

Beach Management Concept Assessment

Town of Kitty Hawk, North Carolina



Coastal Planning & Engineering of North Carolina
September 3, 2013

Ken Willson
(kenneth.willson@cbi.com)

What's In The Report?

INTRODUCTION.....

 What is Beach Nourishment?.....

FEDERAL PROJECT DESCRIPTION.....

 Project Design.....

 Fill Volume Requirements.....

 Sand Sources.....

LOCAL PROJECT ALTERNATIVES.....

 Erosion Mitigation Project.....

 Storm Damage Reduction Project.....

 Summary.....

ALTERNATIVE SAND SOURCES.....

 Summary.....

PERMITTING AND ENVIRONMENTAL DOCUMENTATION.....

 Permitting.....

COST ESTIMATES.....

 Design and Permitting Estimates.....

 Construction Estimates.....

 Environmental Monitoring Estimates.....

 Summary.....

REGIONAL COORDINATION.....

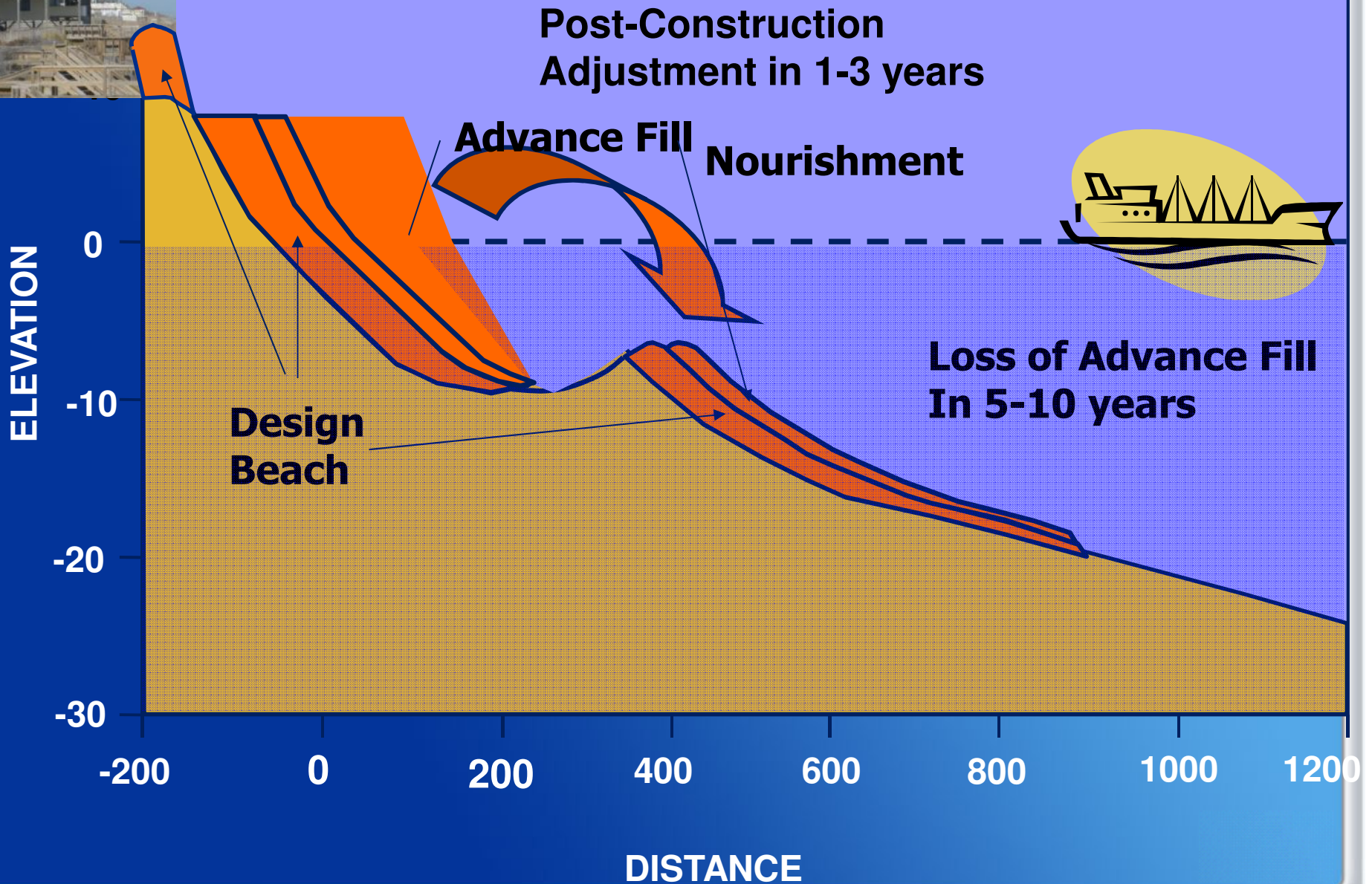
SCHEDULE.....

