



*Effective Management of Coastal Barrier Islands in a Challenging Future  
Workshop, May 2-5, 2010*

**Sponsored by the Coastal Barrier Island Network (CBIN) of the National Science Foundation (<http://www.coastalbarrierisland.org/>), and the Bald Head Island Conservancy (<http://www.bhic.org/>)**

### **Summary**

The Coastal Barrier Island Network (CBIN) is an interdisciplinary research group dedicated to creating a research-management-outreach framework for sustainable management of barrier island systems in a changing environment. In early May 2010, CBIN had their third meeting at the Bald Head Island Conservancy (BHIC), a non-profit organization whose mission is barrier island conservation. The BHIC is located within the Smith Island complex that includes Bald Head Island, a barrier island where residential development is blended with the natural environment. Bald Head Island is currently addressing local and regional concerns regarding sustainability in the face of increased development and the threat of increasing impacts due to global warming. The location of the meeting presented the opportunity to discuss management strategies for barrier island sustainability from a more localized perspective that faces continued anthropogenic development and the potential for sea level rise and increased storm activity in the future.

The meeting was held May 3 – 6, 2010 and included two days of round-table discussion, attended by coastal scientists, policy-makers, BHIC personnel, and Bald Head Island Village employees, in addition to an open panel discussion with Bald Head Island and nearby residents. As a result of this meeting, six general themes emerged (discussed in detail below).

## **1. Managing for future global climate change**

Barrier islands and coastal systems are threatened by future global climate change, primarily from a predicted increase in sea level and increase in extreme episodic storm event frequency and intensity. It was suggested that the impacts of sea level rise on coastal systems may be adaptable, mainly due to the time scale, but if storms become more intense, it may swamp the effect of sea level rise. For future management of barrier islands, it is imperative that there is a basic understanding of current and future processes, and what the thresholds are for barrier islands. Management strategies will be most likely need to be a continual process, and it may not be economically feasible to continue management of the entire coastline (e.g. renourishment projects). Thus, future management in the face of global climate change will include decisions of which islands are management priorities and which islands need be left to natural processes.

## **2. More science is needed**

It was emphasized that more scientific research is needed determine the complex interaction of geomorphology, biological, and hydrological factors that sustain barrier islands, the impact of anthropogenic development, and response of these systems to future global climate change. Many coastal management policies have been made with little awareness of these factors. Current regulations are based on a static environment, yet barrier islands are dynamic environments, and this creates difficulty in implementation of these regulations. In addition, little research has been conducted on the long-term environmental effects of coastal management practices, such as terminal groins and channel dredging.

Scientific research projects should include an effort to understand the sediment budget and mechanics of sand movement of barrier islands. Computer models could be created to explore geomorphological and hydrological processes and to predict the effect of various coastal management strategies. Since barrier islands are connected via sediment movement and exchange, management plans for one barrier island, such as dredging of inlets and navigation channels, should consider the negative impact of these activities on neighboring islands.

## **3. Policy should be based on science**

It was generally agreed on by all attendees that management strategies should focus on current as well as future conservation. New legislative policies should consider scientific research and include regulations and management strategies that allow for the natural processes of barrier islands. Science should be injected at every stage of legislation, from creation to negotiation to implementation.

Coastal management practices may need to be localized to single islands or a complex of islands, and the application of science will be critical in the creation of customized policy focusing on preservation in some areas and coastal

engineering and management in others. Also, each barrier island is maintained by a unique balance of geological and hydrological processes, thus the coastal management strategy applied to one barrier island may not be effective or sustainable for another.

Furthermore, there is a need to include management for natural resource sustainability and preservation of habitat. Coastal management practices should attempt to mimic, rather than alter, natural processes to maintain ecosystem health. In addition, coastal management practices should include an assessment of potential downstream effects. Furthermore, proposed mitigation projects should include the cost of assessing and managing these effects.

#### **4. Economics and damage costs**

Much discussion focused around the following question: can there be an agreement between science and economy regarding coastal management? Economics will most likely drive what happens to barrier islands in the future. It was unanimously agreed that it is critical that cost-benefit analyses be included in any proposed management plan. In addition to the value of premier property, tourism, and a myriad of natural resources, economic cost-benefit analyses should also include the value of tourism, the esthetic aspects of the environment, and the critical ecosystem services each barrier island provides, as well as the cost associated with the any loss of these services.

Many mitigation projects are funded by the federal government, and much of the money comes from tax revenue. There has been much discussion over who should bear the cost for these projects. Arguments have been made that barrier island residents have chosen to live in what is considered “risky environments” and should therefore pay for mitigation projects. Supporters of this argument are not only residents of inland areas, but even from owners of property on the back barrier island who do not want to pay for shoreline projects.

Much of the economic value of coastal counties lies in beachfront property, resulting in an economically depressed inland area. It was suggested that economics be expanded to inland by sustainably developing the natural resources, such as aquaculture and ecotourism, of the inner wetland systems. As a result, inland residents of coastal counties would be encouraged to preserve the habitat behind barrier islands, thus reducing downstream effects.

