

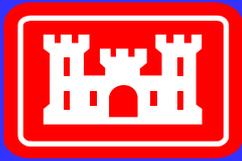
Wilmington District



# WILMINGTON HARBOR DREDGED MATERIAL MANAGEMENT PLAN (DMMP)



<http://www.saw.usace.army.mil/wilmington-harbor/main.htm>

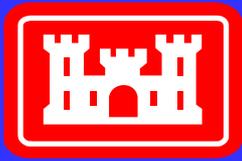


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# Wilmington Harbor DMMP AFB Presentation Topics



- DMMP Process
- Project Location & Existing Conditions
- All Alternatives Considered
  - Alternatives Eliminated
  - Remaining Alternatives
- Environmental Considerations
- Economic Summary
- Summary of Recommended Plan
- 1 Technical Issue & 1 Policy Issue
- Next Actions by PDT
- DMMP Schedule



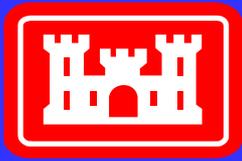
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# DMMP Process



- Preliminary Assessment
  - Completed in 1996
  - Identify investigations to document long-term management plan
- Phase I – DMMP
  - Completed in 1997
  - O&M for 38 ft project
- Phase II – DMMP
  - Completed in 2001
  - Upper Harbor (Anchorage Basin & NECFR)
  - O&M (38' and 42') and new work
  - Disposal in Eagle Island and improvements
- Phase III – Comprehensive DMMP, part of Wilmington Harbor '96 Act project (42 ft project)
  - Initiated in 2004
  - To meet requirements of ER 1105-2-100 and PGL-47
  - 20 year dredging requirement (2011 – 2031)
  - Environmentally acceptable , engineeringly sound and economically justified
  - Dredging needs, disposal capabilities, DA capacities, environmental compliance, beneficial use, & continued economic justification

*Iterative Process*



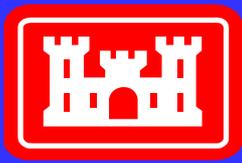
# DMMP Phase III Process



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- Multi-disciplined PDT including: non-Fed sponsors, Corps team members, resource agencies, stakeholders
- DMMP alternatives identified, evaluated, screened and recommended/eliminated
- 29 potential alternatives originally identified
- Eliminated 15 due to significant environmental impacts, mitigation costs, lack of available land, potential groundwater impacts, lack of economic justification
- Remaining 14 include modification to existing sites, rehab/restore disposal islands, acquisition of new sites, and beneficial uses





