



STATE *of the*  
SOUNDS  
SYMPOSIUM

*Charting a New Course*

# Science-Based Decision-Making *or* Can We do Better Than I have My Scientist, Do you have Yours???



# HWY 12 + Bonner Bridge Decision Making Process

[NC asks judge to toss bridge lawsuit](#) The state Department of Transportation is asking a federal ...



[NCDOT awards contract to replace bridge](#) The North Carolina Department of Transportation awarded a



[Permit meeting set for Bonner Bridge](#) Now that the federal government has signed off on a replacement..



[NC may begin Bonner Bridge replacements](#) North Carolina has the green light to begin work on replacin



[Sen. Hagan to tour Bonner Bridge](#) North Carolina Sen. Kay Hagan is visiting the Outer Banks to ...



[People want to replace Bonner Bridge](#) North Carolina officials have received more than 4,000 comments...



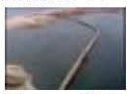
[Weigh in on Bonner Bridge's future](#) Monday is your last chance to weigh in on the fate of the ...



[Weigh in on Bonner Bridge's future](#) Thursday night is your last chance to weigh in on the fate of ...



[Bonner Bridge public hearing planned](#) Public hearings on Bonner Bridge plans is planned in Manteo.



[Fate of Bonner Bridge still undecided](#) An environmental group has written President Obama, supporting ...



This is **NOT** an example  
of  
Science based decision  
making.....

This is a political  
process...

Do not confuse them!

# Got Science???





# National NEMO Network

Protecting natural resources through better land use planning.

## Is the NEMO Network Having an Impact?

In other words, are local officials who make land use decisions for their communities better equipped to protect natural resources? The answer is YES.

### Research & Information Gathering

These initiatives help provide the local data upon which effective land use plans and decisions can be based. [Go to Research & Information Gathering](#)

### Decision Making Process Changes

The players and specific steps involved in local land use decision-making can make a huge difference. These changes create a decision making structure that is more conducive to proactive planning. [Go to Decision Making Process Changes](#)

[http://nemonet.uconn.edu/about\\_network/impacts.htm](http://nemonet.uconn.edu/about_network/impacts.htm)



# The Race to Protect Shellfish Waters of the White Oak River Through Research, Urban Stormwater BMPs, Public Involvement and Education

Christy Perrin, Patrick Beggs, Watershed Education for Communities and Local Officials, NC State University; Nancy White, PhD., UNC Coastal Studies Institute; William Kirby-Smith, PhD, Duke University Marine Lab; Dan Line, Water Quality Group, NCSU; David Bidespach, Dept. Biological & Agricultural Engineering, NCSU

## The White Oak River: An Undiscovered Jewel, or Rapidly Degrading Coastal Watershed?

The residents of the White Oak River Watershed recognize the integral role this unique ecosystem plays in their quality of life. This concern led to the formation of the White Oak River Watershed Advisory Board (WORAB) by NC Cooperative Extension leaders in 1996. In 2001, WORAB sought to address increasing shellfish area closures through research of likely bacterial sources, stormwater management, and education. A cadre of partners joined to undertake an ambitious project funded by EPA Clean Water Act 319 grants between 2001-2005 in two focus areas of the watershed: the Town of Swansboro and the Pettiford Creek Watershed.

This poster provides an overview of the multiple methods used in these areas, and the lessons learned while trying to win the race of protecting an ecological and recreational treasure from rapidly increasing bacterial contamination.



### Project Partners

- > WECO, Dept. Agricultural & Resource Economics, NC State University
- > Water Quality Group, Dept. Of Biological and Agricultural Engineering, NC State University
- > College of Design, NC State University
- > Duke University Marine Lab
- > NCDENR Division of Environmental Health, Shellfish Sanitation Section
- > Carteret & Onslow County Cooperative Extension Centers
- > Carteret & Onslow Soil & Water Conservation Districts
- > Crystal Coast Kayak and Canoe Club
- > Crank Walton League, White Oak River Chapter
- > Town of Swansboro
- > Town of Peletier
- > White Oak River Watershed Advisory Board

## The Town of Swansboro Project

The Approach: Best Management Practices to reduce runoff and educate the community



Ward's Shore Park



Ward's Shore Park with Fish Garden



The Town Hall Plan Garden was planted by NC Cooperative Extension Master Gardener volunteers.

### Partnering with Swansboro

The project team worked closely with town staff and elected officials to site, design, and construct BMPs on municipally-owned property. Educational signage was created to accompany rain gardens at Town Hall and Ward's Shore Park, and a permeable paved parking lot on Highway 24 that will connect with a planned dock walk. A portion of the dock walk will be on dry land, constructed with permeable materials. Additionally, a partnership with a local business owner yielded another permeable paved lot at the Flying Bridge Restaurant on the Highway 24 Caseway.

