Bogue Banks

Carteret County, North Carolina
Coastal Storm Damage Reduction Study

Civil Works Review Board
June 27, 2014

Presented by
U.S. Army Corps of Engineers
South Atlantic Division
Wilmington District

US Army Corps of Engineers
BUILDING STRONG®

Outline

- Authority
- Study Area
- Problems and Opportunities
- Objectives and Constraints
- Existing and Future Without Project Conditions
- Plan Formulation
- Identification of Recommended Plan
- Recommended Plan Details

Study Authority

This study was conducted pursuant to a congressional resolution issued in 1998. The authorizing resolution states:

RESOLUTION ADOPTED JULY 23, 1998 BY THE UNITED STATES HOUSE OF REPRESENTATIVES:

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that the Secretary of the Army is requested to review the report of the Chief of Engineers dated November 27, 1984, on Bogue Banks and Bogue Inlet, North Carolina, and other pertinent reports, to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of shore protection and related purposes for Bogue Banks, North Carolina.

Study Background

- Feasibility Study Cost Sharing Agreement signed with Carteret County on 8 February 2001
- Total estimated Feasibility Study Cost: $5.9M
- Study was included in President's budget only in FY 2002-2004 and 2013 (Congressional adds/workplan funds used in intervening years)
- Average Fed funding per year was $220k but sporadic; annual funds received but in some years funding levels dropped as low as $24k
- Mid-study shift required transitioning from GRANDUC to BeachFx; lost considerable investment and time in initial modeling effort

Engineered Beaches

Project Beach

Wrightsville Beach After Hurricane Fran (1996)

Beach Without a Project

Surf City After Hurricane Fran (1996)

Bogue Banks

Coastal Storm Damage Reduction

Economic Investment*	
Initial Construction:	$37.3M
16 Nourishments:	$229.5M
Annual O&M:	$0.075M
Project First Cost:	$266.9M
Average Annual Cost:	$6.1M

* Oct 2014 price levels

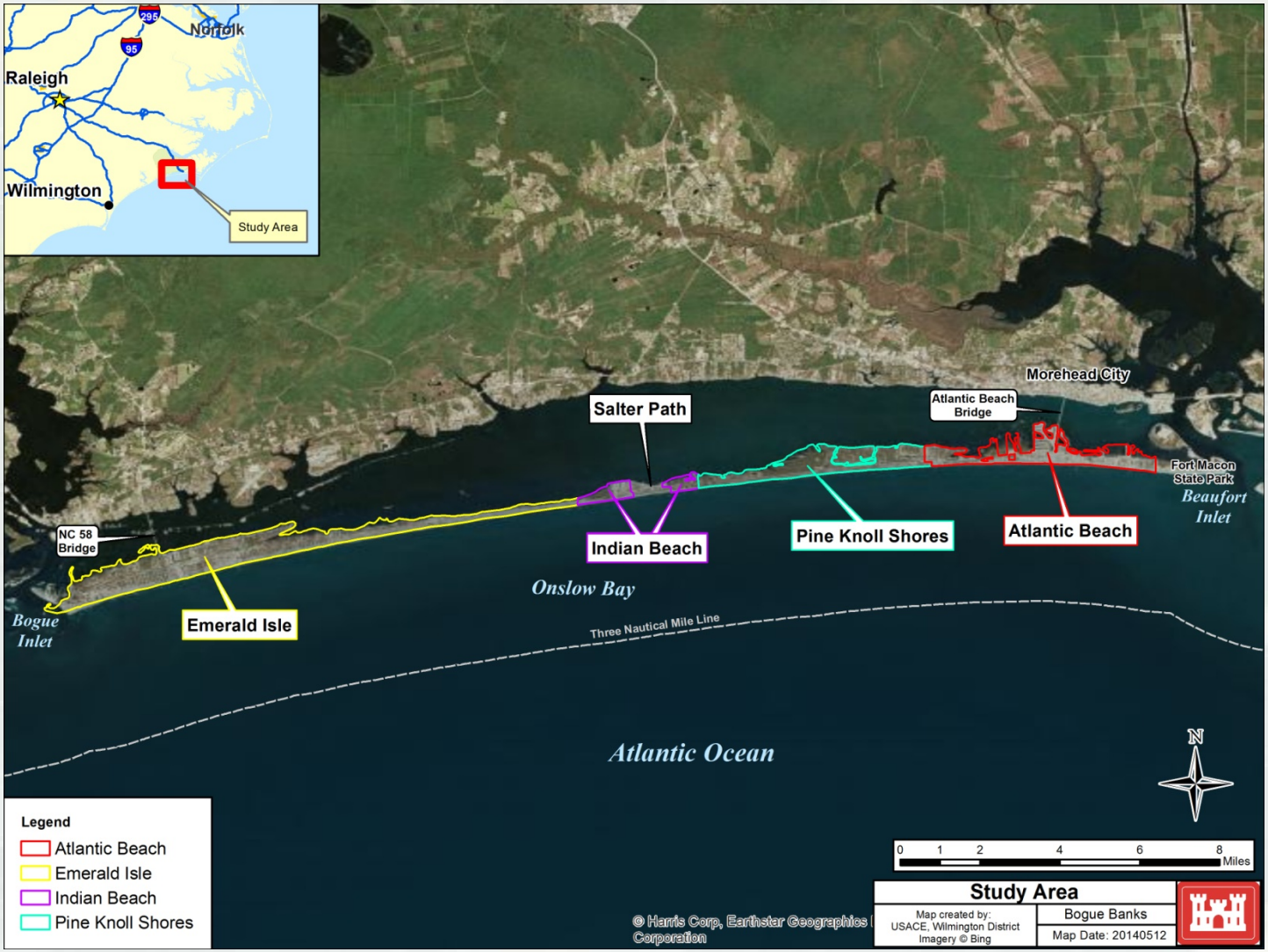
Benefit/Cost Ratio (3.5%): 2.45 to 1

Economic Returns (average annual)	
Storm Damage Reduction:	$11.7M
Recreation:	$3.1M
Total Benefits:	$14.8M
Net Benefits:	$8.7M

Federal Interest:
Return of $2.45 for every $1 invested

Full Access Participation	Federal	Non-Federal
Initial Construction	$24,263,000 (65%)	$13,064,000 (35%)
Renourishment	$114,725,000 (50%)	$114,725,000 (50%)
Current Access Participation	**Federal**	**Non-Federal**
Initial Construction	$20,789,222 (56%)	$16,537,778 (44%)
Renourishment	$98,296,380 (43%)	$131,153,620 (57%)

Study Area


Norfolk
295
95
Raleigh
Wilmington
Study Area
Morehead City
Atlantic Beach Bridge
Salter Path
Fort Macon State Park
Beaufort Inlet
Pine Knoll Shores
Atlantic Beach
Indian Beach
NC 58 Bridge
Onslow Bay
Emerald Isle
Bogue Inlet
Three Nautical Mile Line
Atlantic Ocean
N
Legend
Atlantic Beach
Emerald Isle
Indian Beach
Pine Knoll Shores
0 1 2 4 6 8 Miles
Study Area
Bogue Banks
Map created by: USACE, Wilmington District
Imagery © Bing
Map Date: 20140512
© Harris Corp, Earthstar Geographics Corporation

Fly Through

- 20140602_Bogue_Banks_FlyThru.wmv

Storm Damage Vulnerability

Hurricane Ophelia-2005 (CAT 1)

Tropical Storm Irene-2011

Clamdigger, Pine Knoll Shores - looking west

Problems:

- Long-term beachfront erosion
- Storm-induced damages to structures and contents
- Loss of beachfront recreational areas
- Loss of sea turtle and shorebird habitat

Opportunities:

- Reduce storm damage risks
- Enhance recreation
- Improve long-term sea turtle nesting and shorebird habitat

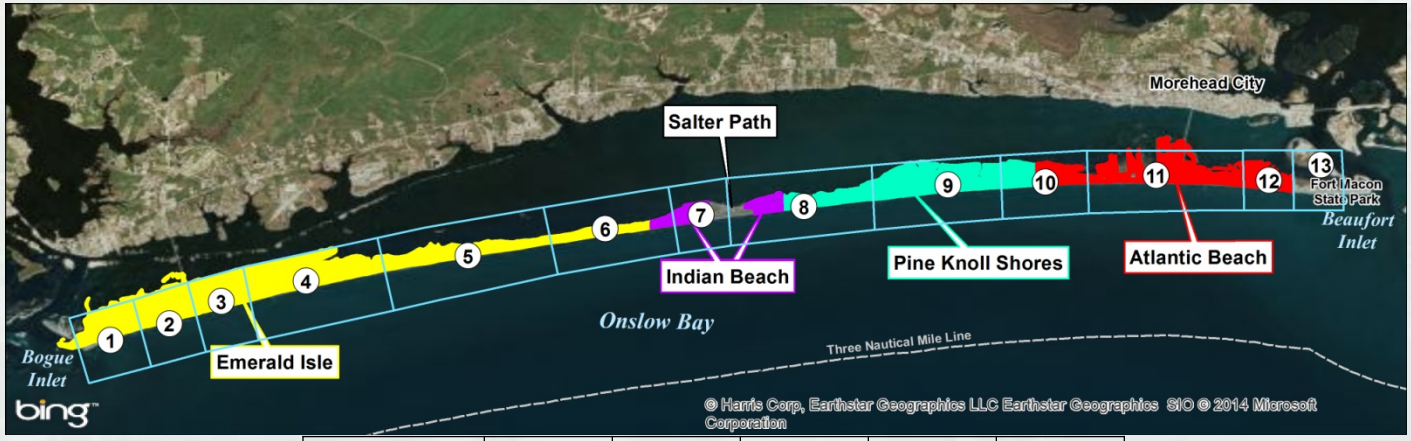
Plan Formulation – Objectives and Constraints

Objective: Over a 50-year period of analysis, reduce the risk of coastal storm damages (as measured by increases in NED benefits), to approximately 22.7 miles of shoreline at Bogue Banks while minimizing or avoiding impacts to natural resources.

