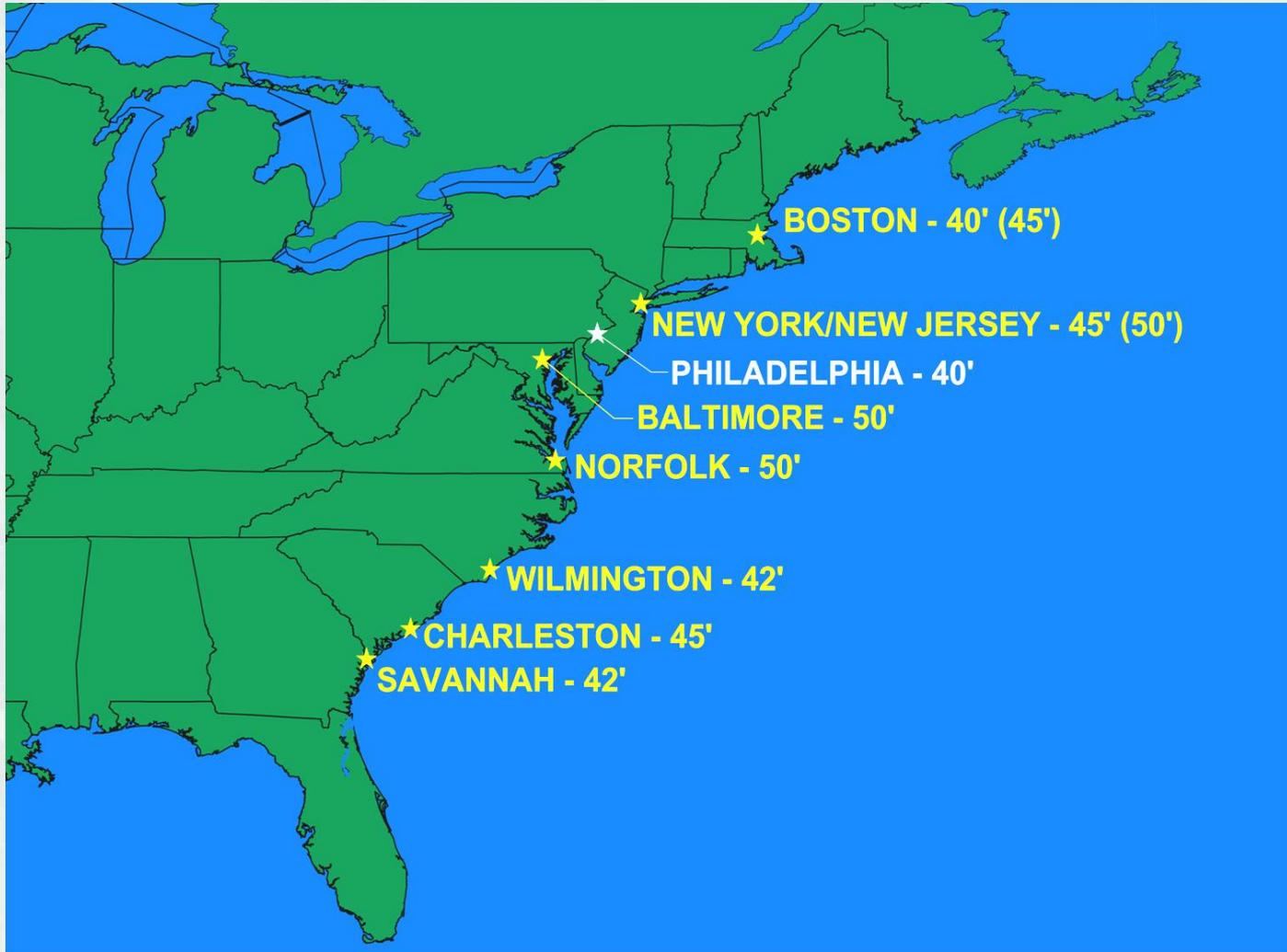
USACE/Philadelphia District



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Delaware River Ports

- Largest freshwater Port Complex in the World
- Fifth Largest Complex in the United States
- Handle over 105 million tons of cargo annually



Project Timeline

Congress directs Corps to study improving 40' channel	1983
Feasibility Study report recommends 45' channel	1992
Congress authorizes construction	
Final Design, Supplemental EIS complete	1997
Corps recommends construction	1998
GAO audit, Corps response	2002
Economic reanalysis complete	2004
Sponsor changes from DRPA to PRPA	2007
Signing of Project Partnership Agreement w/ PRPA	2008
First deepening contract	2010
Estimated completion of 45' channel	2017