CONCLUSION.....

SUMMARY.....

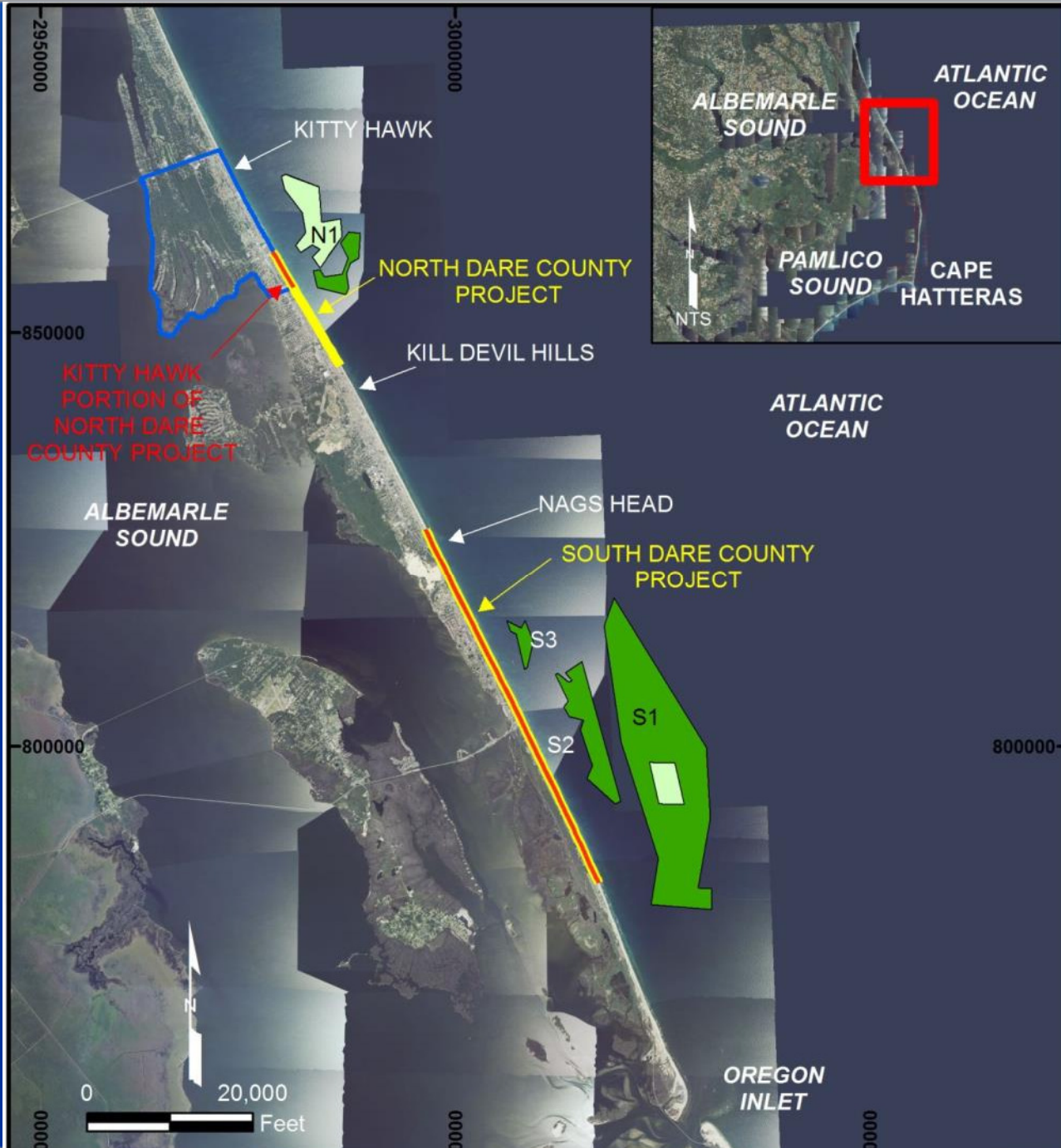
REFERENCES.....