Constraints:

- Limited land availability for relocation of structures.
- Avoidance or minimization of impacts to threatened and endangered sea turtle and shorebird nesting habitat.

Existing Conditions – Shoreline Profile



Coastal Reach	Towns Included	Dune Elevation	Dune Width (ft)	Berm Height (ft)	Berm Width (ft)
1	EI	11	95	5.5	135
2	EI	15	15	7	125
3	EI	20	5	7	70
4	EI	26	25	7	85
5	EI	20	25	7	70
6	EI/IB	22	15	7	55
7	IB/SP	28	90	7	65
8	IB/SP/PKS	18	100	7	80
9	PKS	20	30	7	65
10	PKS/AB	18	100	7	65
11	SB	18	10	5.5	75
12	AB	14	40	5.5	30
13	FMSP	16	10	5.5	5

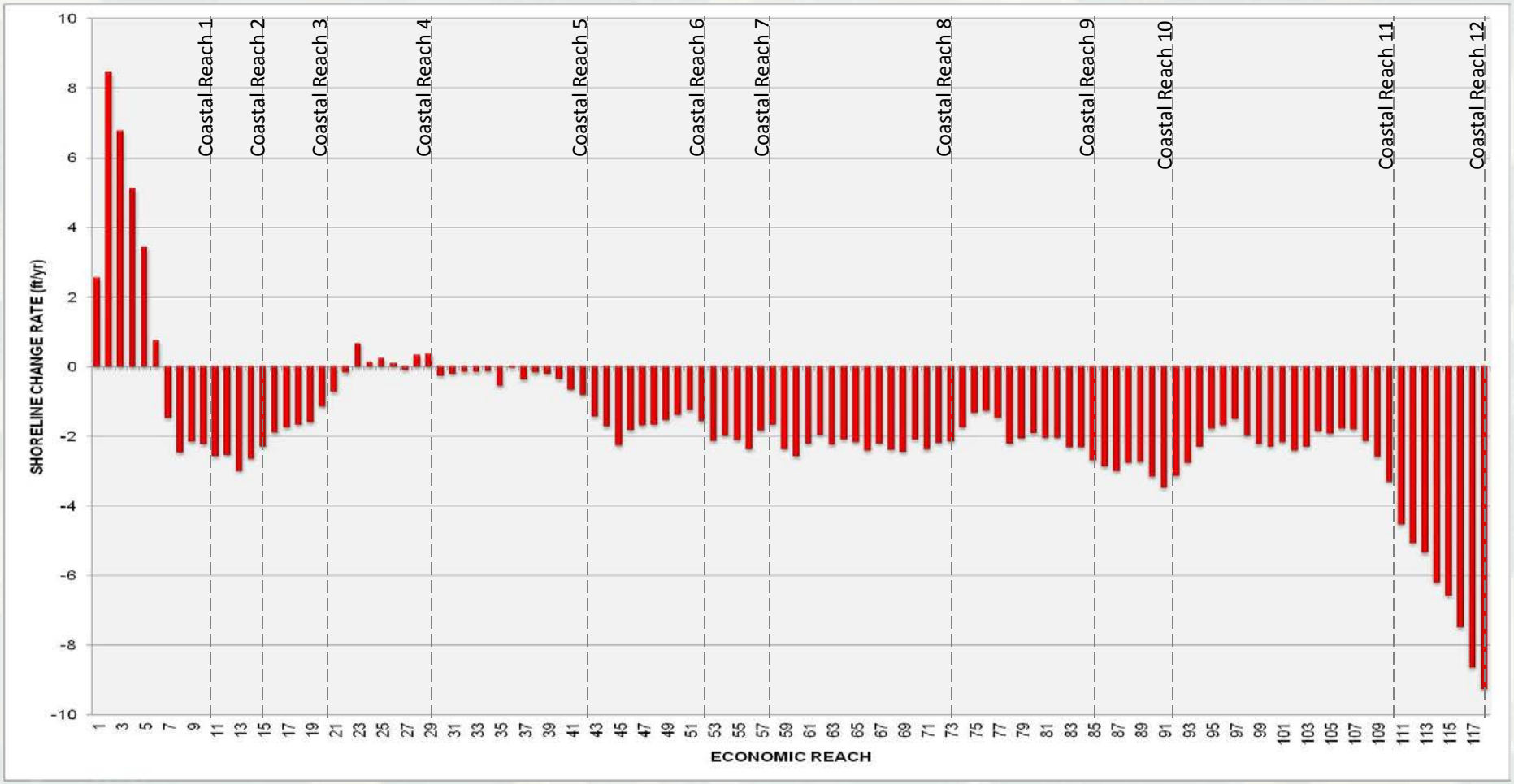
Future Without-Project Condition (FWOP) Assumptions

- FWOP analysis assumes no new beach placement.
  - Local interests are currently preparing a plan for beach nourishment as a contingency/fallback in the event that Federal authorization/ funding is not available when needed.
  - Although some beachfill placement could occur in the FWOP, the timing, location, and quantities are uncertain; therefore, it is impractical to incorporate into numerical modeling scenarios.

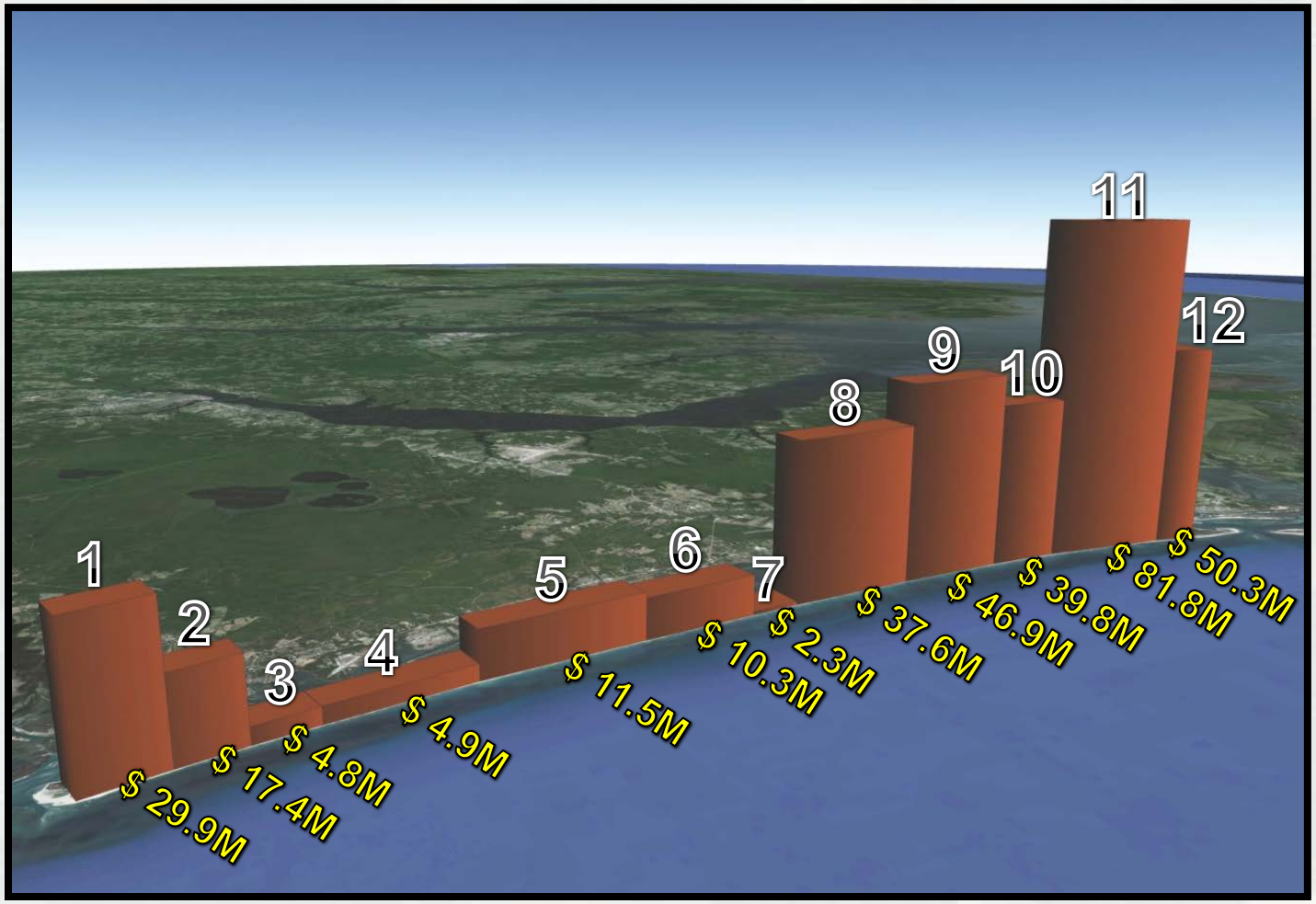
Future Without Project Condition Assumptions (con't)

