

# *Inlet Management*

## *Village of Bald Head Island*



**Charles S. Baldwin, IV**

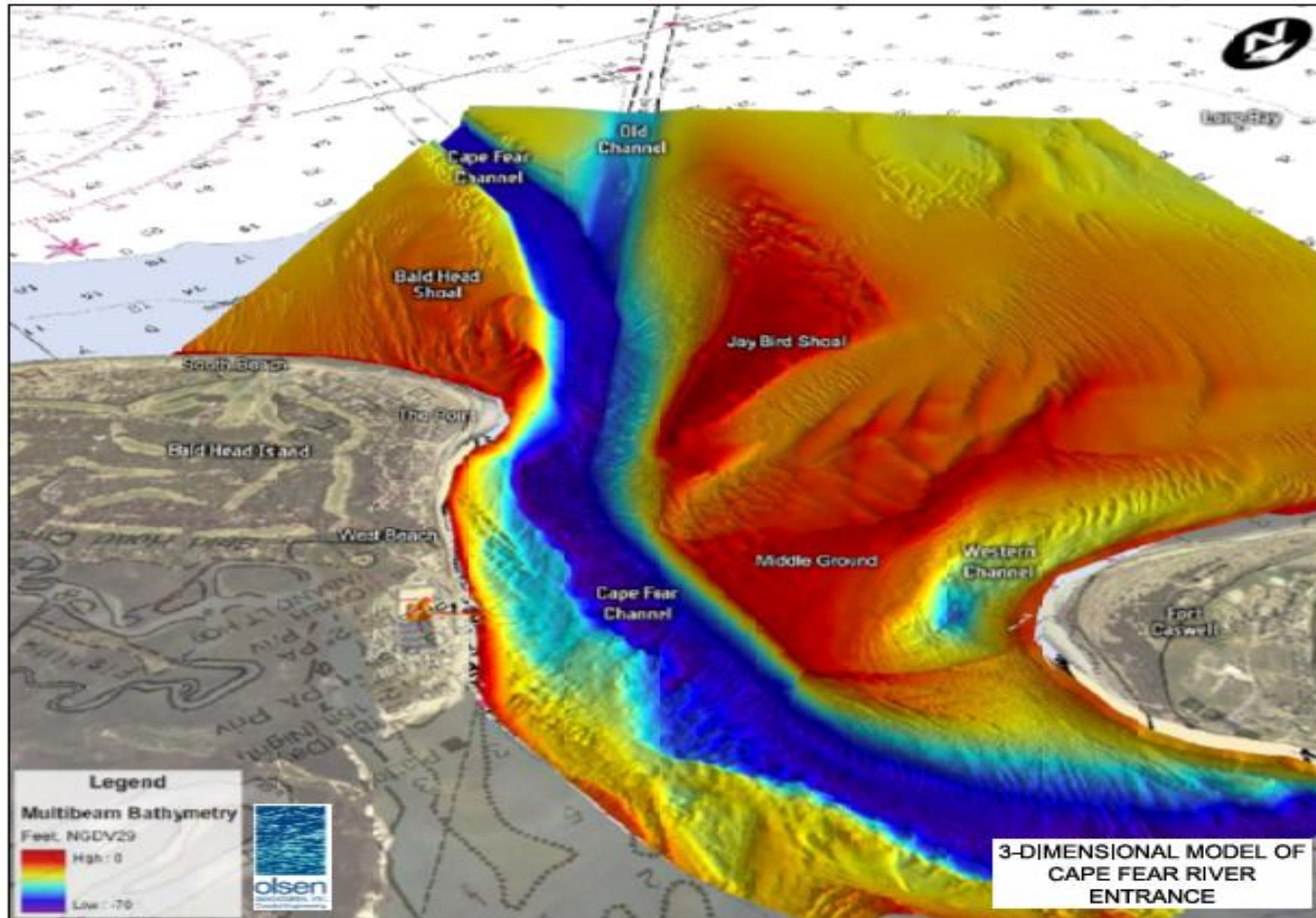
**Brooks Pierce**

**Village of Bald Head Island**

**March 26, 2014**

***Doc # 894238***

# Channel is Dominant Influence: *Bathymetry*







BROOKS  PIERCE  