What is Beach Nourishment?



Federal Project Description

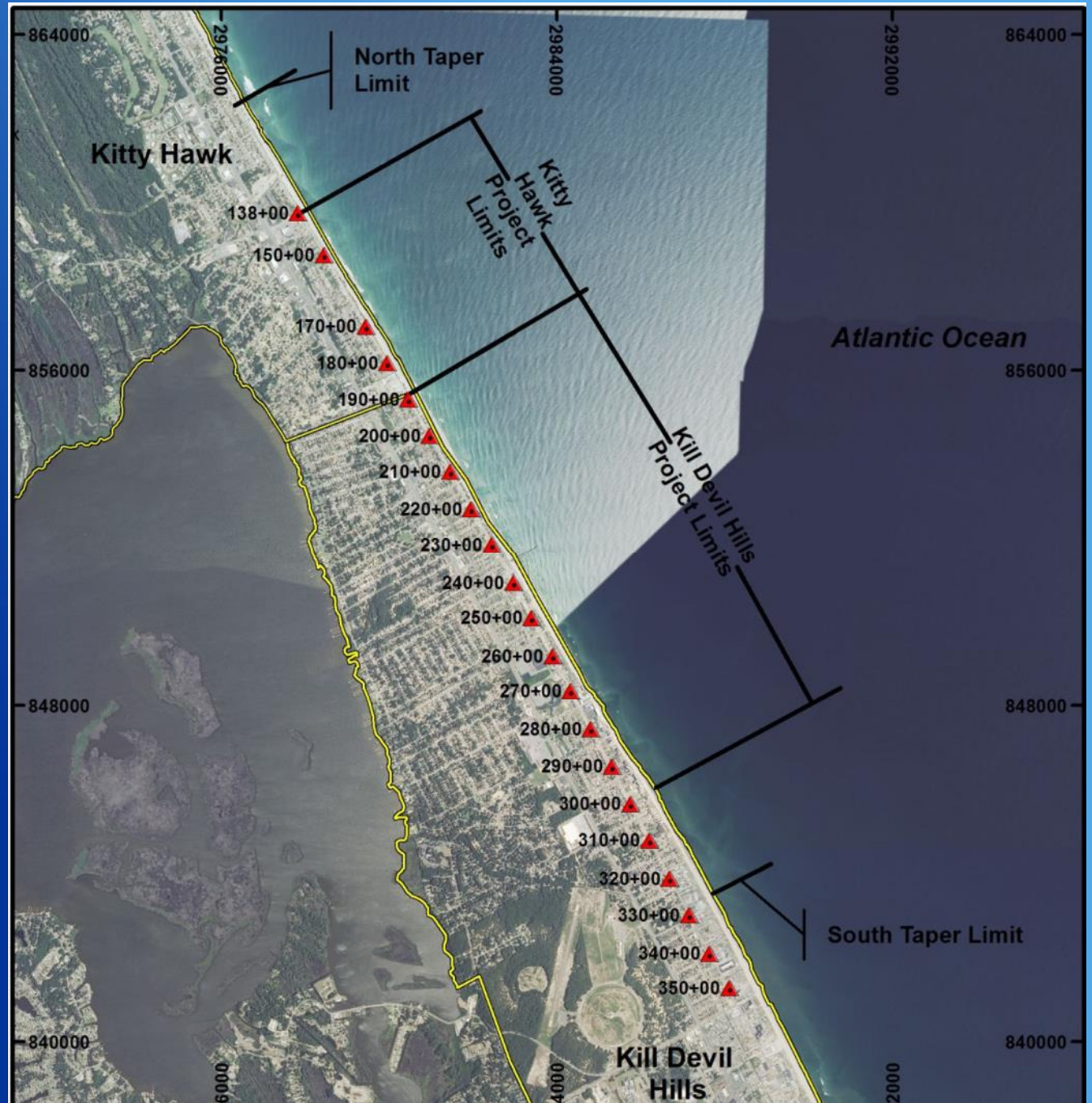
- USACE Feasibility Report Completed in 2000
- 2 Components:
 - South Project Area – 10.1 Miles along Nags Head
 - North Project Area – 4.1 Miles along Kitty Hawk and Kill Devil Hills
- Borrow Areas Identified as N1 and S1