- FWOP economic analysis assumes no new structures being built on currently undeveloped lots. This is a conservative approach with regards to benefits; additional structures would result in additional FWOP damages, hence increased benefits.
- Analysis considers environmental resource utilization of study area: average 38 sea turtle nests along Bogue Banks (3.6% of State average)

Existing and FWOP Conditions – Shoreline Change Rates



Future Without Project Total Damages



Plan Formulation – Measures

Preliminary measures considered:

- Beachfill (dune and berm combinations)
- Hard structures (i.e., groins, revetments, seawalls).
- Non-structural (e.g. building codes, floodplain regulations, retreat, relocation, demolition).

Plan Formulation – Screening of Measures

Carried Forward

- Beachfill
- Building codes and floodplain regulations
- Demolition and Buy-out

Screened Out

- Hard structures
- Non-structural:
  - Retreat and relocation

Plan Formulation – Array of Beachfill Alternatives

		Existing Condition (2010 profile)			Alternative 1			Alternative 2			Alternative 3			Alternative 4		
		Profiles based on 2010 survey			50 ft berm width throughout project,5-10 ft dune width additions in reaches 2-12, 2 ft dune height addition in Reach 1			50 ft berm width throughout project, 10-20 ft dune width additions in reaches 2-12, 2 ft dune height and 10 ft dune width addition in Reach 1			50 ft berm width throughout project, 20-30 ft dune width additions in reaches 2-12, 4 ft dune height addition in Reach 1			100 ft berm width throughout project,5-10 ft dune width additions in reaches 2-12, 2 ft dune height addition in Reach 1		
Coastal Reach	Economic Reaches	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width
1	1-10	11	95	135	13	95	50	13	105	50	15	95	50	13	95	100
2	11-15	15	15	125	15	25	50	15	35	50	15	45	50	15	25	100
3	16-20	20	5	70	20	10	50	20	15	50	20	25	50	20	10	100
4	21-29	26	25	85	26	30	50	26	35	50	26	45	50	26	30	100
5	30-42	20	25	70	20	30	50	20	35	50	20	45	50	20	30	100
6	43-52	22	15	55	22	20	50	22	25	50	22	35	50	22	20	100
7	53-58	28	90	65	28	95	50	28	100	50	28	110	50	28	95	100
8	59-73	18	100	80	18	105	50	18	110	50	18	120	50	18	105	100
9	74-85	20	30	65	20	35	50	20	40	50	20	50	50	20	35	100
10	86-92	18	100	65	18	105	50	18	110	50	18	120	50	18	105	100
11	93-110	18	10	75	18	15	50	18	20	50	18	30	50	18	15	100
12	111-117	14	40	30	14	50	50	14	50	50	14	60	50	14	50	100

		Alternative 5			Alternative 6			Alternative 7			Alternative 8			Alternative 9		
		50 ft berm width throughout project, no dune additions (berm only plan)			75 ft berm width throughout project, no dune additions (berm only plan)			50 ft berm width throughout project, 20-30 ft dune width additions in reaches 3-12, 35 ft dune width addition in reach 2, 5 ft dune height addition in Reach 1			50 ft berm width throughout project, 20-30 ft dune width additions in reaches 3-10,12, 40 ft dune width addition in reach 11, 6 ft dune height addition in Reach 1			50 ft berm width throughout project, 30 ft dune width addition in reach 2 and 11, 5 ft dune width addition in reach 3, 5 ft dune height addition in reach 1		
Coastal Reach	Economic Reaches	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width	Dune Height	Dune Width	Berm Width
1	1-10	x	x	50	x	x	75	16	95	50	17	95	50	16	95	50
2	11-15	x	x	50	x	x	75	15	50	50	15	50	50	15	45	50
3	16-20	x	x	50	x	x	75	20	25	50	20	25	50	20	10	50
4	21-29	x	x	50	x	x	75	26	45	50	26	45	50	x	x	50
5	30-42	x	x	50	x	x	75	20	45	50	20	45	50	x	x	50
6	43-52	x	x	50	x	x	75	22	35	50	22	35	50	x	x	50
7	53-58	x	x	50	x	x	75	28	110	50	28	110	50	x	x	50
8	59-73	x	x	50	x	x	75	18	120	50	18	120	50	x	x	50
9	74-85	x	x	50	x	x	75	20	50	50	20	50	50	x	x	50
10	86-92	x	x	50	x	x	75	18	120	50	18	120	50	x	x	50
11	93-110	x	x	50	x	x	75	18	40	50	18	50	50	18	40	50
12	111-117	x	x	50	x	x	75	14	60	50	14	60	50	x	x	50

Non-Structural Alternative: Demolition and Buy-out

Assumptions:

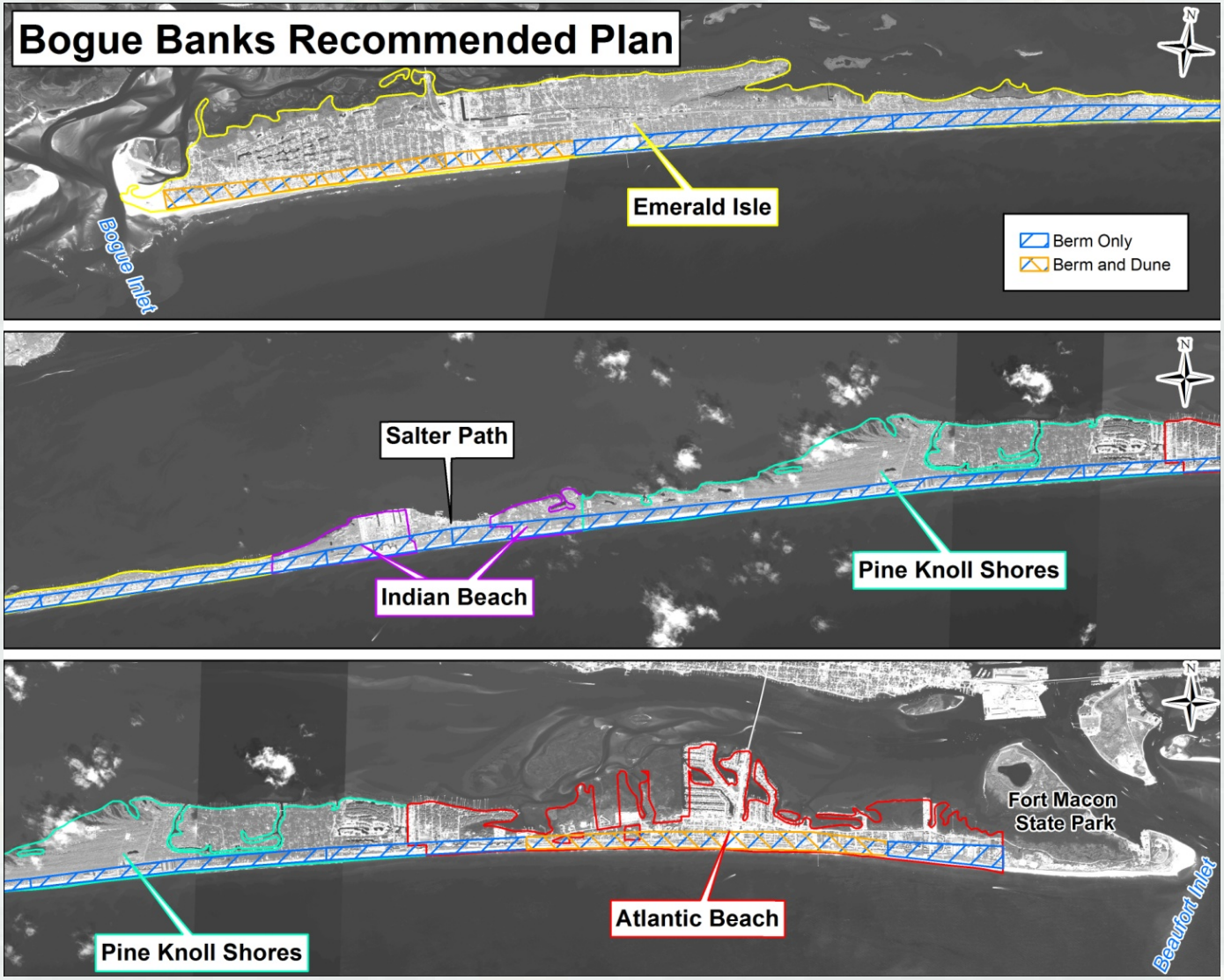
- 100% compliance and buyout and demolition of almost all first-row structures at the start of the project.
- Cost of structure based on replacement cost less depreciation (from structure file)
- Lot acquisition value of $650,000 per lot
- Demolition/removal cost of $100,000 per lot

NED Comparison of Alternatives

Alternative	AA Benefits	AA Costs	AA Net Benefits
No Action	$0	$0	$0
1	$9,600,000	$3,173,000	$6,427,000
2	$10,209,000	$3,564,000	$6,645,000
3	$11,644,000	$4,428,000	$7,216,000
4	$10,493,000	$6,145,000	$4,348,000
5	$8,667,000	$2,715,000	$5,952,000
6	$9,031,000	$4,049,000	$4,982,000
7	$12,022,000	$4,594,000	$7,428,000
8	$12,114,000	$4,770,000	$7,344,000
9	$11,249,000	$3,333,000	$7,916,000
10 (Non-Structural)	$11,080,000	$58,873,000	($47,793,000)

NED Plan is Alternative 9. It is bracketed by both higher and lower cost plans.