# Existing Conditions

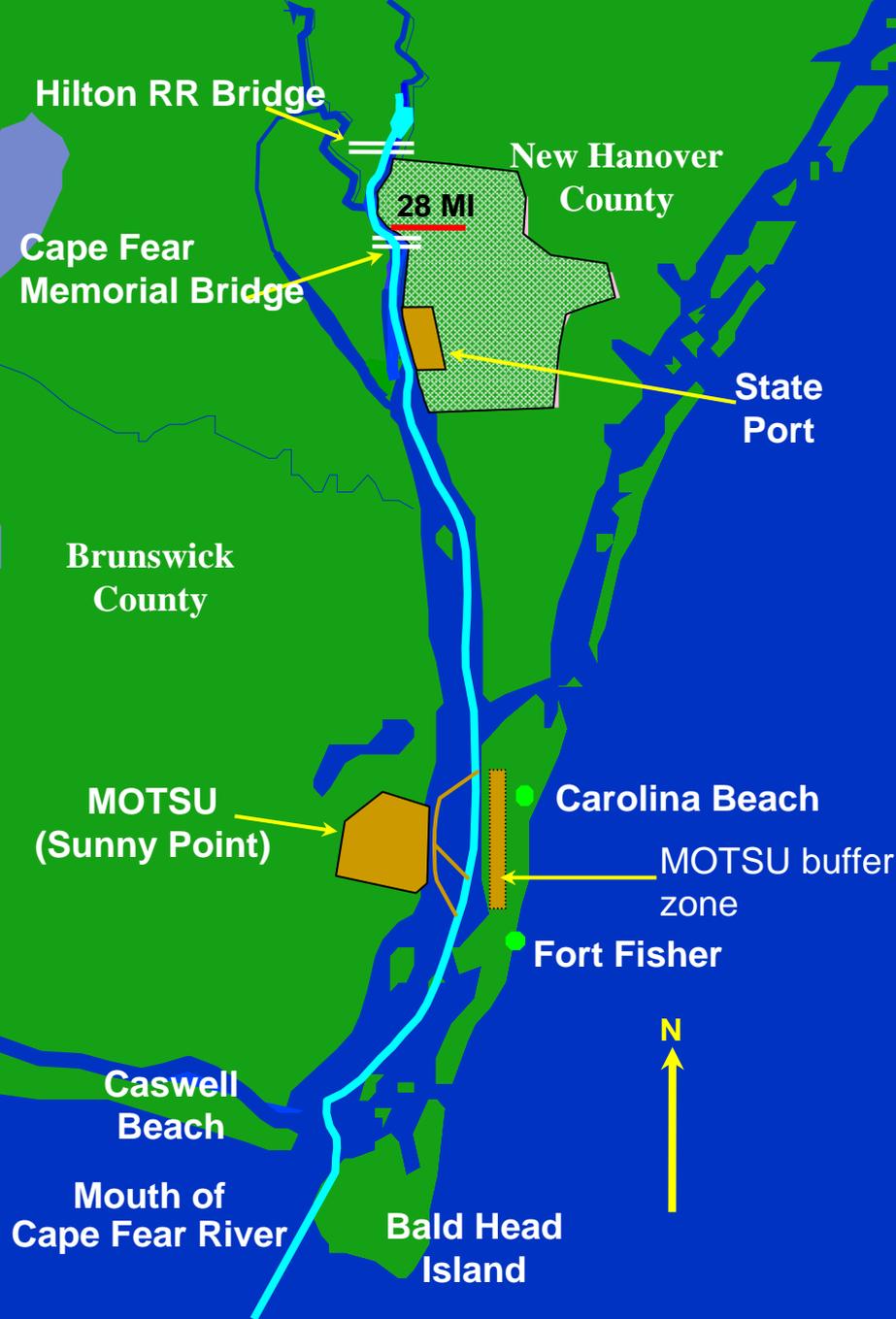
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Reaches	Channel Reaches	Shoaling Cubic Yards per Year	Frequency of dredging (years)	Disposal Location	Dredge Type	Sediment Type
	Upstream Limits of Project to 750 ft					
Upper	above Chemsolve	12,600	5	Eagle Island Cells 2/3	pipeline	silt
Upper	750 ft above Chemsolve to NC 133 Bridge	70,600	5	EI Cell 2/Cell 3	pipeline	silt
Upper	NC 133 Bridge to Cape Fear Mem Bridge	14,100	5	EI Cell 2/Cell 3	pipeline	silt
Upper	Anchorage Basin	1,168,100	1	EI Cell 1/Cell 2/Cell 3	pipeline	silt
Upper	Between Channel	84,200	1	EI Cell 1/Cell 2/Cell 3	pipeline	silt
Upper	Fourth East Jetty	19,600	2	EI Cell 1/Cell 2/Cell 3	pipeline	silt
Upper	Upper Brunswick	17,100	2	EI Cell 1/Cell 2	pipeline	silt
Upper	Lower Brunswick	29,800	2	EI Cell 1/Cell 2	pipeline	silt
Mid River	Upper Big Island	22,500	2	ODMDS/DA-10	B&B or Hopper, Pipe.	sandy silt
Mid River	Lower Big Island	35,900	2	ODMDS/DA-10	B&B or Hopper, Pipe.	sandy silt
Mid River	Keg Island	34,100	2	ODMDS/DA-10	B&B or Hopper, Pipe.	sandy silt
Mid River	Upper Lilliput	48,900	2	ODMDS/DA-10	B&B or Hopper, Pipe.	sandy silt
Mid River	Lower Lilliput	43,000	2	ODMDS/DA-10	B&B or Hopper, Pipe.	sandy silt
Mid River	Upper Midnight	107,000	2	ODMDS/DA-8	B&B or Hopper, Pipe.	sandy silt
Mid River	Lower Midnight	25,500	2	ODMDS/DA-8	B&B or Hopper, Pipe.	sandy silt
Mid River	Reaves Point	21,200	2	ODMDS/DA-8	B&B or Hopper, Pipe.	silty sand
Mid River	Horseshoe Shoal	45,900	2	Bird Island/DA-3/4	pipeline	sand
Mid River	Snows Marsh	21,800	2	Bird Island/DA-3/4	pipeline	sand
Mid River	Lower Swash	12,000	2	ODMDS/DA-3/4	B&B or Hopper, Pipe.	sand
Inner OB	Battery Island	25,300	4	ODMDS/DA-3/4	B&B or Hopper, Pipe.	sand
Inner OB	Southport	0	4	ODMDS/DA-3/4	B&B or Hopper, Pipe.	sand
Inner OB	Baldhead-Caswell	11,000	4	ODMDS/DA-3/4	B&B or Hopper, Pipe.	sand
Inner OB	Smith Island	257,800	2	BHI/CB/WOI beaches	Pipeline	sand
Inner OB	Ocean Bar Entrance Channel	545,000	2	BHI/CB/WOI beaches	Pipeline	sand & silt
Outer OB	Ocean Bar Outer Channels	538,000	1	ODMDS	Hopper	silt
	<b>TOTAL</b>	<b>3,211,000</b>				

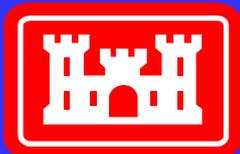
EI = Eagle Island, ODMDS = Ocean Dredged Material Disposal, BHI=Bald Head Island,CB=Caswell Beach,WOI=West Oak Island, B & B = Bucket and Barge

# Existing Conditions

- ✓ New ODMDS
- ✓ Mgmt Plan for Eagle Island (& other islands)
- ✓ Shoaling Study (Coastal)
- ✓ Sand Management Plan