Project Economics

- As of 2011
 - ▶ Average Annual Benefits: \$35,167,000
 - ▶ Average Annual Costs: \$21,502,000
 - ▶ Average Annual Net Benefits: \$13,665,000
 - ▶ Benefit-Cost Ratio: 1.64
- Port beneficiaries
 - ▶ 80% Container & Dry Bulk Cargo
 - ▶ 20% Crude Oil & Petroleum Products
- Primary sources of benefits
 - ▶ Larger and more fully loaded containerships and dry bulk (steel and slag) vessels
 - ▶ Reduced lightering of tankers
- Conservative analysis
 - ▶ Counts only national benefits (excludes competitive advantages)
 - ▶ Counts only direct benefits (excludes jobs created/saved, tax revenues)
 - ▶ Based on existing tonnage, commodities, origins, destinations



Prior Channel Deepenings

Delaware River, Philadelphia to the Sea

Authorization	Depth	Width	Complete
NATURAL CONDITIONS (pre-1885)	17'-24'	175'-600'	n/a
January 1885 Board of Engineers recommendation	26'	600'	1898
March 1899 improvement plan	30'	600'	1905
June 1910 River and Harbor Act	35'	800'	1934
June 1938 River and Harbor Act	40'	800'-1000'	1942
Water Resources Development Act 1992	45'	400'-1000'	est. 2017



Dredged Material Disposal Plan

Rock Blasting

- 77K CY near Marcus Hook
- Crushed rock to Fort Mifflin CDF

River Material

- 12M CY
- Sand, clay, silt

All Federally Owned Sites

- Confined Disposal Facilities
- 5 in NJ, 1 in DE, 1 in DE & NJ

TOTAL Dredged Material

- 16M CY over 5 years
- (Less per year than avg. maintenance of ~5M CY)