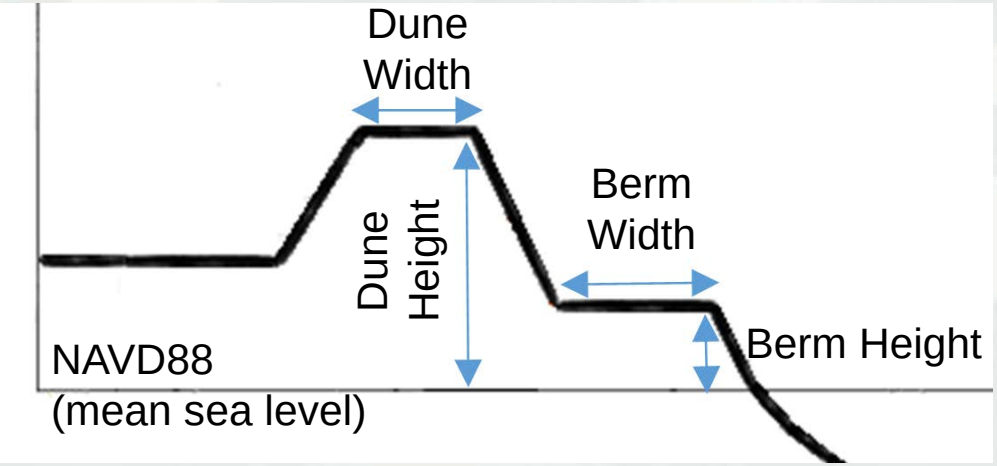
Recommended Plan



Recommended Plan

Reaches	Length (ft)	Landward Dune Slope (X:1)	Max Dune Elevation (ft)	Dune Width (ft)	Seaward Dune Slope (X:1)	Berm Height (ft)	Berm Width (ft)	Berm Seaward Slope (X:1)
4-10	4,876	4	16	95	-4	5.5	50	-15
11-15	5,633	4	15	45	-4	7	50	-15
16-21	6,891	4	20	10	-4	7	50	-15
22-92	82,053	4	x	x	-4	7	50	-15
93-110	15,274	4	18	40	-4	5.5	50	-15
111-117	4,943	4	x	x	-4	5.5	50	-15

Recommended Plan main beach fill dimensions. An “x” indicates that a Federally maintained dune feature is not part of the selected plan in those reaches.



Renourishment Cycle Identification

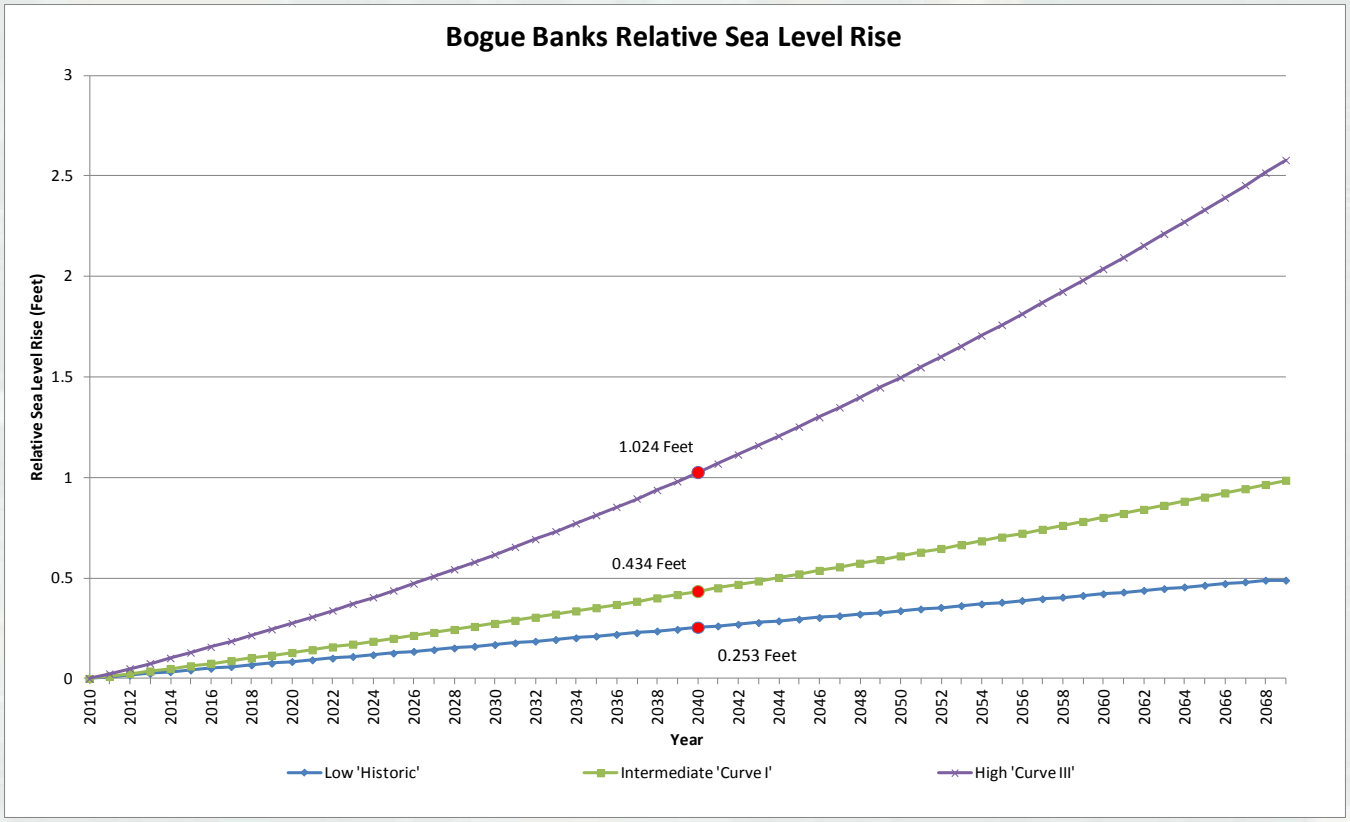
Interval (yrs)	Average Annual Benefits	Average Annual Costs	Average Annual NET Benefits
3	$11,511,000	$4,394,000	$7,117,000
4	$11,277,000	$4,222,000	$7,055,000
5	$11,114,000	$4,076,000	$7,038,000

Comparison of benefits and costs for different renourishment intervals. October 2010 price levels, FY 2012 interest rate (4.000%). Price levels only valid for time of comparison.