**WILMINGTON HARBOR  
DMMP**

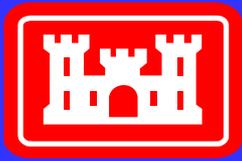


# All Alternatives Considered



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Item #	Wilmington Harbor DMMP Alternatives
1	Management Plan for Eagle Island, cell rotation / dike raises
2	Capacity restoration of existing CDFs by ocean disposal/beneficial use
3	Sand recycling at Islands 3 and 4
4	Disposal of all Beach Compatible Material on Beach
5	New ODMDS
6	Create a nearshore disposal site for recycling sand to the beach
7	Use of scow or barge overflow to increase dredging efficiency
8	New CDF at U. S. Coast Guard LORAN site
9	Open water site mid-harbor near Snows Cut (100-200 acres)
10	Sand recycling from borrow hole in the channel near Horseshoe Shoal
11	CDF at Progress Energy's Brunswick Nuclear Plant (Southport)
12	New Eagle Island type CDF in MOTSU buffer area at Carolina Beach
13	New confined disposal facility on Eagle Island by expansion north
14	Restoration of Islands 8 and 10



# Alternatives Eliminated

## Eagle Island Expansion

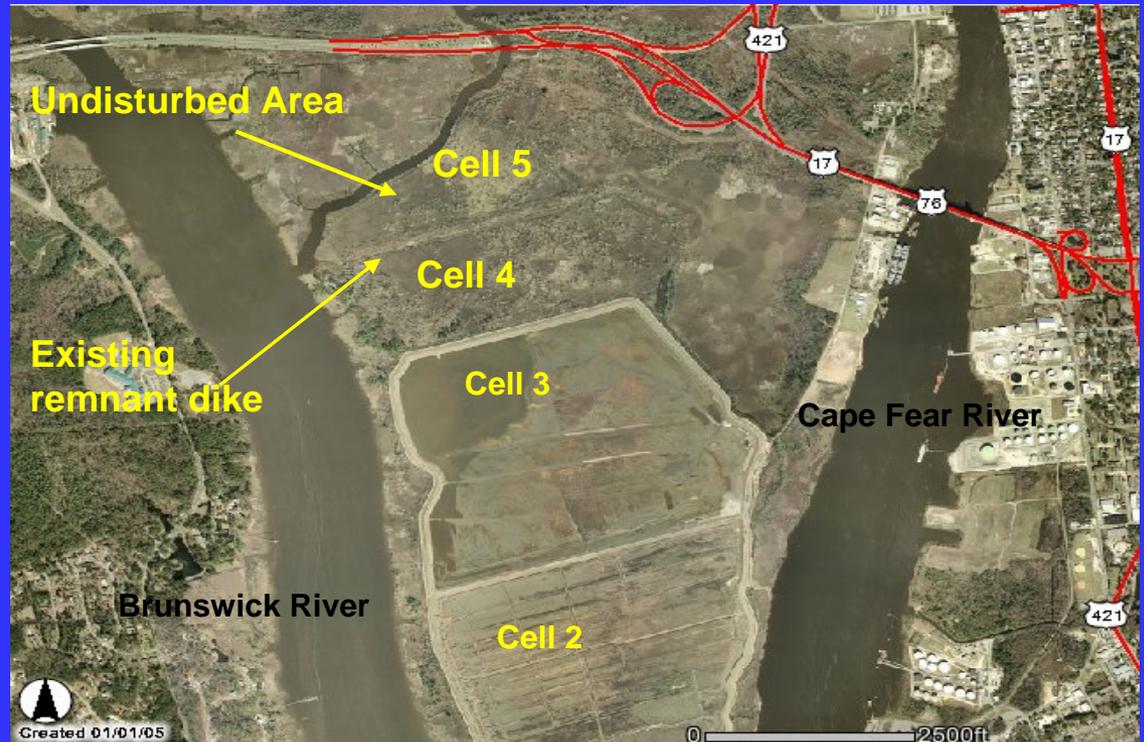


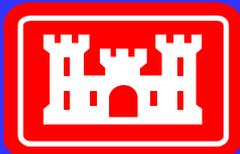
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- Expansion north into Cell 4 (120 ac.) and/or Cell 5 (55 ac.)
  - use as typical CDF
  - use as stockpile area for dried material from Cells 1-3

