

NC COASTAL RESOURCES COMMISSION (CRC)

March 24 - 26, 2010

Sea Trail Golf Resort and Convention Center

Sunset Beach, NC

Present CRC Members

Bob Emory, Chairman

Joan Weld, Vice-Chair

Melvin Shepard

Bob Wilson

Charles Elam

Jamin Simmons

David Webster (present at 3:25 p.m. 3/24, present 3/25, absent 3/26)

Ed Mitchell (present at 3:45 p.m. 3/24, present 3/25, absent 3/26)

James Leutze (present 3/24, present at 10:00 a.m. 3/25, present 3/26)

Veronica Carter (absent 3/24, present at 10:30 a.m. 3/25, absent 3/26)

Renee Cahoon

Jerry Old

Lee Wynns

Bill Peele

Present CRAC Members

Dara Royal, Chair

Frank Rush, Vice-Chair

Bob Shupe

Dave Weaver

Bill Morrison

Wayne Howell

Webb Fuller

Harry Simmons

Bert Banks

Debbie Smith

Phil Harris

Judy Hills

Eddy Davis

Tracy Skrabal

Spencer Rogers

Joe Lassiter

Lee Padrick

Anne Deaton

Cyndi Karoly

Travis Marshall

Present Attorney General's Office Members

Jennie Hauser

Christine Goebel

Ward Zimmerman

CALL TO ORDER/ROLL CALL

Chairman Emory called the meeting to order and reminded Commissioners of the need to state any conflicts due to Executive Order Number One and also the State Government Ethics Act.

Angela Willis called the roll. Chuck Bissette was absent. There were no conflicts or appearance of conflicts stated by Commissioners. Based upon this roll call, Chairman Emory declared a quorum.

CONTESTED CASES

Lawing v. DCM (09 EHR 4793)

Ward Zimmerman

Ward Zimmerman of the Attorney General's office represented the Division of Coastal Management in this case. Mr. Zimmerman stated this contested case hearing never actually got to the factual stage. We believe that Mr. Lawing will be presenting some sort of variance on this same matter in one of the next few CRC meetings. This is a matter in which Mr. Lawing asked for a CAMA permit to build a boathouse on a boatlift that he had on his property. However, in applying for this contested case hearing he did not necessarily state that the rule was misapplied by DCM. He stated the rule itself was invalid. Based upon that simple fact, the ALJ determined that there was no factual matter before him and therefore entertained a motion for summary judgment based on the fact that under 150B-23A petitioner is required to state that DCM acted inappropriately. In this particular matter petitioner never did that in his prehearing statement. During the actual summary judgment hearing he reiterated that he didn't believe that DCM acted inappropriately in this matter but the underlying law was invalid. On February 23, Mr. Lawing sent an e-mail to Mr. Zimmerman stating that he does not intend to contest the existing ruling and does not wish to attend the CRC meeting. Mr. Zimmerman requested that the Commission accept the ALJ's decision in full as the final agency decision.

Bob Wilson made a motion to accept the ALJ's decision in full. Jerry Old seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Leutze).

STATIC VEGETATION EXCEPTION REQUESTS

Christine Goebel of the Attorney General's office stated she will be representing Staff in the static line exception requests before you today. Ms. Goebel stated she will give a summary of each request and let the representative from each Town add any comments on behalf of the Town. Jeff Warren, DCM Coastal Hazard Specialist, will give a general description of the static line exception request process.

Jeff Warren stated a static line is what occurs prior to a Town receiving a large-scale, long-term beach fill project. A town that meets the criteria for a large-scale project has DCM go out and stake the first line of stable, natural vegetation prior to the project. That line becomes static and becomes the setback measurement datum on record in perpetuity. No matter what the actual line of stable vegetation does, setbacks are measured from the static line. If the lot was not conforming at the time you got a static line it was nonconforming in perpetuity because the static line was there and continues to be there forever. In the CRC's rules a static line exception was created for limited development under limited conditions. We did some clarification in the rules that states if the vegetation line ever moves landward of the static line then it becomes the default measurement line. It is always the static line until such time the actual vegetation moves to a more landward position and becomes a little more restrictive than the static line. There are two ways to mitigate for coastal hazards on the oceanfront. One is to move structures further from the shoreline and you did that with graduated setback and increasing the setback for larger structures. The other way to mitigate the coastal hazard is to move the shoreline farther from the structures. Many towns have now embarked on long-term projects and not a one-time beachfill

project. Towns that come forward and show that they have a static line and have waited at least five years since the project occurred that created the static line can come to the CRC and request an exception. To grant an exception there must be a plan for 25 years from the date of the exception, they have to show that they have the appropriate volume of compatible sand to build the initial project and maintain the initial project, and they also have to identify the financial resources to do it.