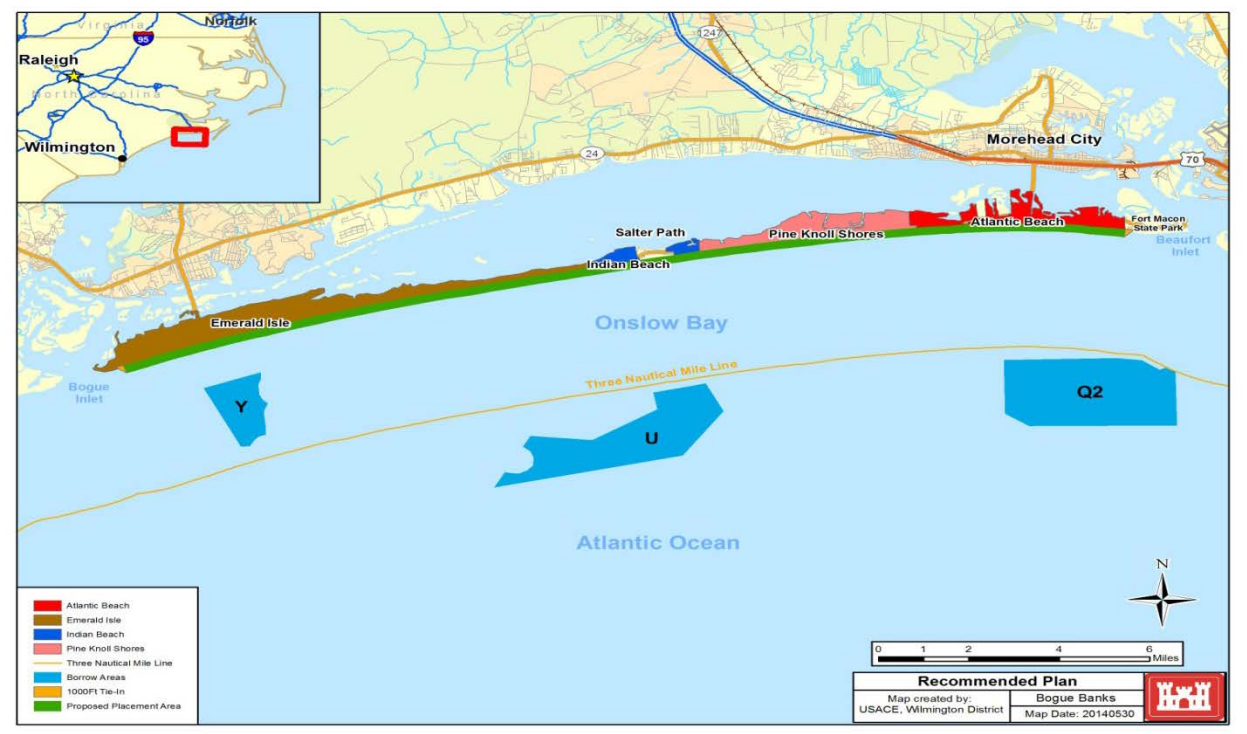
Renourishment cycle economically optimized at 3 years. Cycles of < 3 years were not considered in order to allow for adequate recovery time of borrow areas. As benefits decreased from 3 to 4 to 5 years, renourishment intervals of > 5 years were not analyzed.

Sea Level Rise Analysis

	FWOP Damages (AA)	With Project Damages (AA)	AA Benefit
Historical (low)	$14,497,381	$5,734,856	$8,762,525
Intermediate Rate	$14,676,977	$5,797,386	$8,879,591
High Rate	$14,923,307	$5,879,066	$9,044,241



Borrow Material Availability



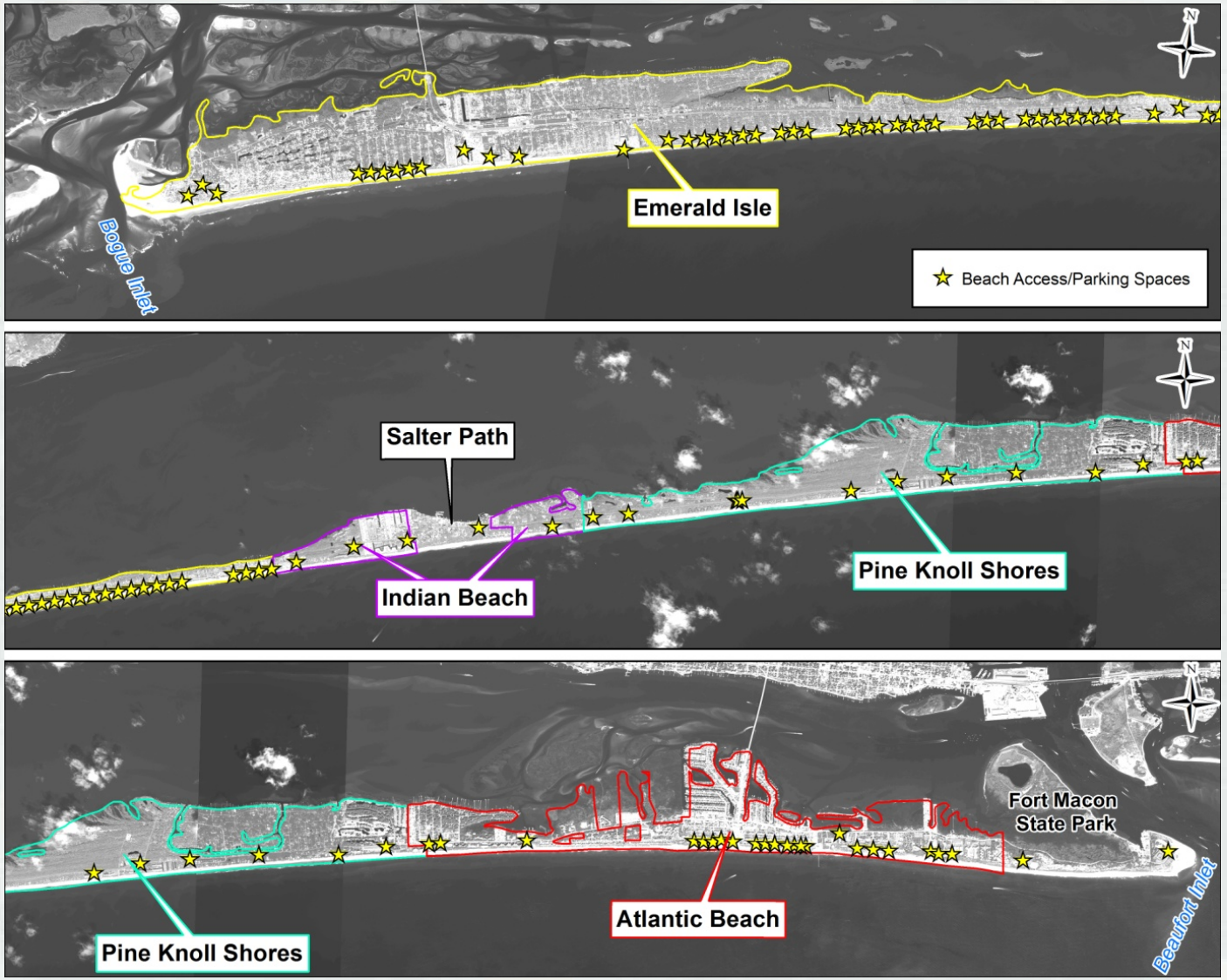
Area	Available Volume (mcy)	50 yr Volume Needed (mcy)
Y	4.6	3.6
U	8.9	6.1
Q2	28.3	9.9
Total	41.8	19.6

NED Plan Costs and Economics

Initial Construction Cost	$37,327,000
Renourishment Cost (per, 16 total)	$14,341,000
AA Cost	$6,065,000
AA Benefits (CSDR only)	$11,688,082
AA Benefits (Recreation)	$3,148,607
AA Total Benefits	$14,836,688
AA Total Net Benefits	$8,771,688
BCR @ 3.5%	2.45 : 1

Oct 2014 price level

Public Access



Parking and Access

Town	Total Parking Spaces Needed for Peak Demand	Current Parking Spaces	Additional Parking Spaces Needed
Emerald Isle	662	529	133
Salter Path/Indian Beach	96	141	0
Pine Knoll Shores	210	180	30
Atlantic Beach	1,100	1,011	89
Total	**2,068**	**1,861**	**252**

109 current access points, 122 needed to meet minimum distribution requirements

Parking and access is currently not sufficient to meet requirements for full federal participation. Sponsor is aware of additional needs and has indicated they can/will provide when project is authorized and funded.

Cost Sharing

Gap analysis (Based on June 2014 Access Points)

- Project Length (proposed) = 22.7 miles
- Gap Total (sum of gaps) = 3.25 miles
- Length of Beach in Compliance = 19.45 miles

FULL ACCESS PARTICIPATION	FEDERAL	NON-FEDERAL
Initial Construction	$24,263,000 (65%)	$13,064,000 (35%)
Renourishment	$114,725,000 (50%)	$114,725,000 (50%)

CURRENT ACCESS PARTICIPATION	FEDERAL	NON-FEDERAL
Initial Construction	$20,789,222 (56%)	$16,537,778 (44%)
Renourishment	$98,296,380 (43%)	$131,153,620 (57%)

Real Estate

- Current RE cost assumes easements would need to be acquired across all affected properties.
- County has already obtained easements throughout most of the project length.
- Feasibility analyses assumed 75% of these easements will meet project requirements.
- Assumption will be validated during PED.