### Issues

- 1- Size (SETTLE model)
- 2 - Mitigation Costs
  - ~14\$M each cell





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# Alternatives Eliminated

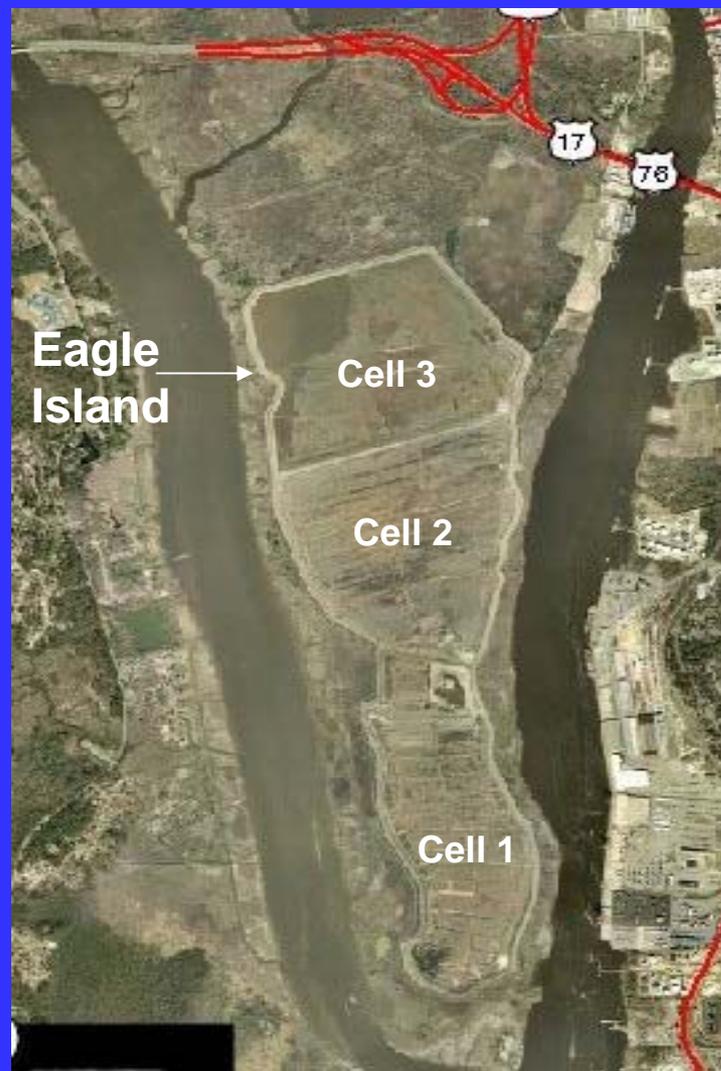
## Eagle Island Dike Raises

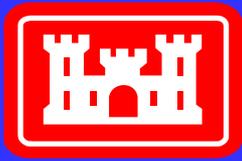


- Raise Dikes to elev. 52 feet and 62 feet
- Also evaluated: stone columns, wick drains, and underdrains

### Issues

- 1- Slope Stability Analysis
- 2 – Construction Costs
- 3- Economics





# Alternatives Eliminated



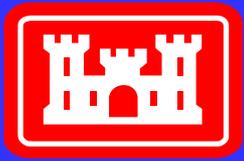
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CDF at the **Coast Guard Loran Station** on River Road

## Issues

- 1-Timing of decommissioning
- 2-Support for a park by local municipalities
- 3-Opposition by adjacent property owners
- 4-Natural Heritage Area
- 5-Groundwater





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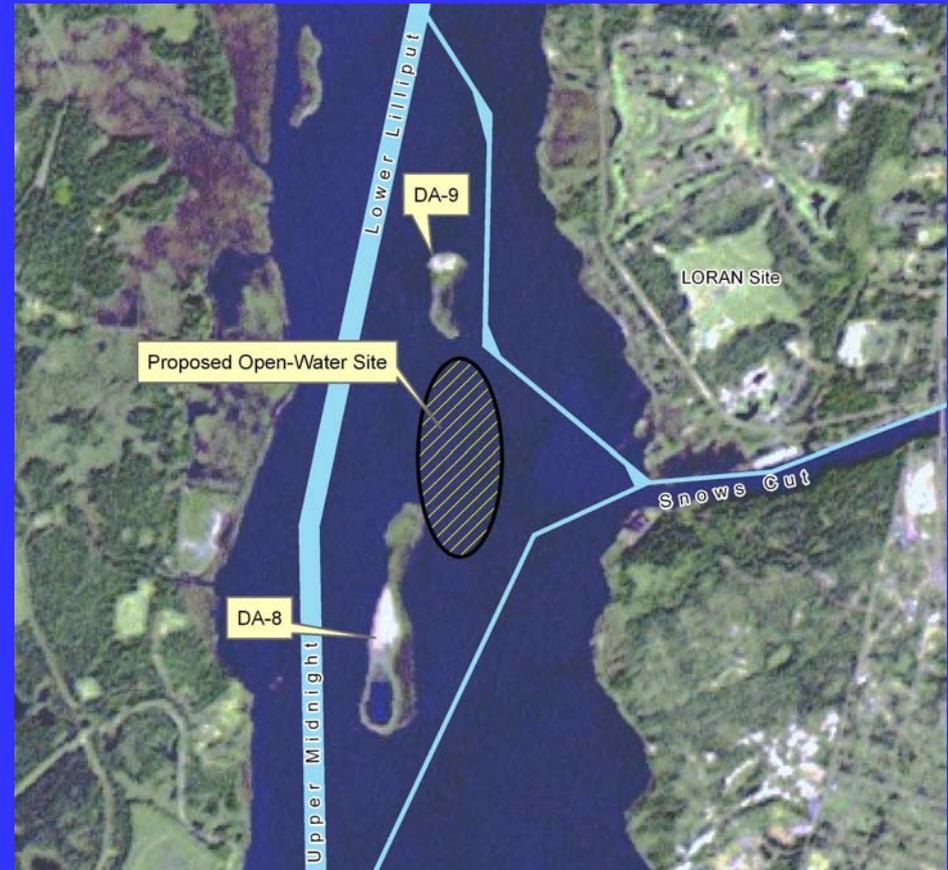
# Alternatives Eliminated

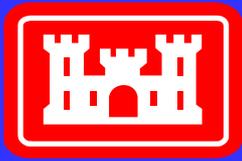


**Open water disposal site** near Snows Cut (~150 acres)

## Issues

- 1-Mitigation Costs (~\$39,000,000)
- 2-Major opposition by resource agencies
- 3-Location for mitigation site