Rudi Rudolph of the Carteret County Shore Protection Office stated that about ten years ago when Carteret County passed its occupancy tax law providing money for beach nourishment, the Legislature also created the Beach Commission. The Beach Commission is an 11 member group in Carteret County that has to exist at all times. The Beach Commission turned around and created the concept of the Shore Protection Office. We do a lot of things by consensus. The Towns, Beach Commission, and Shore Protection Office are almost one body. We have also developed a very robust monitoring program. We have over 160 beach profiles that we survey every year on Shackleford Banks, Bear Island, and Bogue Banks.

Town of Atlantic Beach (CRC 10-09)

Christine Goebel stated Atlantic Beach has had a static line since 1986 and 1994 for two different parts of the shoreline. Atlantic Beach is bordered by the Ocean, Intracoastal, Fort Macon and the Beaufort Inlet area and Pine Knoll Shores to the west. The shoreline and the static line in Atlantic Beach are 4.5 miles long. It was delineated by DCM from pre-project aerial photographs. The setback for Atlantic Beach is primarily two feet per year annual average erosion rate. There is one small area that is 2.5 feet per year. In Atlantic Beach there are approximately 350 lots. If the static line exception were granted approximately 50 developed lots and ten vacant lots could be affected. The Town of Atlantic Beach has an extraordinarily long history of nourishment starting as far back as 1911. It is primarily derived from the dredged spoils from the Morehead City Harbor project. It has primarily been conducted by the Army Corps. The Corps is doing a new spoil plan which is expected to be out in 2011. Atlantic Beach is expected to continue to get nourishment. Historically the outer harbor sediment has been used on the beach and has not been problematic. Based on the consistency requirement, Staff is comfortable with the sediment quality and quantity available from the Town of Atlantic Beach to keep using for its project life. The Morehead City project has been federally funded and that is expected to continue. There have been some areas in the Town's jurisdiction in the past that have not been covered. The County and the Town have covered the cost of the extra little area. This is expected to continue through the occupancy tax and Town taxes. The Staff recommends that the Town has met the four criteria for the static line exception request and would recommend the CRC grant the exception.

Melvin Shepard made a motion to approve the static line exception request for the Town of Atlantic Beach. Jerry Old seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Leutze) (Webster, Mitchell absent for vote).

Town of Emerald Isle (CRC 10-10)

Christine Goebel of the Attorney General's Office stated the request for Emerald Isle is for the eastern 5.9 of the 11 miles total within Emerald Isle. Their original projects were done in a

phased approach. Their project was first placed in 2003. Emerald Isle is bordered by the Atlantic Ocean, the Intracoastal, Bogue Inlet and Indian Beach. The static line was determined by DCM's Staff through staking the vegetation line and surveying that line in November 2002. The entire area covered under this request has a two foot per year erosion rate. There are approximately 160 developed lots and 10 vacant lots that could potentially benefit from a static line exception. This area first had nourishment in September 2003 after Hurricane Isabel and then again in September 2005 after Hurricane Ophelia. Both of these were FEMA projects that were federally funded. The plan developed for the eastern part of Emerald Isle is the part of the larger Bogue Banks project. The project is basically modeled after the Atlantic Beach portion of the Morehead City project. Emerald Isle has used sand in the last two projects from the ODMDS and this is the plan for the future. The Army Corps has also identified three other sites that are offshore as backup sites. Staff is comfortable that the ODMDS and/or the other Corps sites have sufficient quality and quantity for the 25 years of the project. Currently the County has a room occupancy tax which funds a beach nourishment fund. This is what has been used for a long time to pay for projects. The Town also has its own tax that was used to pay for the nourishment in 2005. Based on the projected costs for the 25 year plan, a similar city tax is all that would be needed to cover the project for the future assuming a 25% State, 25% Town, and 50% County split for the overall Bogue Banks project. Staff requests that the Commission grant the static line exception request.

Charles Elam made a motion to approve the static line exception request for the Town of Emerald Isle. Jim Leutze seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Leutze, Webster) (Mitchell absent for vote).

Town of Indian Beach & Salter Path (CRC 10-11)

Christine Goebel of the Attorney General's Office stated the next request is a joint request from the Town of Indian Beach and the unincorporated area known as Salter Path. This request is for a 2.4 mile area of shoreline. In 2001 they received a static line. It is based on a staked vegetation line which was then surveyed pre-project. All 2.4 miles of this area has a two foot erosion rate per year. Of these 2.4 miles, Indian Beach covers 65% of it and Salter Path is 13% of it and the Roosevelt State Park is 22% of it. This area is located between the Atlantic Ocean, the Intracoastal, Emerald Isle and the Town of Pine Knoll Shores. The first project was completed in the winter of 2001-2002. This first project was from local and state money. The second project was part of the Section 933 project in the spring of 2004. The third project was post-Ophelia in the winter of 2007 and was a FEMA project. The sediment criteria is focused on primarily using sand from the ODMDS and alternatively the other Corps sampled sites. The allocation of nourishment costs is based on 50% County funds, 25% State funds and 25% local funds. This is only 2.4 miles so the cost for this portion is relatively small. Financially the Town of Indian Beach in 2002 funded a local project. The voters supported the purchase of bonds to cover the project. This debt was paid off in 2008. Since 2008, they have had a one cent tax for future nourishment. This is a tax which does have to be reauthorized annually through the budget process. Salter Path is an incorporated part of the County. The County has committed to covering the cost for Salter Path. Staff feels comfortable that the Petitioners have satisfied the four criteria and recommends approval of the static line exception request for Indian Beach and Salter Path.