Bay Material

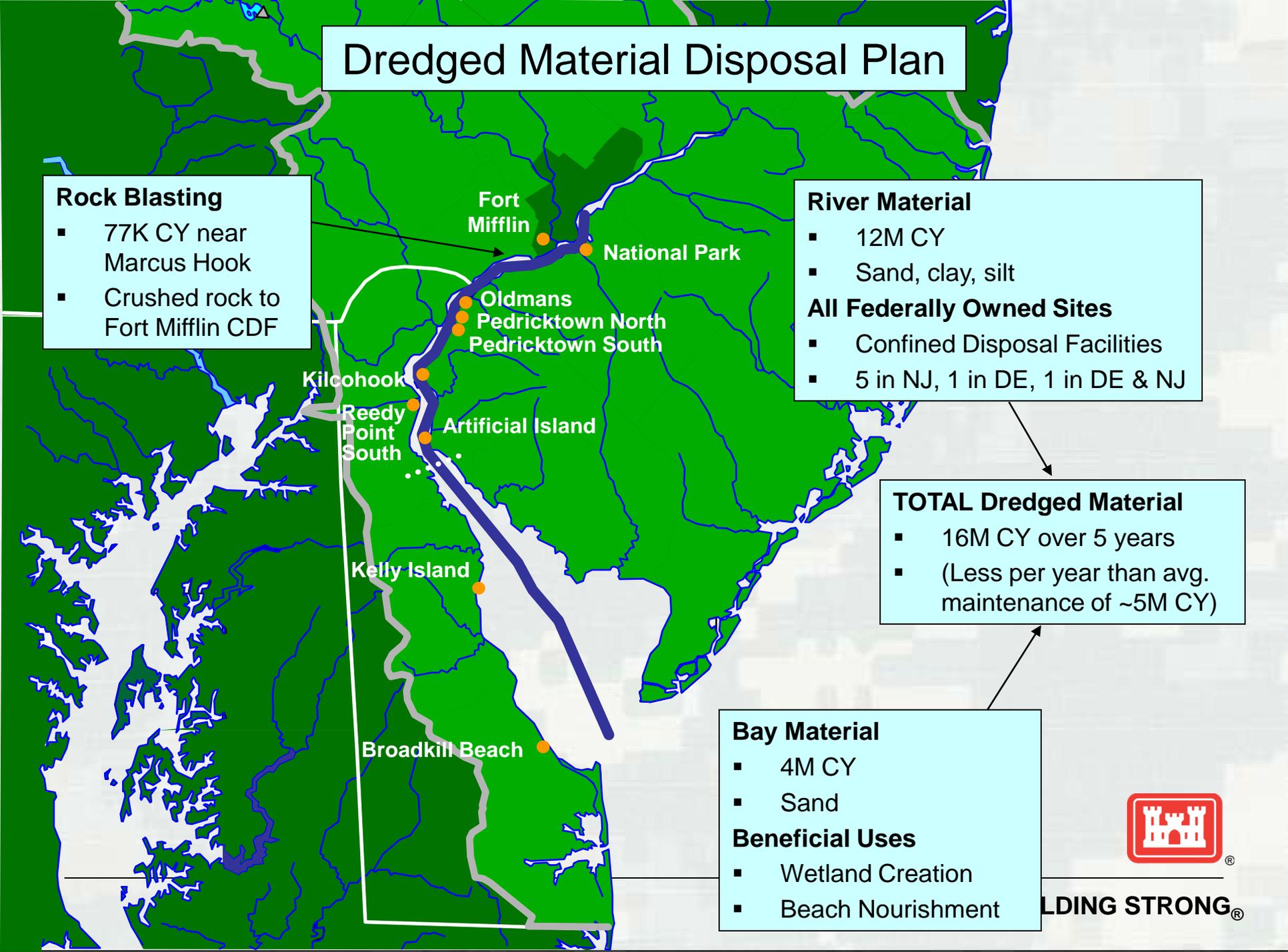
- 4M CY
- Sand

Beneficial Uses

- Wetland Creation
- Beach Nourishment



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The 45-foot Project

- Increase authorized depth of Delaware River federal navigation channel by 5 feet
- Follow 40-foot channel alignment 102.5 miles from Philadelphia/Camden to deepwater in Delaware Bay
- Widen 12 of 16 channel bends for safer navigation
- Deepen Marcus Hook Anchorage to 45 feet also
- No change in channel widths (ranging 400 to 1,000 feet)
- Channel was already deep enough in about 50% of its area pre-construction and thus requires no dredging
- Initial construction cost: approximately \$300 million
- Nonfederal sponsor (35% cost share): Philadelphia Regional Port Authority
- Total estimated dredging volume: 16 million cubic yards
- River Portion (Reaches AA thru D): 12 million cubic yards of silt, clay, sand and gravel to be placed in 5 federal confined disposal facilities (CDFs)
- Bay Portion (Reach E): 4 million cubic yards of sand to be placed ashore at two sites for ecosystem restoration, storm risk reduction
- Rock Removal (Marcus Hook vicinity): 200,000 cubic yards to be blasted in place, removed by bucket dredge, and placed in federal CDF at Fort Mifflin

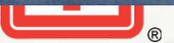


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Contract #7 (awarded)

- Lower Reach E
 - ▶ Awarded June 2014
 - ▶ Construction to start September 2014
 - ▶ South end of project (~15 miles)
 - ▶ Estimated quantity: 1.9 million cubic yards
 - ▶ Placement/Beneficial Use: Broadkill Beach Coastal Storm Damage Reduction (beachfill + dune) (initial construction)
 - ▶ Method: hopper dredge
 - ▶ Contractor: Weeks Marine Inc.
 - ▶ Cost: \$63 million





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Delaware River Deepening Contract Summary

Date	Contract	Contractor/ plant	Cubic meters	\$/ cu m	Cubic yards	\$/ cu yd	Total cost
2010	Reach C	Norfolk / pipeline (2)	2,765,900	\$12.02	3,617,600	\$9.19	\$30,100,000
2011	Lower Reach B	Norfolk / pipeline	688,100	\$8.89	900,000	\$6.80	\$7,600,000
2012	Upper Reach A	GLDD / pipeline, hopper	1,456,700	\$12.29	1,905,300	\$9.40	\$14,500,000
2013	Reach D	Dutra /DonJon hopper, excavator	829,900	\$12.75	1,085,500	\$9.75	\$18,500,000
2014	Lower Reach A	GLDD / bucket	336,400	\$35.32	440,000	\$27.00	\$14,800,000
2014	Reach AA	GLDD / bucket	529,800	\$48.40	693,000	\$37.00	\$25,400,000
2014	Lower Reach E	Weeks Marine/hopper	1,452,700	\$42.23	1,800,000	\$33.00	\$63,300,000
2015	Rock Removal	GLDD	TBD	TBD	TBD	TBD	\$77,000,000TBD
2016	Upper Reach E	TBD	TBD	TBD	TBD	TBD	TBD
2017	Upper Reach B	TBD	TBD	TBD	TBD	TBD	TBD





The Rest of the Work

- 2015 to completion
(currently on track for 2017)
 - ▶ Upper Reach B and Marcus Hook Anchorage
 - ▶ Rock Removal
 - ▶ Upper Reach E (beneficial use – ecosystem restoration)
- Channel maintenance
(after initial construction)
 - ▶ Expected annual volume: 4.3 million cubic yards
 - ▶ Increase of about 20% over 40-foot channel maintenance (3.5 million cubic yards)



For more information...

Visit the Delaware River Deepening website
<http://bit.ly/deldeep>

Contact the
Philadelphia District Public Affairs Office
edward.c.voigt@usace.army.mil
215-656-6515
Or
anthony.j.depasquale@usace.army.mil



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