Federal Project Description

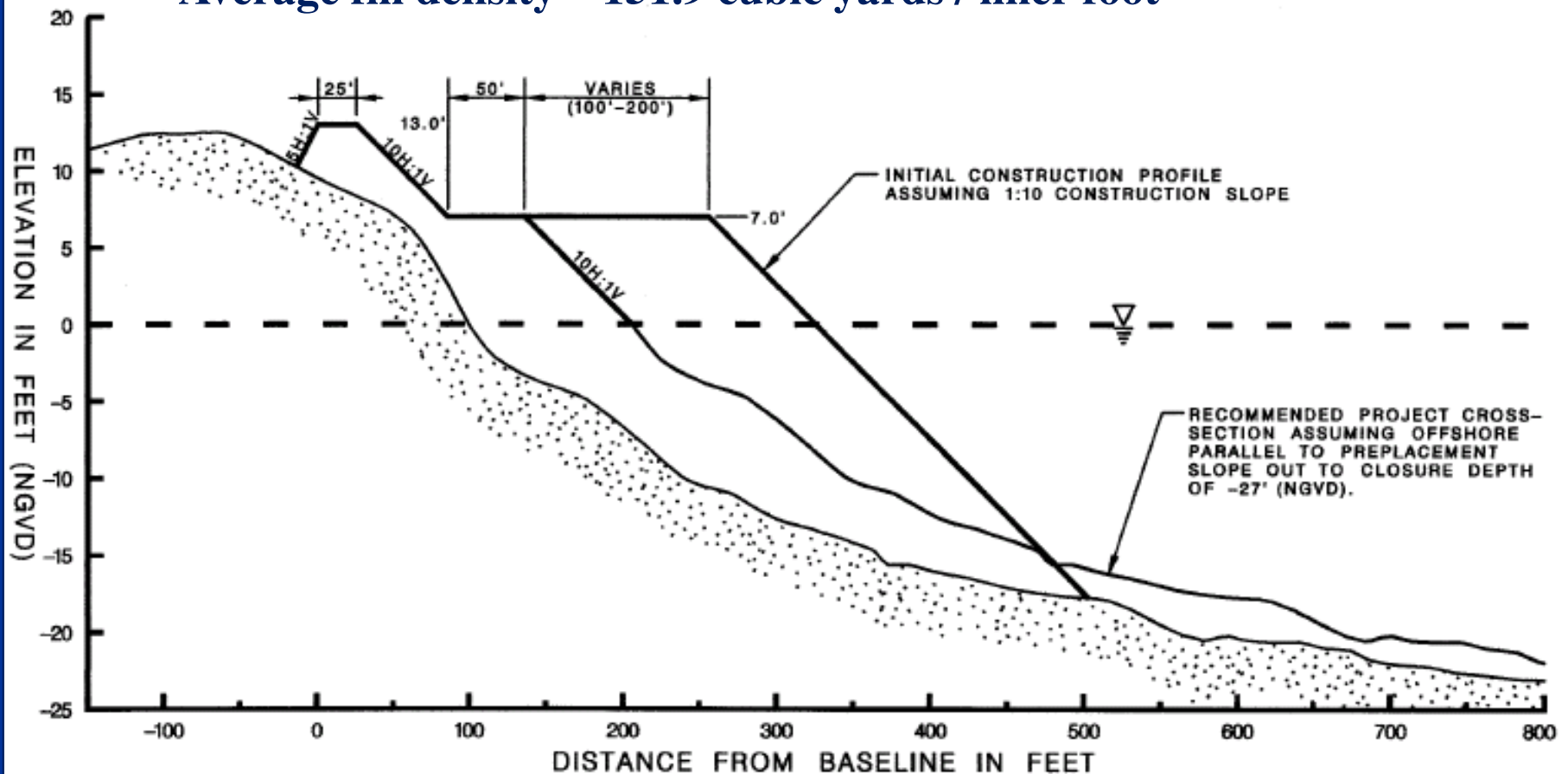
- North Project Area – 4.1 Miles along Kitty Hawk and Kill Devil Hills
 - Kitty Hawk Main Fill – MP 4.3 (Kitty Hawk Rd.) to Southern Town Limit (5,070 ft.)
 - Kitty Hawk Taper - ~500 ft. South of Historic Street to Kitty Hawk Road (3,000 ft.) Borrow Areas Identified as N1 and S1