FOUNDED 1897



24 Nov. 2008



24.11.2008 12:38

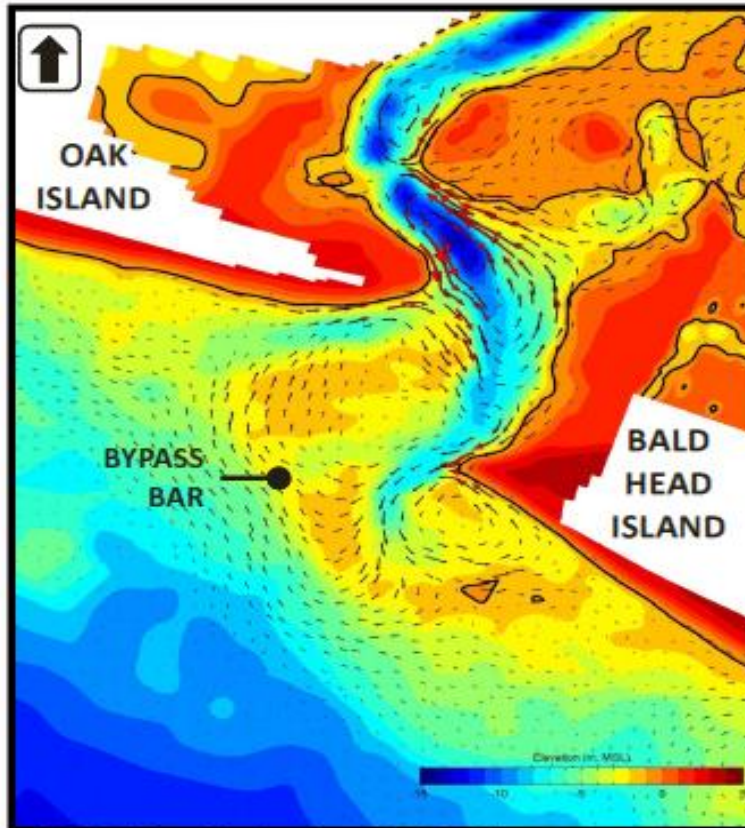
# Channel is Dominant Influence



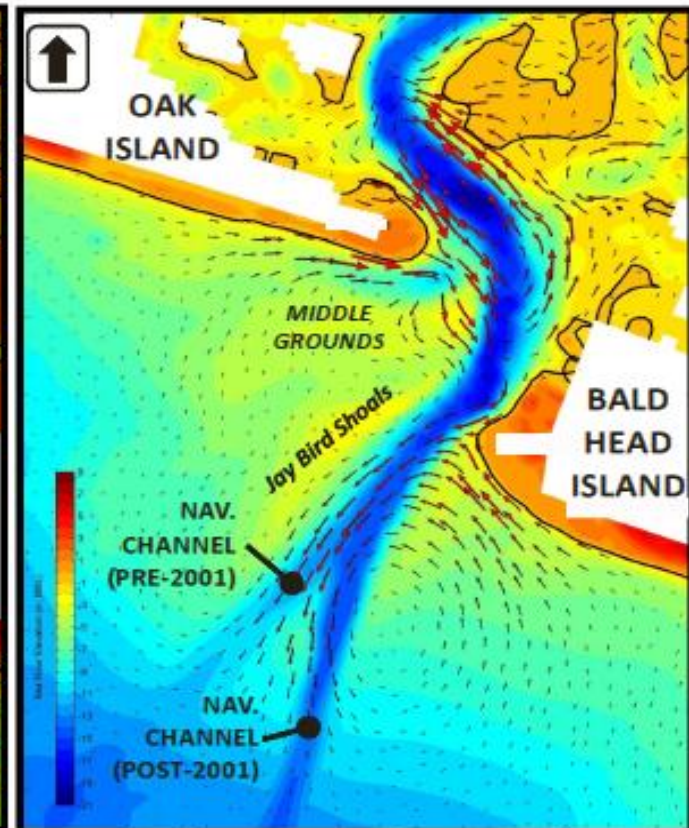
- *Channel bifurcates the natural sand by-passing system*
- *Channel increases water flow and rate*