The community celebrated the BMP projects with a ribbon-cutting ceremony.



The municipal lot planned for parking



The municipal permeable paved lot provides over 1000 sq ft of parking.



The Mayor and Town Commissioners joined NCSU Chancellor Fox and NC House Representative Joel Pieston to celebrate the BMPs.

## The Pettiford Creek Watershed Project

The Approach: Target bacterial loading "hotspots" through research and outreach in a small coastal plains perennial stream and its estuary

### 1. Community Involvement

The White Oak River Watershed Advisory Board (WORAB) guided all aspects of the project, including selecting monitoring locations, seeking landowner permission, conducting a watershed survey, and helping to host public workshops.



### 2. Watershed Monitoring

Grab sampling and automated sampling were used to identify bacterial "hot spot" loading areas. Grab sampling monitoring showed significant local coliform bacteria sources in the watershed, conveying high levels to the creek during rain events. Automated samples from 3 sites showed developed areas producing 8 times more local coliforms than the Croatan National Forest.



Pettiford Creek Sampling Points and subwatersheds

### 3. Bacterial Source Assessment/ Watershed Assessment

GIS data, the water quality monitoring data, and results from a volunteer-conducted watershed survey of bacteria sources and conveyances were compiled and analyzed to identify risks for bacterial loading. Several "hotspot" subwatersheds were identified - these resulting areas consisted of residential land uses and modified hydrology.



### 5. Education/Outreach with Citizens and Local Officials

Local officials in Peletier and Cape Carteret were presented with the research results and engaged in discussions about policy options for reducing impacts from development. Two well-attended public workshops were held near the beginning and end of the project. Citizens made pledges to undertake specific actions to protect the White Oak River at the final project workshop. The Town of Cape Carteret is currently examining their ordinance to determine how to reduce stormwater runoff impacts.

## Results and Lessons Learned

Or how I learned to love the BMP...

- ✗ The Pettiford Creek watershed revealed significant relationships:
  - local coliform counts and
  - e. coli counts and amount of wildlife
- ✗ A stormwater wetland was a subwatershed identified with
- ✗ Six stormwater BMPs in the watershed:
  - 2 rain gardens in public
  - 2 permeable pavement
  - 1 permeable paved parking lot
  - 1 permeable parking lot
  - Several have been specifically educating local government
- ✗ 65 citizens were educated and reached through several methods
- ✗ Final post-workshop participants:
  - 94% said YES, when asked about policies that guide development
  - 94% also believed that they would protect water quality
  - 78% voluntarily commit water quality, such as in pets, and educating others
- ✗ The Town of Cape Carteret is currently examining their ordinance and policies to improve stormwater management



found that after raising awareness, it is needed if storm water runoff.

ial to success. We then, and checked in local BMP site selection is to all aspects of the

others takes time, and changes, War, and

one above lesson)

provided locally the educational

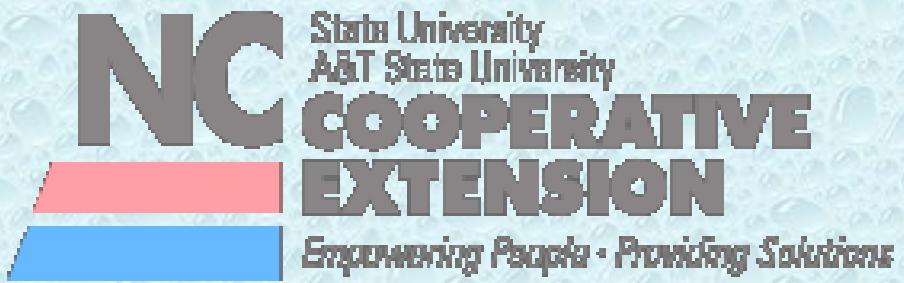
Shellfish area closures at an alarming pace-in Hwy 24 Caseway it closure lines continue the river. Changes in government and vary to make a real



**North Carolina Cooperative Extension provides ready access to the resources and expertise of NC State University and NC A&T State University. Through educational programs, publications, and events, Cooperative Extension field faculty deliver unbiased, research-based information to North Carolina citizens.**

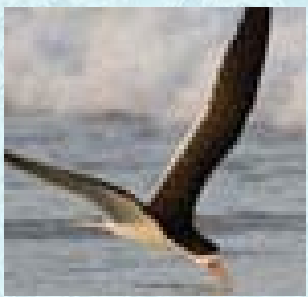


**Statewide birding trail aims to boost ecotourism in North Carolina's rural communities**





# Healthy Coastal Ecosystems



# Safe and Sustainable Seafood Supply



North Carolina Sea Grant provides research, education and outreach opportunities relating to current issues affecting the North Carolina coast and its communities.