# Alternatives Eliminated

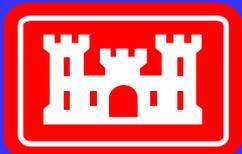


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## Borrow Hole/Sediment Trap at Horseshoe Shoal Issues

- 1-Questionable benefits
- 2-Environmental Impacts
- 3-No advanced maintenance dredging authority





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# Alternatives Eliminated



Disposal sites at Progress Energy's **Brunswick Nuclear Plant (BNP)**

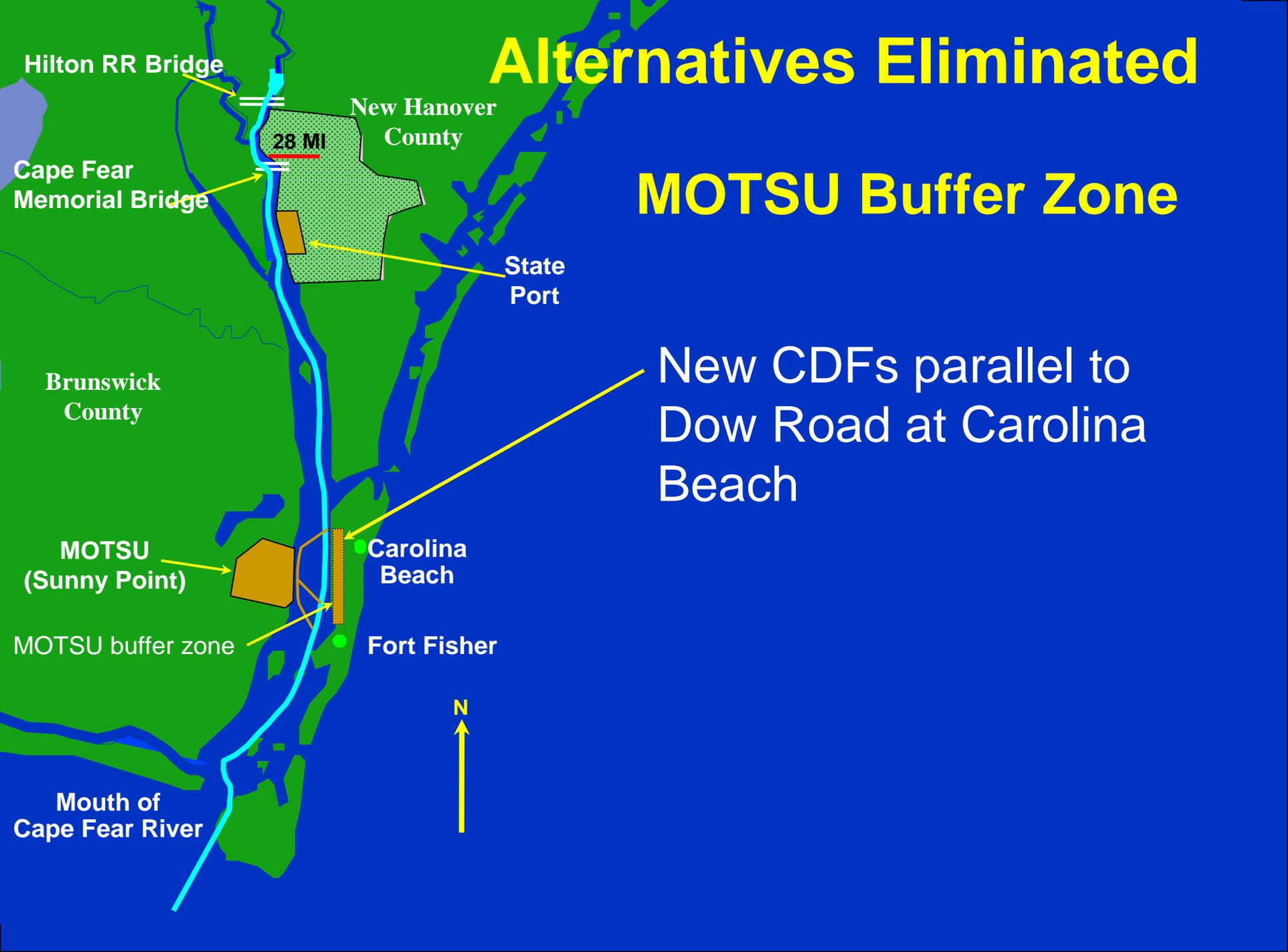
## Issues

- 1-Landuse Plan by Ownership
- 2-Proximity to proposed NCIP
- 3-Location of BNP



# Alternatives Eliminated

## MOTSU Buffer Zone



Hilton RR Bridge

New Hanover  
County

28 MI

Cape Fear  
Memorial Bridge

State  
Port

Brunswick  
County

New CDFs parallel to  
Dow Road at Carolina  
Beach

MOTSU  
(Sunny Point)