# Channel Locations



1865 (Pre-Navigation Project)



2005/06 (Post-Navigation Project)

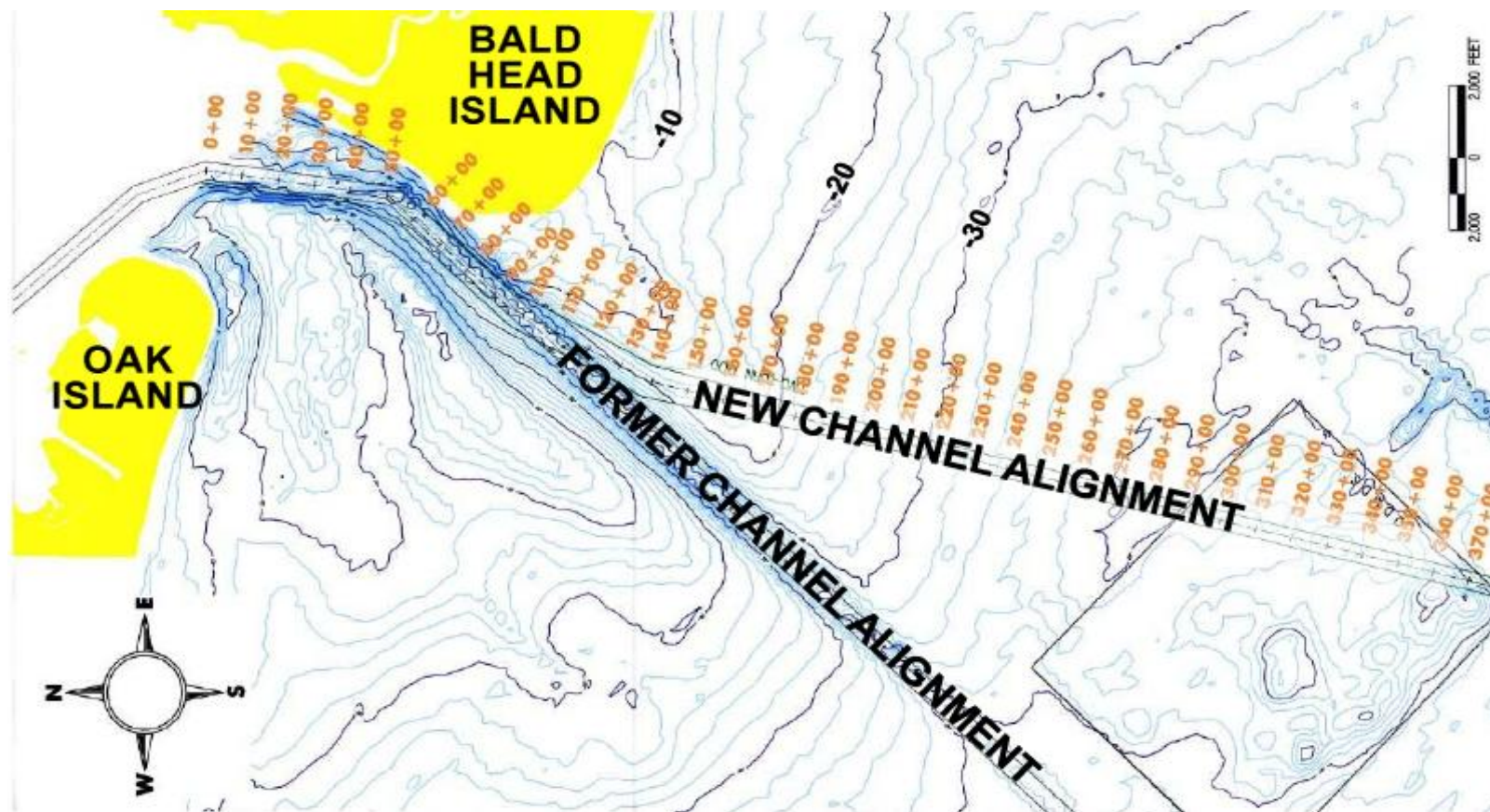
Navigation Project induced morphological changes at the Cape Fear River Entrance.