Federal Project Description



Federal Project Description

- NED Plan – 25 ft. wide dune at elevation +12 ft. NAVD88 fronted by a 50 ft. wide berm at +6 ft. NAVD88.
- Average fill density – 151.9 cubic yards / liner foot



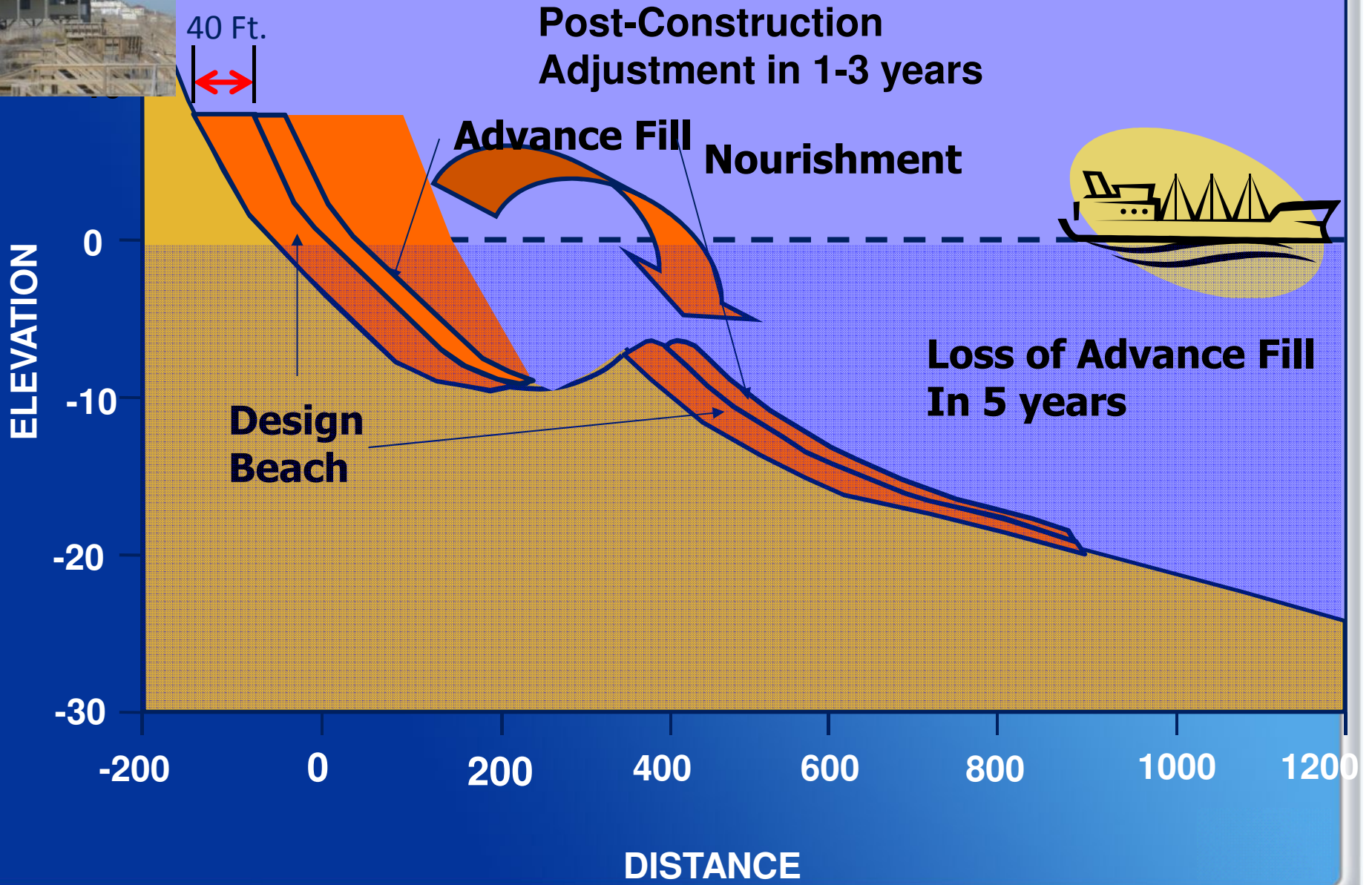
Local Project Alternatives

- Alternative Formulation:
 - Engineering considerations
 - Financial considerations
- Cover Town's entire oceanfront shoreline (3.5 Miles)
 - Provide storm damage reduction to public infrastructure including NC 12, Town roads between NC 12 and U.S. highway 158, and utilities
 - Reduce overwash/flooding of interior portions of the Town including NC 12 and U.S. highway 158
 - Provide storm damage reduction to private properties east of U.S. highway 158 within the Town
- 2 Town wide Alternatives:
 - Erosion Mitigation – Extend existing shoreline 40 ft. seaward and place 5 years of advanced fill.
 - Storm Damage Reduction - Fill Density and Design Template comparable to Federal NED Plan