Environmental Operating Principles

- ✓ Foster Sustainability throughout the organization
- ✓ Proactively consider environmental consequences and act accordingly
- ✓ Create mutually supporting economic and environmentally sustainable solutions
- ✓ Continue to meet corporate responsibility and accountability
- ✓ Consider the environment in employing a risk management and systems approach throughout life cycle of the project
- ✓ Collaboratively understand environmental context and effects through leveraging scientific, economic, and social knowledge
- ✓ Open and transparent process that respects views of others

Environmental Compliance

- ☑ Draft EIS prepared and coordinated
- ☑ Endangered Species Act Coordination (USFWS)
- ☑ Endangered Species Act Coordination (NMFS)
- ☑ Essential Fish Habitat Coordination (NMFS)
- ☑ Cultural Resources Coordination (NCSHPO)
- ☑ Coastal Zone Consistency (NCDENR-DCM)

Policy Compliance

- Planning Models: BeachFx (Certified Model)
- Value Engineering(PM) Certification on April 16, 2014
- IEPR certified on April 10, 2014
- ATR Completion certified on April 16, 2014
- Cost Certification received on March 20, 2014
- Legal Certification received on April 17, 2014
- Vertical Datum Compliant

Public and Agency Involvement

- Scoping Letter - September 2012
- Draft Integrated Report released - August 2013
- Ongoing Agency and Public Coordination throughout study

Project Milestones

- Public Review of Draft Report completed in September 2013
- Final Report submitted to higher HQ in April 2014
- CWRB – June 2014
- Public Review of Final Report scheduled for July/August 2014
- Chief's Report – October 2014

Sponsor Support

- Has the financial resources and commitment
- Understands the magnitude of the investment
- Enforces land use control and flood damage prevention ordinances
- Enforces strict building codes adopted by the state for construction in flood zones and high wind areas
- Understands and will accept operation and maintenance requirements
- Is prepared for storm events

Carteret County supports the Recommended Plan because it provides safeguards to homes and businesses, roads, infrastructure, public utilities, tax base, habitat for sea turtles, recreational areas, and because it supports the national and local economy.

Profile of Bogue Banks, N.C.

USACE Civil Works Review Board – 6/27/14

Photo by Chris Laforet

PROJECT NEEDS

PROTECTION OF THESE RESOURCES ARE CRITICAL

Municipalities' Infrastructure/Public Utilities
Recreational Space/Opportunities
Property Tax Base inc. Occupancy Tax
Tourism & Merchant Economy inc. Sales Tax
Sea Turtle Nesting, Bird, & Other Habitat

DEMOGRAPHICS

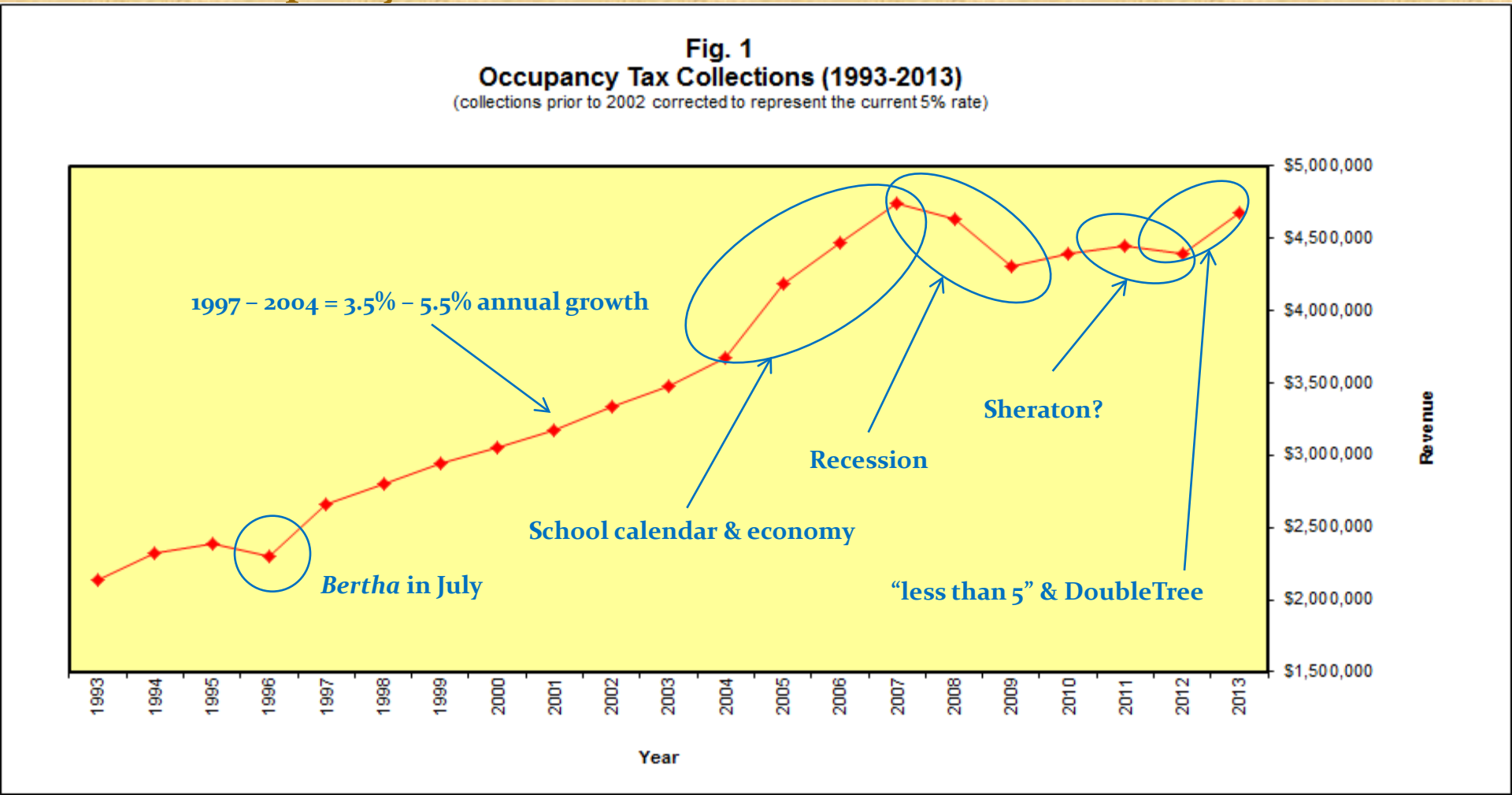
Carteret County population is 67,000.

Emerald Isle's summer population ~40,000 and ~ **80,000** for the island.

Municipalities (year of incorporation)	**Population** (2012)
Atlantic Beach (1937)	1,500
Pine Knoll Shores (1973)	1,351
Indian Beach (1973)	116
Emerald Isle (1957)	3,717

ECONOMIC ENGINE

- ✓ Carteret County ~ $212M revenue for 2012 by beach visitors.
- ✓ Bogue Banks property values are 46% of County total of $14B
- ✓ Occupancy Tax



SPONSOR FINANCIAL COMMITTMENT

OCCUPANCY TAX - 6% on accommodations with 50% of the revenue legislatively-mandated for beach nourishment (~$3 million/yr).

PROPERTY TAX - Municipalities already leverage a nourishment-specific property tax. First implemented to repay bonds.

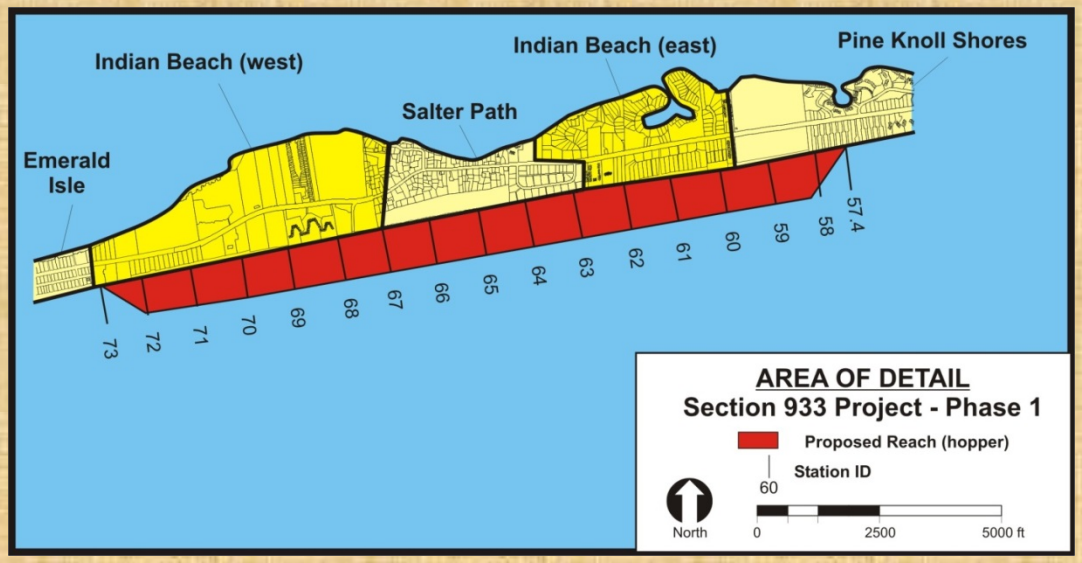
	FY 2013-14		
Municipality	**Oceanfront rate** (per $100 valuation)	**Non-oceanfront rate** (per $100 valuation)	**Estimated total revenue**
Atlantic Beach	$0.0000	$0.0000	$0
Pine Knoll Shores	$0.0520	$0.0140	$316,500
Indian Beach	$0.0850	$0.0325	$282,406
Salter Path (county)	tbd	tbd	tbd
Emerald Isle	$0.0450	$0.0150	$675,000
Average or Total	$0.0364	$0.0123	$1,273,906

North Carolina – in the past, State has provided excellent support (75%).

Local financial resources alone can fund non-federal portion of Project.