Carolina  
Beach

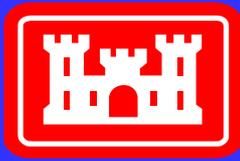
MOTSU buffer zone

Fort Fisher

N



Mouth of  
Cape Fear River



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# Alternatives Eliminated

## MOTSU buffer zone

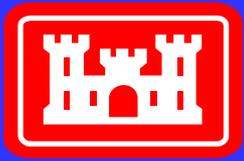


- Eagle-Island type CDFs w/ multiple cells
- Sand in buffer area to be pumped to beach prior to building CDFs
  - Sediment compatibility analysis
  - Groundwater study

### Issues

- 1-Groundwater
- 2-Economics
- 3-Disposal Site Longevity
- 4-Environmental Impacts
- 5-Social Impacts





# Alternatives Eliminated



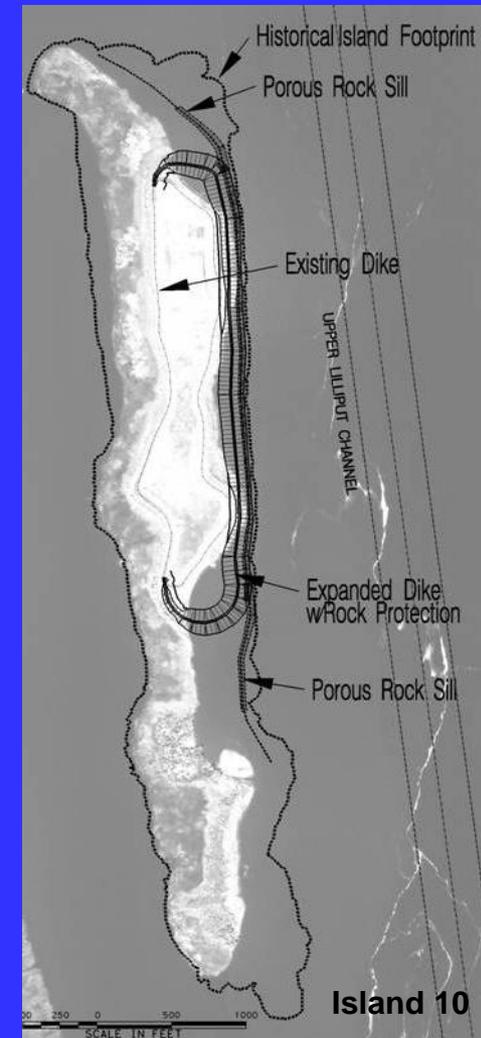
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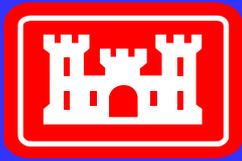
## Restoration/Rehab of Islands 8 & 10

- Restore original footprint on channel side
- Restore capacity at existing sites by ocean disposal and/or beneficial use
- Create ecosystem restoration feature (rock sill)

### Issues

- 1-Construction cost
- 2-Mitigation
- 3-Economics





# Remaining Alternatives

## Eagle Island



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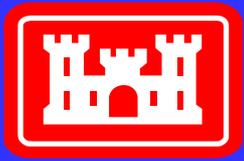
- Cell rotation (update management plan), ditching, drying & dike raising
- Geotech analysis to determine dike heights
  - Current limit is 40'+2' overbuild
- Increase capacity: beneficial use or dry material to ODMDS



Fiscal Year	2003												2004												2005												2006												2007												2008												2009																																			
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Eagle Island Activites	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S																								
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# Eagle Island Management

Least maintenance cycle that can be placed in one cell has just been dredged Disposal site changes to ODMDS



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# Remaining Alternatives

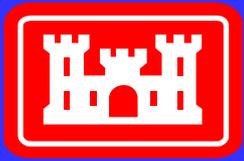
## Sand Recycling



- **Systematic sand recycling at Islands 3 & 4**
  - DA-4 – primary sand recycling island
  - DA-3 – disposal of material from DA-4 access channel
  - DA-4 material pumped to Kure Beach in 2002

(Carolina Beach & Vicinity South Flood & Coastal Storm Damage Reduction)