Erosion Mitigation Project

- Town wide project (3.5 Miles)
- Extend Shoreline 40 feet seaward
- Place 5 years of advanced fill
- ~1,400,000 cy of material required to construct based on published erosion rates.
- Fill Density = 74.9 cubic yards / linear foot

What is Beach Nourishment?



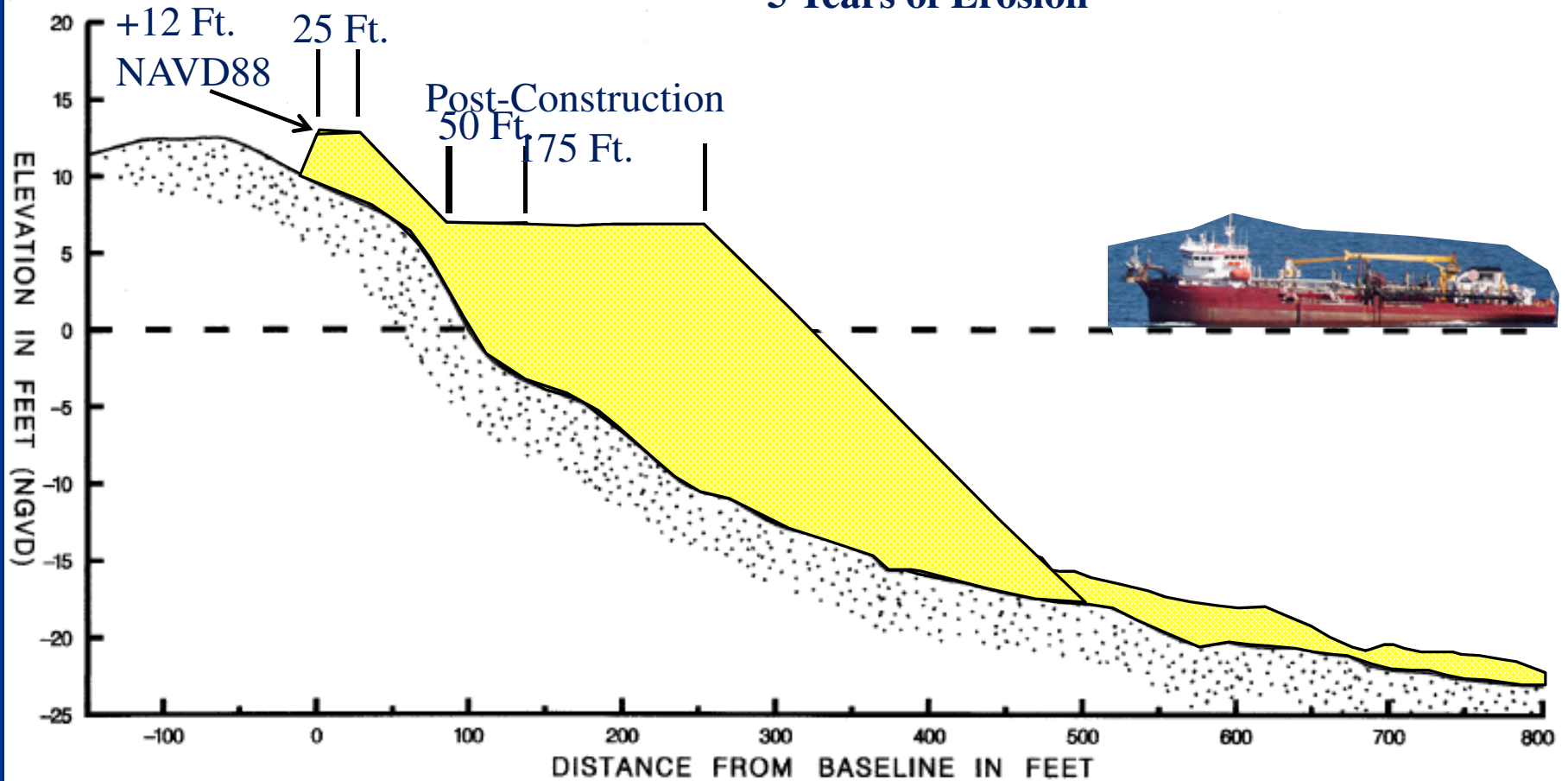
Tracking No. 00.00.2011