# Engineered Channel Location

- Channel is maintained in a particular location
  - Natural inlets migrate
- New Channel alignment (2000-present) cuts through Bald Head's protective shoals





# Engineered Channel Location

- Cape Fear Inlet is characterized by episodic maintenance dredging activities
  - On going and high erosion rates
  - Shifting and evolving shorelines



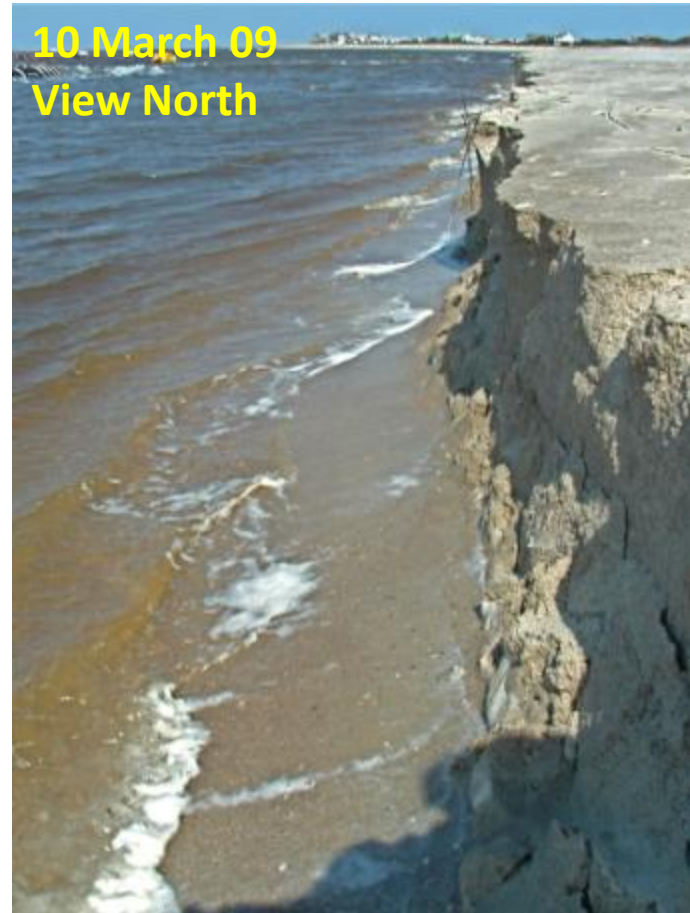
# Accelerated Erosion Rates



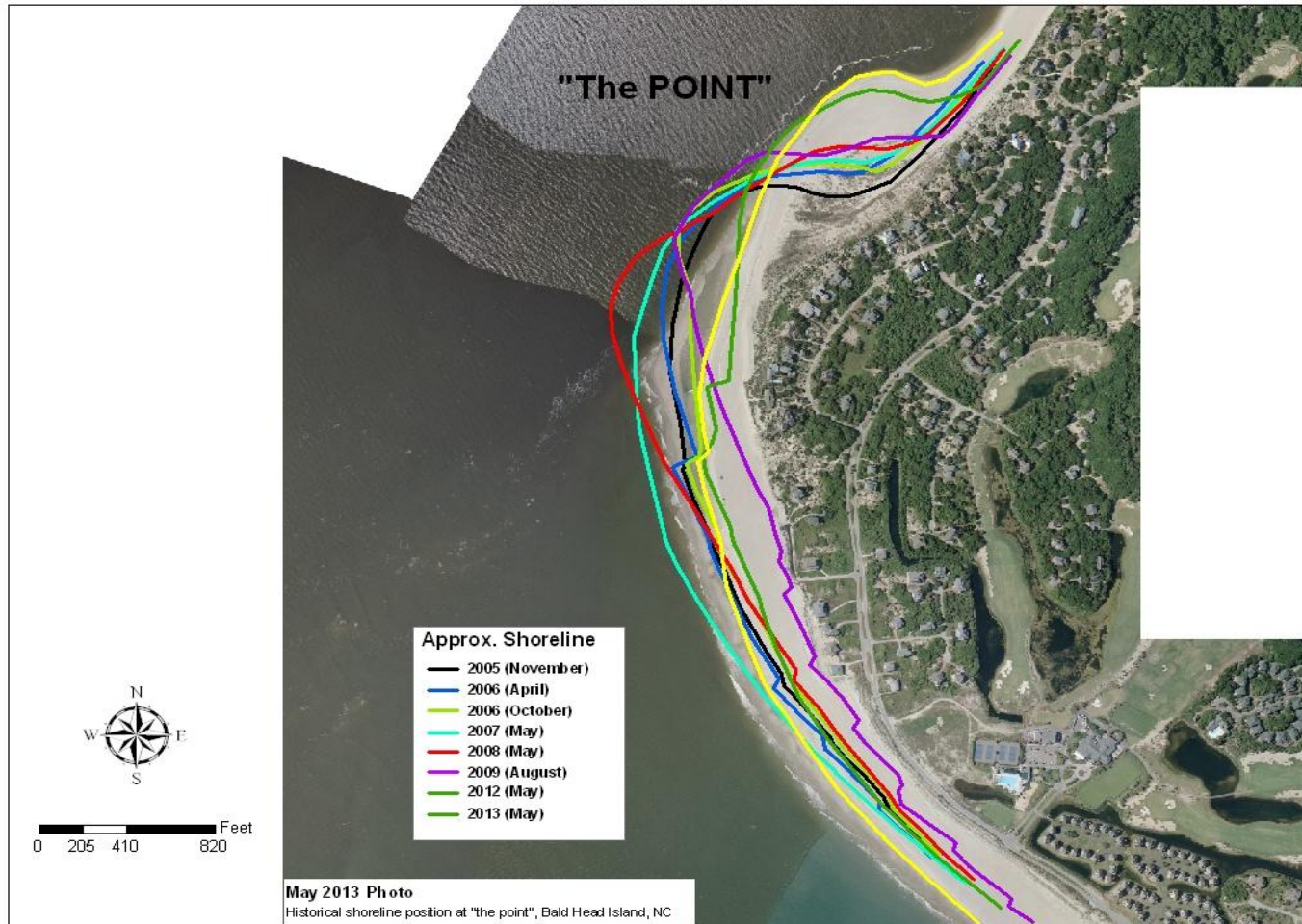
10 March 09  
View South



10 March 09  
View North



# Erosion at 'The Point'



Erik Olsen  
chronology  
2005 - 2013



- *Beaches come and go with sand removal and placement from maintenance dredging*