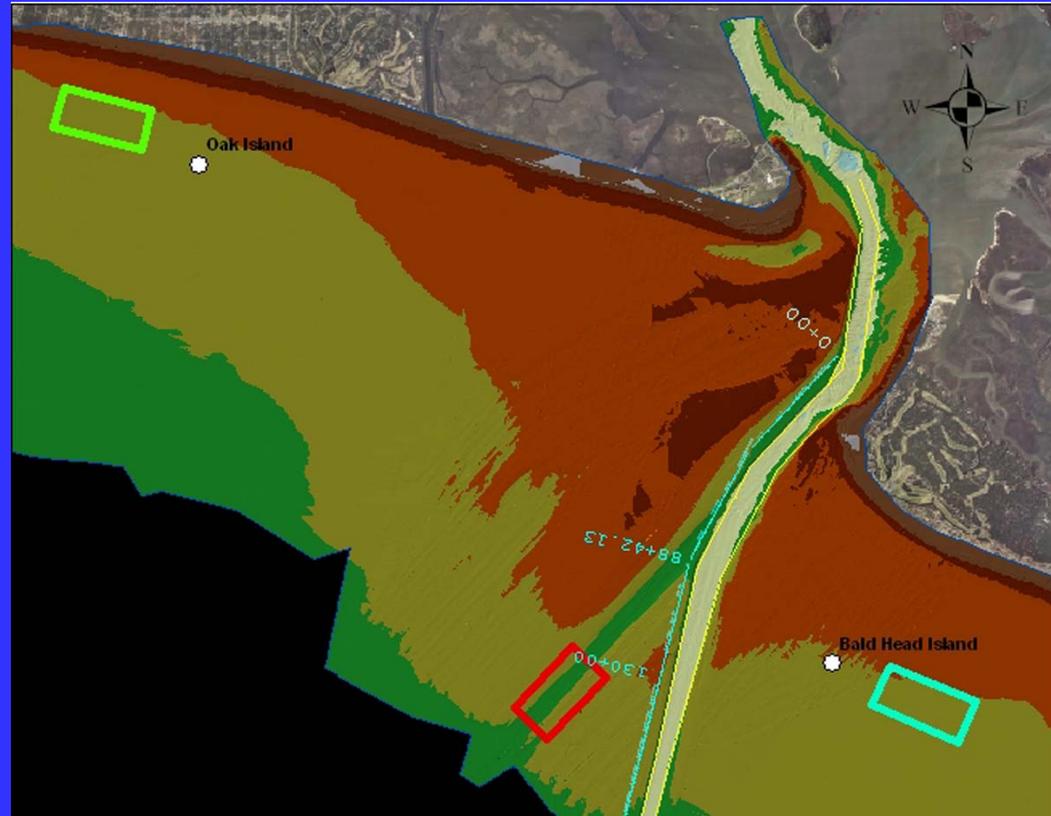
# Remaining Alternatives

## Nearshore Placement

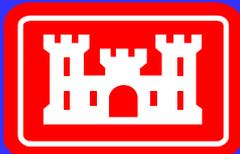


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- Establish nearshore placement site(s)
  - Caswell Beach
  - Jay Bird Shoal
  - Bald Head Island
- Placement sites in water depths 30'-40' for sand recycling to beaches



- Temporary sand placement areas (avoid permanent disposal of sand)
- Small to large quantities of sand



# Remaining Alternatives



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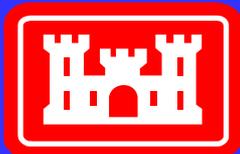
## Beneficial Use

- **Bird Islands (Ferry Slip and Pelican Island)**
  - Least cost disposal method for adjacent reaches
  - Last renourished in 2004 with 167,000 cu. yds. of material
  - In coordination with the National Audubon Society
- **Beach Disposal (Inner Ocean Bar)**
  - 2000 Sand Management Plan
  - 6-yr. cycle for beach disposal
- **Eagle Island Dry Dredged Material**
  - continuing to pursue beneficial uses/users
  - additional sediment testing



Courtesy Bill Adams





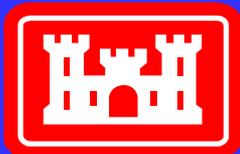
# Environmental Considerations



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- O&M of Wilmington Harbor covered under existing NEPA documents
  - FEIS, Long-Term Maintenance of Wilmington Harbor, NC, 1989
  - Final Feasibility Report EIS on Improvement of Navigation, Cape Fear - Northeast Cape Fear Rivers Comprehensive Study, Wilmington, NC, 1996.
  - EA Preconstruction Modifications of Authorized Improvements, Wilmington Harbor, NC, 2000.
- DMMP NEPA Process
  - Scoping meeting and letter in Dec 2005
  - Notice of Intent to prepare EIS in Dec 2006
  - EIS or EA, as required
  - Resource agencies and stakeholders are on PDT





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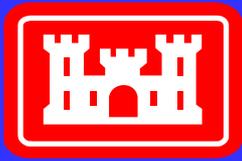
# Environmental Considerations



## “New” Environmental Impacts

- Related to proposed Nearshore Placement Sites
- Avoidance and Minimization:
  - EFH, including hardbottoms & other aquatic resources
  - Cultural Resources
  - Mitigation only if impacts cannot be avoided or sufficiently minimized
- Continue to coordinate with appropriate agencies:
  - NCDWR      - NCWRC      - SHPO
  - NMFS      - NCDWQ
  - NCDMF      - USFWS





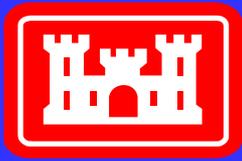
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# Economic Summary

## Eagle Island Alternatives



<b>Comparison of Eagle Island (EI) Alternatives</b>	
	Total Avg. An. Equiv. Costs
EI with Cell 4 (\$14 million mitigation)	\$13,189,948
EI with Cell 4 (\$4 million mitigation)	\$12,281,503
EI to 2014 then ODMDS	\$9,539,426
Pump to EI (w/o Cell 4) then take dry material by scow to ODMDS	\$11,485,825
Mechanical direct to ODMDS from 2011 (reaches that normally go to EI)	\$11,070,756

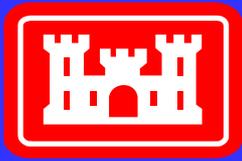


# Economic Summary



Wilmington District

<u>Location</u>	<u>Average Annual Costs</u>
Upper River to the ODMDS (currently goes to Eagle Island)	\$9,539,426
Mid-River to the ODMDS	\$2,358,023
Disposal (sand recycling) at Islands 3 and 4	\$706,715
Inner Ocean Bar Sand to Beaches	\$6,752,063
Outer Ocean Bar to ODMDS	\$3,458,000
<b>Totals</b>	<b>\$22,814,228</b>