Storm Damage Reduction Project

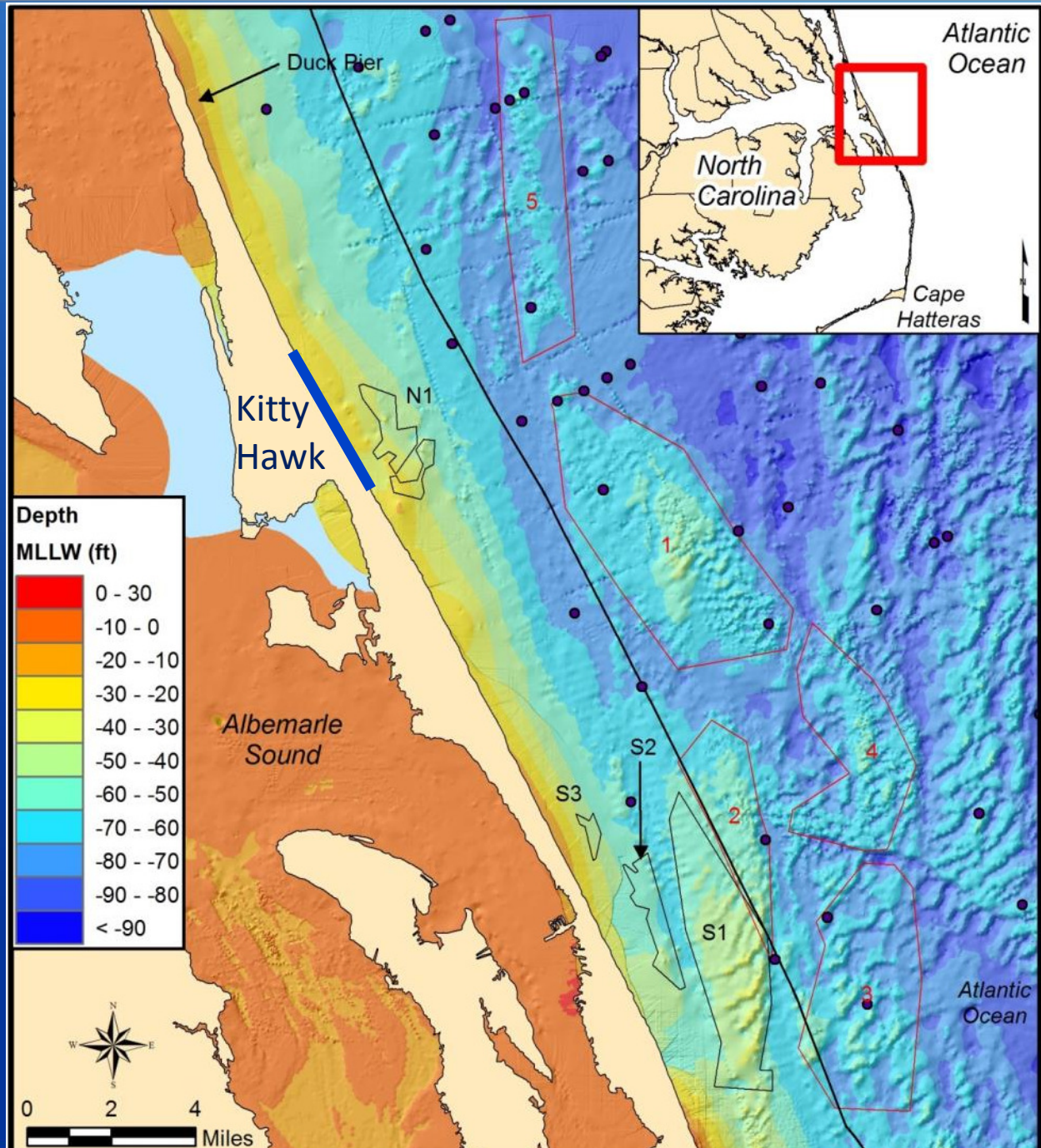
- Town wide project (3.5 Miles)
- Construct a 25 ft. wide dune at elevation +12 ft. NAVD88
- Construct a 50 ft. wide berm in front of the dune at elevation +6 ft. NAVD88
- ~2,800,000 cy of material required to construct.
- Fill Density = 151.9 cubic yards / linear foot