PARKING & ACCESS

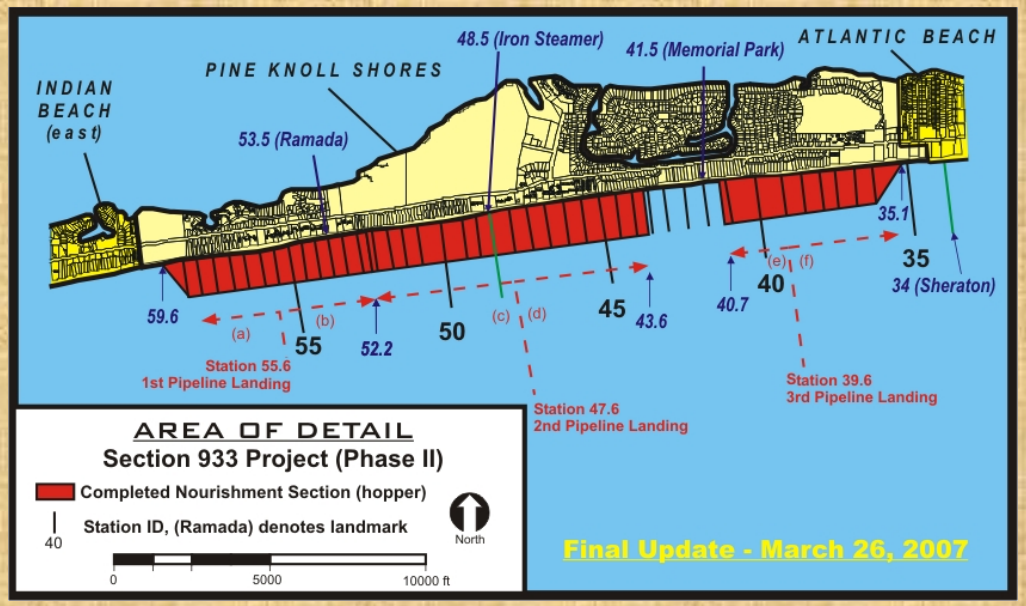
Commitment



SUPERLATIVE TRACK RECORD

Morehead City Harbor Section 933 Project

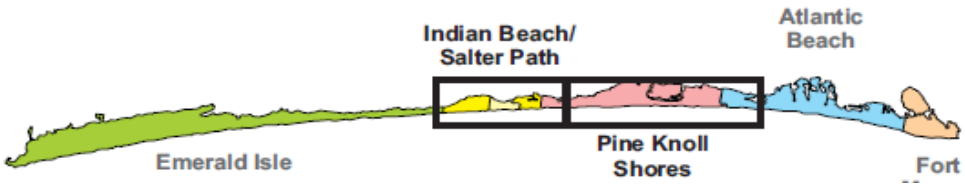
* 9 new accesses/90 parking spaces after the PCA was signed.

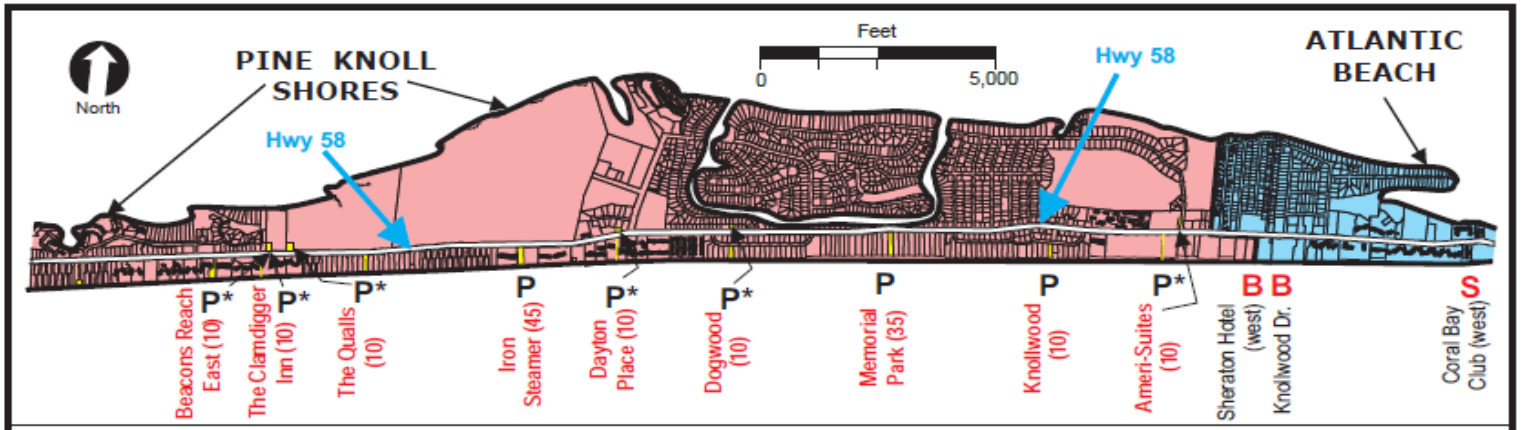


PARKING & ACCESS

Commitment

BEACH PARKING & ACCESS LOCATION MAP
INDIAN BEACH, SALTER PATH, PINE KNOLL SHORES
Bogue Banks, Carteret County





Parking Notes (east to west):

(1) **Ameri-Suites** access is positioned along the western boundary of the Atlantis Lodge, south of Hwy 58 with associated parking located at the intersection of Oakleaf Drive & Hwy 58.
(2) **Knollwood** oceanfront parking (10 spaces) and access, emergency ramp.
(3) **Memorial Park** is an oceanfront facility located west of milepost 6 and includes 35 parking spaces, an overlook deck, and a picnic table.
(4) **Dogwood** includes an oceanfront wooden walkway with an associated wood fenced parking lot located across the street along Hwy 58.
(5) **Dayton Place** includes an oceanfront walkway with associated parking located across the street on Hwy 58 near the Fire/EMS building.
(6) **Iron Steamer** is a regional, oceanfront area (45 parking spaces) located just west of the former Iron Steamer fishing pier, near milepost 7.5 and includes a bathroom facility, showers, etc.
(7) **The Qualls** includes an oceanfront walkway within the Beacons Reach/Maritime West subdivision and associated parking located 0.25 miles west of the access, situated across Hwy 58, near the Clamdigger Inn.
(8) **The Clamdigger Inn** - Parking (20 spaces total) is within a gated public complex located north of Hwy 58 at the Clamdigger Inn. The walkway to the beach is located across the street, on the south side of Hwy 58, west of the Clamdigger.
(9) **Beacons Reach East** ocean side access with associated parking east of the access at the Clamdigger Inn.

PARKING & ACCESS

Commitment

REGIONAL Accesses w/ 50 - 100+ parking spaces and showers & other amenities.

NEIGHBORHOOD Accesses accommodates visitors that multiple rentals units

Rights of Way owned by Municipalities can easily accommodate new parking

Uniquely Prepared for Storm Events

- Municipalities' Flood Damage Prevention Ordinances
- Carteret County Shore Protection Office – 1st in State. Unique legislatively-mandated Beach Commission guiding shore protection efforts
- CodeRED telephone communication service. Cable TV access, weather channel, & large electronic DOT sign at bridge
- Carteret County Control Group – Mayors, Managers, Schools, EM, Law enforcement meet to discuss storm preparation plans as conditions change
- Coordination of Emergency Shelters, Evacuation and Reentry
- Annual review of Tropical Storm and Hurricane Evacuation Plans
- EOC Training for All Emergency Personnel
- N.C. Emergency Management Certification Program for Department Heads and Staff
- WebEOC.org – information portal for all communities
- Municipal and County Websites/Newsletters
- Mutual Aid Agreements with inland Emergency Agencies

Construction/Storm Mitigation Standards

5 year Update, & Adopted Hazard Mitigation Plans.

Enforcement of N.C. State Building Code requirements for construction in a VE Flood zone and 130 MPH exposure C.

All structures are elevated on engineer designed foundation systems to meet the requirements for high velocity wave action and scour/erosion effects.

Municipal Vegetation Ordinances.
(e.g. - total land coverage minimums, tree diameter thresholds, etc.)

Pre-permitting and plan review for all structures.

No municipal sewer – constrains density/eliminates chance for catastrophic failure.

Building height restrictions in residential and business zones to minimize windborne debris hazards.

More restrictive standard for coastal A zones to comply with VE zone standards.

No living space below 100-year flood elevation.

N.C. Division of Coastal Management administers one of the most progressive oceanfront setback policies in the U.S.

Municipalities participate in the National Flood Insurance Program Community Rating System **(CRS)** - Carteret County **(8)**, Atlantic Beach **(8)**, Pine Knoll Shores **(6)**, and Emerald Isle **(7)**.