2004 11 10



2004 11 9



BROOKS  
PIERCE  
FOUNDED 1897



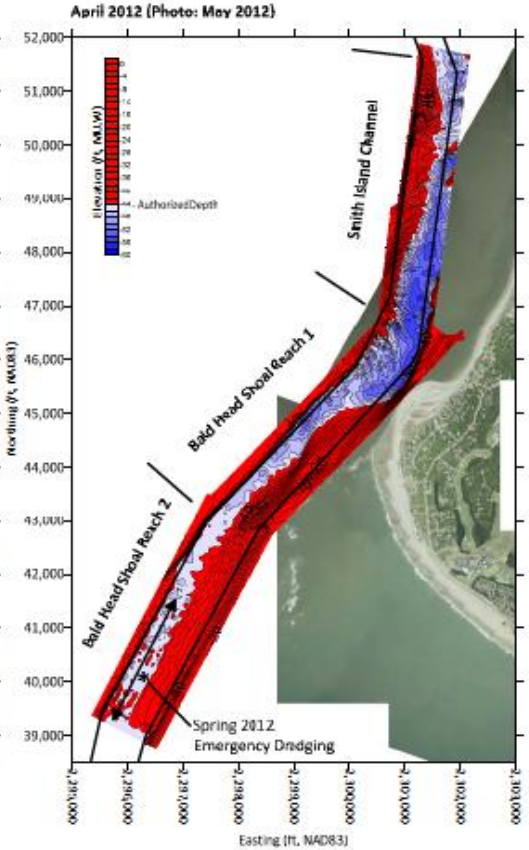
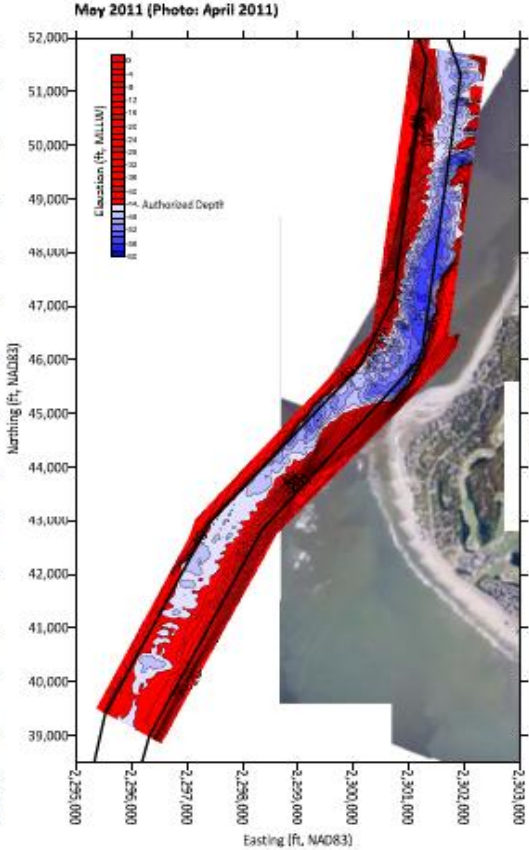
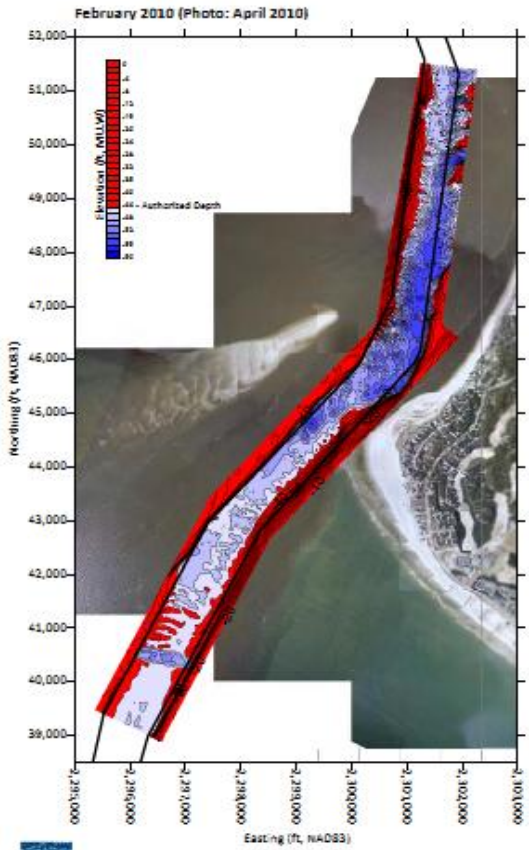


BROOKS  PIERCE  
FOUNDED 1897



- ***Beach erosion/Channel shoaling affects the Channel's performance, State Ports Authority operations, and Channel maintenance.***

# Channel Shoaling



Capt. For River Entrance  
Channel Conditions Surveys (COE)  
(Feb. 2010 - April 2012)





# Survey Data

- Bald Head Island (as of May 2009) had received well in excess of 4.04M cubic yards of beach fill placement since 2001 on South Beach alone.
- Of that amount, by the COE's surveys, only 118,000 cubic yards remained Island-wide as of May 2009.
- The Village of Bald Head Island surveys between May 2009 and September 2009 document an additional volumetric erosional loss at South Beach in excess of 550,000 cubic yards.