Federal Project Description

Condition of Beach Following: Equilibration & 5 Years of Erosion



Sand Sources



Permitting & Environmental Documentation

- Inter-Agency Meeting (June 19th, 2013)
- Permitting:
 - State – Major CAMA Permit; Federal – Dept. of the Army (DOA) / USACE
 - Additional Approvals: NEPA Compliance, NCDWQ 401 Certification, USFWS Biological Opinion (BO), NMFS Concurrence, NC SHPO Concurrence
- Environmental Documentation:
 - Environmental Assessment (EA) – USACE/BOEM Co-Lead Agencies
 - Essential Fish Habitat (EFH) Assessment
 - Biological Assessment (BA)

Cost Estimates: Design and Permitting

“Based on similar projects completed in the State of North Carolina, the estimated cost for the design and permitting phase could range between \$550,000 and \$1,120,000.”

- **Project Management and Coordination**
- **Engineering**
 - Shoreline Change and Volume Change Analysis
 - Storm Damage Vulnerability Analysis
 - Beach Fill Performance Analysis (Numerical Modeling)
 - Beach Fill Design
 - Development of Engineering Report
- **Beach Profile Surveys**
- **Geotechnical/Geophysical Analysis**
 - Native Beach Sand Analysis
 - Offshore Geophysical Surveys
 - Offshore Hydrographic Surveys
 - Offshore Vibracore Surveys
 - Compatibility Analysis
 - Development of Geotechnical Report
- **Environmental Documentation**
 - Development of EA
 - Development of EFH
 - Development of BA
- **Permit Application Submittal**
 - Develop and Submit CAMA Major Permit Application
 - Develop and Submit DOA Permit Application

**Possible
Cost
Sharing**

Cost Estimates: Construction

Item		Borrow Area "1 "		Borrow Area S1 (USACE Site)	
		Erosion Mitigation	Storm Damage Reduction	Erosion Mitigation	Storm Damage Reduction
Design and Permitting Costs		\$1,120,000			
Construction Costs	Mob & <u>Demob</u>	\$2,950,000	\$2,950,000	\$2,950,000	\$2,950,000
	Fill Placement	\$9,660,000	\$19,320,000	\$12,320,000	\$24,640,000
	Construction Subtotal	\$12,610,000	\$25,270,000	\$15,270,000	\$27,590,000
	15% Contingency	\$1,892,000	\$3,341,000	\$2,291,000	\$4,139,000
	Construction Total	\$14,502,000	\$25,611,000	\$17,561,000	\$31,729,000
	Pre-Construction and Construction Services	\$348,000	\$485,500	\$348,000	\$485,500
	Physical and Environmental Monitoring	\$360,000	\$610,000	\$360,000	\$610,000
	Construction Phase Total	\$15,210,000	\$26,707,000	\$18,269,000	\$32,825,000
Physical and Environmental Monitoring		\$500,000			
Project Totals		\$16,830,000	\$28,327,000	\$19,889,000	\$34,445,000

Regional Coordination

- Kill Devil Hills and Duck presently working on design and permitting
- Cost Savings Opportunities:
 - Environmental Documentation - \$25,000 - \$40,000
 - Sand Search Investigations - \$10s of thousands to > \$100,000
 - Beach Profiles
 - CONSTRUCTION – \$Millions
- BOEM Regional Reconnaissance: In-kind services would be unlikely.

Schedule

Task	2013				2014								2015																
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Notice to Proceed	•																												
Environmental Documentation	•	—															•												
Beach Profile Surveys	•	—	•																										
Engineering	•	—									•																		
Sand Search Investigations		•	—					•																					
Permits Issued																							•						
Develop Construction Plans and Specifications																				•	—	•							
Advertise Construction Solicitation																							•	—	•				
Review Bids and Award Contract																								•	—	•			
Project Construction																													• →

Summary

- Permitting & Design Costs: \$550,000 to \$1,200,000; 16 months
- Initial Construction: \$15.2 million to \$32.8 million
- Construction Estimated for 2016
- Potential for Cost Savings Through Coordination of Efforts is Promising (Kill Devil Hills and Duck)

QUESTIONS:

Ken Willson

Kenneth.Willson@CBI.com

(910) 791-9494