#### **5. Improve communication between public and policy-makers**

Policy-makers should communicate with local property owners and stakeholders to address public concerns and questions about proposed legislation. Resources should be available to educate the public about the costs and benefits, including the cost and benefit of barrier island ecosystem services, of proposed policy and

management plans. Property owners need to recognize that change is coming, and there will be financial thresholds in the sustainability of barrier islands.

## 6. Sustainable development

Tax incentives for sustainable development would encourage land owners and stakeholders to include preservation of natural ecosystem services in new development projects. For example, vegetated islands have been shown to absorb and dissipate large amounts of storm and wave energy, resulting in less erosion and damage. Thus, substantial savings in insurance costs could be offered to beach front property owners who preserve vegetated dunes, resulting in protection of both property and wildlife habitat.

Additionally, residential and commercial structures, as well as coastal management structures, should be developed in a way that minimizes damage to the ecosystem. It has been extensively shown that hard coastal management structures, such as sea walls and terminal groins, can have strong, negative impacts on the natural geological processes of barrier islands. Therefore, alternatives to hard structures need to be developed. The design of these structures should include consideration of impacts of future of the rate at w scenarios of sea level rise and increased storm activity predicted to result from global climate change.

### Original Meeting Announcement:

*Effective Management of Coastal Barrier Islands in a Challenging Future*  
Workshop at the Bald Head Island Conservancy  
May 2-5, 2010

Sponsored by the Coastal Barrier Island Network, National Science Foundation

The Coastal Barrier Island Network (CBIN; [www.coastalbarrierisland.org](http://www.coastalbarrierisland.org)) and the Bald Head Island Conservancy will be hosting a three day workshop (May 2-4, 2010) addressing current issues regarding effective management of barrier island ecosystems. Invited guests will include scientists from diverse fields, plus government regulators and stakeholders. The issues addressed will include the possibility of sustaining important ecosystem properties under continued anthropogenic pressure (urbanized ecosystems) and recognizing the dynamic geology of these islands. Future climate change impacts such as increased storminess and sea level rise are critical components of future management strategies. This workshop will also provide a venue for discussing recent legislation regarding erosion control and beach augmentation. **Suggestions for specific agenda topics are being requested of all invited participants** (send email to Bill Smith; [smithwk@wfu.edu](mailto:smithwk@wfu.edu)). Before April 15, 2010, a topical agenda will be emailed to everyone for further input.

CBIN was awarded five years of support from the Research Coordinating Networks (RCN) program of the National Science Foundation in 2008 for the purpose of forming a network of parties interested in all aspects of barrier island management along the East and Gulf Coasts of the United States. This group encompasses a broad spectrum of national and international expertise that includes geologists, hydrologists, ecologists, economists, sociologists, and cultural scientists, as well as government regulators, developers and personal stakeholders.

**Invited Participants:**

William Smith, Wake Forest University  
 Heather Joesting, Wake Forest University  
 Suzanne Dorsey, BHI Conservancy  
 Tom Hancock, BHI Conservancy  
 Stan Riggs, East Carolina University  
 Pete Peterson, UNC Chapel Hill  
 William Cleary, UNC Wilmington  
 Tom Jarrett, coastal engineer  
 Spencer Rogers, North Carolina Sea Grant  
 Jane and Doug Oakley, BHI residents  
 Rachel Lewis, Bald Head Island Association  
 Tracy Skrabal, North Carolina Coastal Federation  
 Robert Norton, BHI Club Manager  
 Scott McLendon, United States Army Corps of Engineers  
 Richard Spruill, East Carolina University  
 Jack Hall, UNC Wilmington  
 Kent Mitchell, Bald Head Island Limited  
 Erik Olsen, coastal engineer  
 Pete Benjamin, United States Fish and Wildlife Service  
 Tom Walker, United States Army Corps of Engineers  
 Ann Mills, Old Baldy Foundation  
 Mike Giles, Cape Fear Coastkeeper  
 Calvin Peck, BHI Village Manager  
 Ken Miller, BHI Conservancy board

**Tentative Meeting Schedule:**

Sunday, May 2

5:30 PM	ferry arrival from Deep Point, transportation to lodging
7:00-9:00 PM	meet and greet at Eb and Flo's

Monday, May 3

7:30-8:30 AM	breakfast
9:00-10:00 AM	workshop convenes
10:00-10:30 AM	break
10:30 AM-12:00 PM	work session
12:00-1:30 PM	lunch

1:30-3:00 PM	work session
3:00-3:30 PM	break
3:30 PM-5:00 PM	work session
5:00 PM	adjourn
6:00-7:30 PM	panel discussion and public forum, BHI Club
7:30 PM-9:00 PM	dinner buffet, BHI Club (public welcome)

Tuesday, May 4

7:30-8:30 AM	breakfast
9:00-10:00 AM	work session
10:00-10:30 AM	break
10:30 AM-12:00 PM	work session
12:00-1:30 PM	lunch
1:30-3:00 PM	work session
3:00-3:30 PM	break
3:30-5:00 PM	work session
5:00 PM	workshop adjourns
5:30 PM	ferry to Deep Point

All work sessions will take place in the Fleming Environmental Center on the BHI Conservancy campus.