# Local Financial Impacts

- Village has spent over \$22MM to mitigate erosion

<b>BHI Expenditures Related to Mitigation</b>	
• Engineered Beach Project 2009/2010	
• Dredging Contract	\$ 14,800,000
• Interest Expense	\$ 1,536,000
• Permitting – <i>Land Management Group, Inc., Olsen Associates, Inc., Legal</i>	\$ 1,000,000
• Sand Filled Geotextile Groinfield	
• 1995	\$ 320,000
• 2005	\$ 850,000
• 2009/2010	\$ 1,150,000
• Road Overwash	
• South Bald Head Wynd Road Repair 2004	\$ 250,000
• Sandbag Revetment Wall	\$ 250,000
• Sandpiper Trail Sandbag Wall + 2009 Repairs	\$ 65,000
• 2007 Sand Placement (Assist USACOE- limited funds)	\$ 900,000
• Periodic Beach Profile Monitoring	\$ 595,000
• Required Jay Bird Shoal Biological Monitoring per Permit	\$ 43,340
• Required Beach Front Biological Monitoring per Permit	\$ 16,200
• Install Emergency Sandbag Revetment at the Point	\$ 230,000
• Repair & Maintenance of Revetment at the Point	\$ 8,000
• BH Creek 2006 dredging Project w/ sand placed on West Beach	\$ 737,858
<b>Total</b>	<b>\$ 22,751,398</b>
<b>Additional Expenditures Reimbursed through FEMA Public Assistance Funds</b>	
• Bald Head Creek Dredging Project (Emergency Sand Source to mitigate Erosion due to Hurricane Irene)	\$ 1,230,000
• Sand-filled Tube Groin Field Repairs due to Hurricane Irene	\$ 650,000
	<b>\$ 1,880,000</b>
<b>Additional Expenditures Reimbursed through State of NC/DENR Water Resources Development Grant Funds</b>	
• Bald Head Creek Dredging Project 2006 (Southwind Construction Co.)	\$ 260,000



- ***Existing relationship with coastal regulatory agencies***
  - Erosion crisis-driven
  - Time sensitive
  - Variances/contested cases
  - Legalistic
  - Expensive
  - Untimely
  - Uncertain outcomes



- ***Existing coastal regulations***
  - Reactive
  - Limited toolbox
  - Overlapping IHA and OEA
  - One size fits all
  - Inflexible
  - Long time periods
  - Inadequate



# Inlet Management Paradigm

- Collaborative/cooperative
- Flexible
- Engineering based problem-solving
- Staff level resolutions
- Efficient
- Effective
- Anticipatory, not reactive





# New Regulations

- IHA and OE AECs are replaced by single AEC
- Existing regulations continue to apply at BHI outside of AEC
- Commission to recommend that General Assembly enacts exception for new AEC from G.S. 113A-115.1, "Limitations on erosion control structures" and subjects those structures to Commission jurisdiction within AEC



# New Regulations

- CRC (and DCM staff by delegation) may permit structures or actions (rock groins, terminal structures, breakwaters, jetties, sandbags, sand push, beach sand placement project, etc.) to mitigate channel-induced erosion that are otherwise prohibited by 15A NCAC 07H.0308 or other CRC regulations
  - Permit process allows agency review and public input but contains efficient timelines
    - Allows expedited process/timeline upon demonstration of emergency

# Beneficial Use of Dredged Materials



“One cubic yard of removal equals one cubic yard of erosion.”



# Beneficial Use of Dredged Material

- “(h2) Clean, beach quality material dredged from navigation channels within the active nearshore, beach or inlet shoal system. This dredged material shall be disposed of on the ocean beach or shallow active nearshore area where it is environmentally acceptable and compatible with other uses of the beach.”  
N.C.G.S. §113-229 (h2).