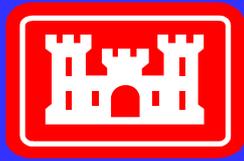
# Summary of Recommended Plan



Wilmington District

- Eagle Island
  - Continue to pursue beneficial use
  - Continue to investigate dike raises (42'-52')
- Sand Recycling at DA-3 and DA-4
- Bird Islands
- Beaches
- Nearshore Placement Sites
- ODMDS





Wilmington District

# Technical Issue

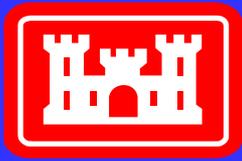
## Eagle Island Earth Dike

### Factor of Safety



- Unresolved ITR comment
- History
- Design Criteria
  - EM-1110-2-1902
  - EM-1110-2-5027
- Low Hazard – Low Risk
- Spencer vs. Corps Methods
- $FS < 1.3$





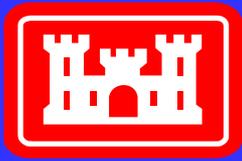
Wilmington District

# Policy Issue

## Beach Disposal



- **Federal Standard**—The least costly alternative, consistent with sound engineering practices and selected through the 404(b)(1) guidelines or ocean disposal criteria
- **Sound Engineering**
  - principled engineering procedures
  - state of the art techniques and approaches
  - provide the best engineering solution
  - balancing economics and the environment
- **Engineering Codes of Ethics**
  - NSPE (#III) “Engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations”
  - ASCE (Fundamental Canon #1) “Engineers...shall strive to comply with the principles of sustainable development...”
- **USACE Environmental Operating Principle #1**—Strive to achieve environmental sustainability. Environmentally sustainable solutions are achieved by linking environmental and economic needs.



Wilmington District

# Policy Issue

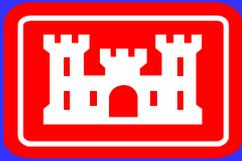
## Beach Disposal



### Beach disposal is Regional Sediment Management

- Regional Sediment Management (RSM) supports Corps Environmental Operating Principles by...
  - Fostering system approaches linking projects and programs
  - Advocating consideration of longer-term consequences of proposed decisions and actions – e.g. not just short-term costs
  - Embracing an “adaptive management mindset”
  - Considering the needs and tradeoffs among economic viability, environmental health and social well-being objectives
  
- Regional Sediment Management incorporates
  - System perspective
  - Recognition of sand as a resource
  - Principles of sustainability
  - Innovative process improvements
  - Leveraging and partnerships

From “Regional Sediment Management: *Background and Overview of Initial Implementation*”, Institute for Water Resources, Policy Studies Program, IWR Report 02-PS-2, July 2002



Wilmington District

# Policy Issue

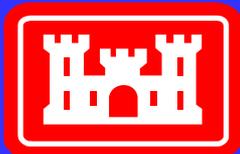
## Beach Disposal



- Basic physical process of dredging and disposal can be termed “sound engineering” but is it sustainable?
  - Is there a cost to the adjacent beach community by throwing this resource away?
  - Is there a cost to endangered species by throwing this resource away?
  
- It is not sound engineering to remove a critical resource (sand) from the littoral system causing impacts (costs) to the social and environmental system?
  - Not supported by Corps Regional Sediment Management principles
  - Not supported by Corps Environmental Operating Principles
  - Not supported by professional codes of ethics
  
- Beach nourishment/disposal projects “do reduce hurricane storm damages, which, in turn, reduce Federal disaster recovery costs” (“Hurricane Fran—Effects on Communities With and Without Shore Protection: A Case Study at Six North Carolina Beaches”, IWR Report 00-R-6, Dec 2000)

- Average Annual Costs (6-yr. cycle)

Beach Disposal (Inner OB)	\$6,752,063
ODMDS (Inner OB)	\$6,581,535



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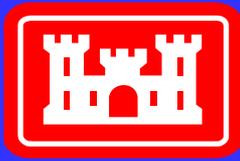
# WILMINGTON HARBOR DMMP

## Next Actions by PDT



- **Final shoaling study** – incorporate new #'s
- **Identify nearshore placement site locations**
- **Dike heights at Eagle Island**
  - Final determination on Eagle Island Cells 4/5
  - Beneficial uses (Eagle Island)
- **Survey of ODMDS (capacity)**





Wilmington District

# WILMINGTON HARBOR DMMP Status/Schedule



Alternative Formulation Briefing	19 Nov 07
ITR of draft DMMP/EIS/EA	3 <sup>rd</sup> Q FY08
<b>File Draft DMMP/EIS/EA with EPA for Public Review</b>	<b>3<sup>rd</sup> Q FY08</b>
ITR of final DMMP/EIS/EA	4 <sup>th</sup> Q FY08
<b>File Final DMMP/EIS/EA with EPA for Public Review</b>	<b>1<sup>st</sup> Q FY09</b>
If EIS - Record of Decision Signed	April 09
MSC Approval Final DMMP/EIS	April 09
<b>Implementation</b>	<b>FY11</b>



QUESTIONS?