SUMMARY

COMMITTED to PROTECTION of …

…National economy
…Property inc. Tax Base
…Municipalities' Infrastructure/Public Utilities
…Recreational Space/Opportunities
…State and local Tourism & Merchant Economy
…Habitats of Sea Turtles, Birds & Other

Through…
- FUNDING via Occupancy Tax
- ACCESS/PARKING
- HAZARD RESPONSE, PREVENTION, & MITIGATION

SAD DIVISION COMMANDER

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

Strategic Value

- Coastal flood risk management projects provide a significant value in reducing damage and reducing the recovery effort. This project provides a 62% damage reduction to structures valued at approximately $714,800,000
- Economic benefit (BCR 2.45) provides value to the nation, with average annual net NED benefits of $8,700,000
- The recommended plan includes non-monetary, yet significant incidental benefits related to life-safety and the protection of important habitats
- Fully supported by community, state, and Federal agencies

Feasibility Report is Legally and Policy Compliant

- ATR conducted by CSRM-PCX, all comments resolved, and ATR certified
- IEPR completed and certified
- Cost DX certified/VE completed/BeachFx used for Economic modeling

Quality Assurance: continuous involvement in the formulation and evaluation of this project throughout the Feasibility Study.

A Team Effort: Thanks to the entire team (internal and external, horizontal and vertical)

Bogue Banks

Carteret County, North Carolina
Coastal Storm Damage Reduction Study

Civil Works Review Board
27 June 2014

Agency Technical Review (ATR)

Ms. Barbara Blumeris – ATR Leader
National Planning Center of Expertise for Coastal Storm Risk Management

US Army Corps of Engineers
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ATR Team

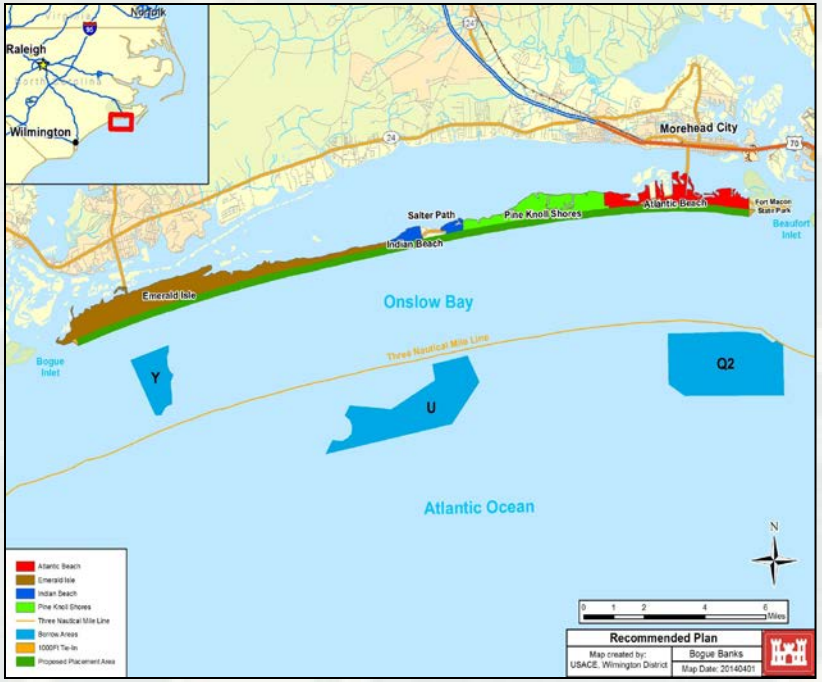
Team Member	ATR Role	Corps of Engineers Office Symbol
Barbara Blumeris	ATR Team Lead/Plan Formulation	CENAE-EP-PB
Ed O'Leary	Risk Analysis and Economics	CENAE-EP-VC
David Schulte	Environmental and NEPA Compliance	CE-NAO-WR-PE
Christina Rasmussen	Coastal and Geotechnical Eng.	CENAN-EN-EH
Adam Oesterich	Real Estate	CENAB-RE-C
Jim Neubauer, P.E. (Cost MCX)	Cost Engineering	CENWW-EC-X

ATR Scope/Charge

- **Reviews completed for:**
  - AFB Draft Integrated Feasibility Report & Environmental Impact Statement and Appendices, dated November 2012, 47 comments.
  - Final Integrated Feasibility Report & Environmental Impact Statement provided for review February 2014, 15 comments.
  - MCX Certification dated 20 March 2014.

ATR Overview
March 2014

- Environmental Compliance
- Economics
- Coastal Engineering
- Real Estate



All comments resolved and closed out.

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Bogue Banks

Final Integrated Feasibility Report and EIS

Agency Technical Review was completed in April 2014 and certified in accordance with EC 1165-2-214.

Independent External Peer Review (IEPR) Integrated Feasibility Report and Environmental Impact Statement (EIS) for Bogue Banks, Carteret County, North Carolina

Presented to the USACE CWRB on June 27, 2014

Karen Johnson-Young, PMP
Program Manager

Julian DiGialleonardo
Project Manager

IEPR - Panel and Schedule

Bogue Banks Panel Members	Panel Discipline
David Bastian, P.E. (Panel Lead)	Economics and Civil Works Planning
Kris Thoemke, CEP, Ph.D.	Biology/Ecology
Jennifer Irish, P.E., Ph.D., D.CE	Coastal Engineering

Bogue Banks IEPR was conducted September 2013 – April 2014

- The Panel reviewed the August 2013 version of the review documents.

IEPR Bottom Line Up Front

The Panel agreed with the actions presented by the PDT to address the Final Panel Comments.

IEPR - Results

Final Bogue Banks IEPR Report submitted on December 4, 2013

Bogue Banks IEPR Final Report Results:

- 9 Final Panel Comments
  - 3 high significance
  - 5 medium significance
  - 1 low significance

Post-Final Panel Comments/Response Results documented on April 8, 2014

Bogue Banks IEPR Results:

- PDT Evaluator Responses to Final Panel Comments
  - 6 concurs, 3 non-concur
- Panel BackCheck Responses to the PDT Responses
  - 9 concurs

IEPR - Notable Findings

1. Limiting the Beach-fx storm population to those storms that have historically affected the area was not consistent with contemporary methods, and by excluding plausible storm events potential failure of the beach and related consequences may not have been fully evaluated.

2. The uncertainties in the coastal engineering numerical modeling inputs and outputs are not presented and were not considered in the economic analyses and carried through to the benefit-to-cost ratio (BCR).

3. The Planform Evolution Model used to predict beach-fill evolution and renourishment interval was not validated for use in the study area.

4. The screening of non-structural alternatives from the areas of highest economic damage was not presented and it was unknown if the full array of non-structural alternatives was considered.

Summary

The Panel agreed with the actions presented by the PDT to address the Final Panel Comments.

HQUSACE REVIEW CONCERNS

Civil Works Review Board

Bogue Banks, Carteret County, North Carolina
Final Integrated Report/EIS

Jeremy LaDart
Office of Water Project Review
Planning and Policy Division
Washington, DC – 27 June 2014

US Army Corps of Engineers
PLANNING SMART
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HQUSACE Team Reviews:

- AFB was held May 2013
- Public Review/HQ Review of Draft Report August 2013
- Review of Draft Report completed September 2013
- Final Report Submitted to HQ May 2014
- Back check of remaining outstanding comments completed June 2014
- Final Integrated Report/EIS HQUSACE review completed

Policy Issues from Draft & Final Report Reviews

- Future Without Project Assumptions
- Constraints
- Non-Structural Evaluation
- Price Level & Discount Rate
- Borrow Area Availability
- **Public Parking and Access Requirements**
- Section 404 Clean Water Act
- Section 401 Water Quality
- LERRD Costs
- Items of Local Cooperation
- Sponsor Letter of Intent and Statement of Financial Capability

Parking and Access Requirements

CONCERN: The draft report recommended full Federal cost share, however the entire length of the project currently does not have sufficient parking and access to meet policy.

REASON: USACE Guidance (ER 1105-2-100 and ER 1165-2-130) requires shoreline projects be open to all on an equal basis. This is defined as public access points every ½ mile and parking within ¼ mile of access points that sufficiently meets peak recreation demand. If this minimum is not met, Federal participation in those lacking areas is prohibited.

RESOLUTION: The sponsor has agreed to provide the necessary parking and access prior to signing the Project Partnership Agreement or the cost share will be adjusted accordingly. The report recommends full cost share and also shows, as a sensitivity, what cost share would be under existing conditions.

RESOLUTION IMPACT: Concern Resolved.

HQUSACE POLICY REVIEW TEAM RECOMMENDATION

Release the Final Integrated Report/EIS for State & Agency Review.

Bogue Banks

Carteret County, North Carolina
Coastal Storm Damage Reduction Study

Civil Works Review Board
June 27, 2014

Lessons Learned

COL Steven Baker
District Commander, Wilmington District

Presented by
U.S. Army Corps of Engineers
South Atlantic Division
Wilmington District

SAW Lessons Learned

- Coastal Storm Damage Reduction is a challenging mission area
  - Variable funding levels interrupt complex modeling analyses
  - Parking and access sensitivity
- Proactive vertical team engagement throughout entire process is key to success
- Coordination of impacts from policy changes
  - Impacts to resources, time & cost of study
  - Disconnect between Planning and Engineering policy (study completion requirements vs modeling)