# Beneficial Sand Use

- “Sand is a resource to both beach communities and the environmental communities that make the coastal zone home. Sand should be managed because it has value both nationally and regionally. The Corps practice of disposing of beach-quality sand in offshore dredged material disposal sites is poor management of a limited resource”. USACE, WH DMMP, Alt. Formulation Briefing, p. 92 (Oct. 2007).



## Beneficial Sand Use

- “This practice removes sand from the littoral system and essentially ‘throws it away’ without regard to environmental consequences on adjacent shorelines or other economic benefit. Regional Sediment Management (RSM) is the principle of managing the valued sand resource in a way that is beneficial (or at least not damaging) to the region.” USACE, WH DMMP, Alt. Formulation Briefing, p. 92 (Oct. 2007).



# Beneficial Sand Use

- North Carolina adopted a set of policies in 1992 and statutes in 1993 and 2002 designated to insure that beach quality sand not be removed from the active beach system.
- Policies incorporated in NC Coastal Management Program and in consistency review of federal activities under Federal Coastal Zone Management Act of 1972.



# Dredging Windows/Moratoria

- Some projects, such as terminal groin (where fillet must be filled at construction) must be constructed outside window.
- We support variance or reduction of dredge windows in appropriate circumstances.
- Positive inlet management benefit to federal and state interests.



# Dredging Depths & Sediment Criteria Rules



- Flexibility should be considered in application where sand sources are used to mitigate inlet impacts – e.g., where sand volume requirements exceed those associated with beach disposal alone.



# Channel Realignment Projects

- Where federal project channels for commercial use are proposed for realignment, such measures shall be subject to extensive study including but not limited to appropriate numerical modeling. Note – none was done at the entrance to Cape Fear River prior to the last deepening.
- Project mitigation should be required.

# Development Standards/Erosion Setbacks



- Regulations should address circumstances where developed lots adjacent a navigation channel will receive sand on an ongoing basis. In some cases, what has eroded will be restored.
- Further study is needed.

# Volumetric Triggers for Beachfront “Static Lines”



- Further study is needed.



# Emergency Permitting: Bulldozing & Sandbags

- We support an increase in flexibility in emergency circumstances for more timely and effective responses.
- More efficient and timely procedures are needed.



# Terminal Groins and Sand Bypassing

- We support an increase in flexibility, to incorporate sound coastal engineering and advances in techniques and materials.
- Appropriate structures in a particular location may include a combination of terminal groins, t-head groins, breakwaters and jetties.

# Erosion Rate Calculations for Inlet Hazard Areas



- The Inlet Hazard Areas have proven ineffective and arbitrary.
- IHAs should be replaced with a new AEC or regulations.
- Further study is needed.

# Monitoring Conditions Associated with Projects



- Monitoring requirements should not be so onerous as to prohibit what has otherwise been authorized.
- The amount of monitoring on projects should be reasonable and consistent with CAMA objectives, including environmental and economic balancing.
- Village monitored Jay Bird Shoal and Bald Head Creek for 4 years with NO negative impacts from pre-project baselines.





# Dune Creation

- Village supports efforts to create protective dunes, such as sand-placement and sand-push.



***Proactive Inlet Management is in the best interests of the State, environment, Ports Authority operations, commerce, property owners, beaches and recreational resources.***



# Inlet Management

- Determine process and actions needed:
  - Shoreline erosion rates, change rates with inlet processes
  - Causes of impacts
  - Determine healthy sediment sand budget
  - Identify sand sources
  - Allocation of sand sources based upon mitigation, environment, structures, etc.



# Inlet Management

- Unique inlet management plan for each inlet
- Dedicated source(s) of funding for inlet management
- Contingency plans
- Cooperation of other agencies and stakeholders
- Permits
- Other?

# *Inlet Management*

## *Village of Bald Head Island*



**Charles S. Baldwin, IV**

**Brooks Pierce**

**Village of Bald Head Island**

**March 26, 2014**

***Doc # 894238***