Through a combination of federal and state dollars, we facilitate university-based research to answer complex questions about the state's diverse coastal ecosystems and meet the needs of coastal communities.



# Hazard Resilience in Coastal Communities



# Sustainable Coastal Development







# COLLEGE OF DESIGN Research and Extension

As part of NC State University – a land-grant institution with a wide network of extension agents in all 100 North Carolina counties – the College of Design delivers research and develops design solutions that improve life for all.

- [Architecture in the Public Interest](#)
- [Community Design Initiative](#)
- [Contemporary Art Museum](#)
- [Downtown Design Studio](#)
- [Innovation Design Initiative](#)
- [Natural Learning Initiative](#)
- [Universal Design Initiative](#)



# NRLI PROCESS

- Assess the issues
- Joint fact finding
- Design decision making process



Resource Guide by Haaland + Smutko

[http://www.ncsu.edu/nrli/resources/documents/plugin-Science\\_Tech\\_Issues-Tools\\_Techniques.pdf](http://www.ncsu.edu/nrli/resources/documents/plugin-Science_Tech_Issues-Tools_Techniques.pdf)



Led by Dr. Mary Lou Addor, the Institute educates and supports a diverse group of North Carolinians who are committed to seeking consensus on issues affecting the sustainable development of North Carolina's natural resources and the quality of our environment.





•The new CCMP represents an opportunity to manage the estuary on an ecosystem-basis approach.

Important aspects include:

- Adaptive planning and management
- Systems-based
- Accountability

•The CCMP is organized by posing and answering four questions.

- Question 1: What is a healthy Albemarle-Pamlico Estuarine System?
- Question 2: What is the status of the Albemarle-Pamlico Estuarine System?
- Question 3: What are the greatest challenges facing the Albemarle-Pamlico Estuarine System?
- Question 4: What actions should be taken to move toward healthier Albemarle-Pamlico Sounds by 2022?

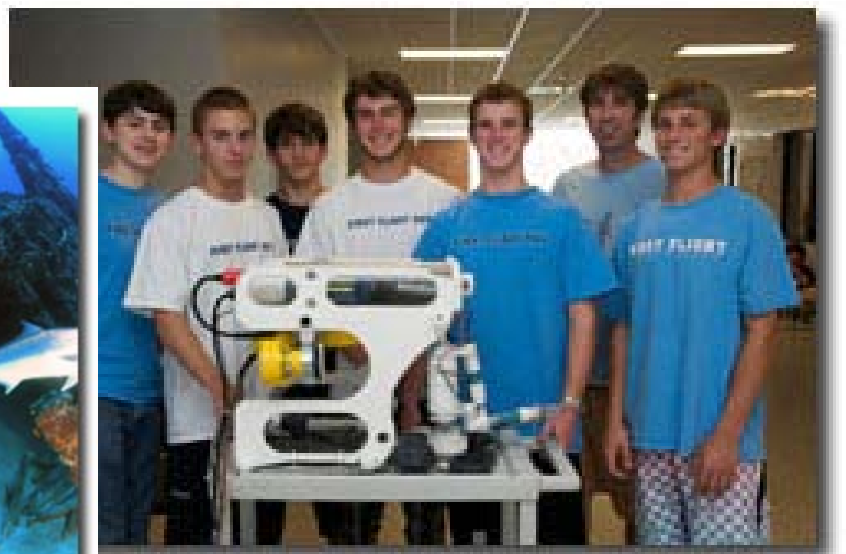
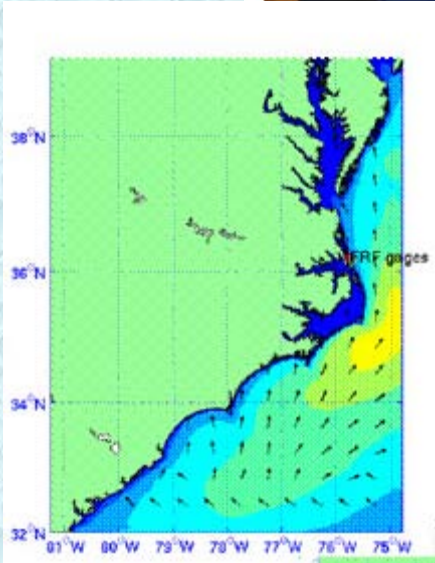


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*Charting a New Course*

- **Science / scientists can be effective and inform decision making, but it requires the delivery of an unbiased, thoroughly developed curriculum and a well thought out educational process. And....**
- **Input or interest of local contact who can link with the community and provide follow through - a champion;**
- **Thorough knowledge and engagement of the stakeholders and issues; and**
- **A group of committed individuals who are willing to participate, Learn, and act upon the information.**

Of course, it is always best to start early.....



<http://csi.northcarolina.edu/>