Melvin Shepard made a motion to approve the static line exception request for Indian Beach and Salter Path. Renee Cahoon seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Leutze, Webster) (Mitchell absent for vote).

Town of Pine Knoll Shores (CRC 10-16)

Christine Goebel of the Attorney General's Office stated the Town of Pine Knoll Shores has 4.5 miles shoreline. The Town has had their static line since 2001. The 2001 line was staked by DCM and surveyed pre-project. The Town of Pine Knoll Shores is bordered by the ocean, the Intracoastal, the Town of Indian Beach and the Town of Atlantic Beach. Pine Knoll Shores has a two foot per year erosion rate for the entire area. Town estimates are that 24 of 71 of the non-conforming structures could benefit, however none of the 22 multi-family larger structures could benefit from the rule. The initial project was in 2001-2002 using local money. In the spring of 2004, it was covered by the Section 933 project from the Morehead City Harbor Project. In the spring of 2007, there were two sources of funding for the project. Part of the area was covered by the 933 project and there was also a post-Ophelia FEMA project that was funded by the federal government. The project design is part of the larger Bogue Banks project. The sediment for this large project is primarily the ODMDS with the other sites identified by the Corps as possible alternatives. The costs are projected out for the 25-year life with a 25%, 25%, 50% split. The Town has committed to new taxes in 2011. Staff recommends approval of their static line exception request.

Jerry Old made a motion to approve the static line exception request for the Town of Pine Knoll Shores. Melvin Shepard seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Leutze, Webster) (Mitchell absent for vote).

PUBLIC HEARING

15A NCAC 07H .0104 Development Initiated Prior to Adoption By the CRC

Bill Ferriss stated I am here representing myself and the property owners on Oak Island and Ocean Isle and Holden Beach. The rule says development on lots created on or after June 1, 1979 and that is when these regulations were implemented but Oak Island was developed in the 1940's, so that means that it doesn't qualify? The other islands were also developed in the 1940's. Some of them were developed after that but the main island itself was. I was curious as to how that applied if in fact they still qualify, you can build no closer to the ocean than adjoining buildings do you still have to be within the sixty feet of the vegetation line? The other thing I would like to say concerning Oak Island is that I wrote you a letter and did quite a bit of study on the buildings on Oak Island and as you know the current economy is really not the best. These towns are going to suffer a lot after the revaluation of which I am in charge of for Brunswick County. The study indicated to me that we had six houses that still have survived Hazel in 1954 on Oak Island. Sixty percent of the 400 houses were built before 1990. Those houses still exist. They still use them. However, they are suffering from damage just due to age. The owners don't have the incentive to maintain them because the regulation here states that all of these buildings are on unbuildable lots of which we finally got a listing of those lots that they have gone out and measured that they are calling undevelopable. But, if you take the sales of

those lots that are not buildable we had three sales around \$75,000.00 the market value of those lots back in 2008 during the last revaluation were between six and seven hundred thousand. If you take the market now and apply that to those 500 lots it's going to cost the Town of Oak Island over a million dollars in taxes. I don't understand how you can apply this regulation to properties that have survived for 40 and 50 years with no erosion problems when I thought the purpose of this regulation was to protect the public from buying lots that have erosion problems, not run them off because they think they are going to erode. The two feet per year in your original study, which I told you years ago, said that beaches with a southern view eroded less than two feet per year. But for the purpose of your study you applied two feet. Well if you apply two feet then that is what your answer is going to be. Two feet. I have this lot, I purchased a lot on Oak Island in 1978 or 1979. There was a house on it. The slab is still there. It was destroyed in 1954 in Hazel. You ask me why? Well if you look at a picture, which I have, those houses were built on slab. They mowed the dune down so they could see the ocean. So when a hurricane comes, guess what? They aren't going to be there. There are still six or eight that survived it. But, those lots were platted in the 1940's. Right now I have over 200 feet from the road to the dune, but I can't build. Nor can my neighbor because you did a renourishment. What I call a replacement of sand. Because from 1989 to 1999 we had four hurricanes come through there and what happened? You got a bulldozer out there. They bulldozed up sand to create the southern half of that dune and it lowered the elevation which does what? The ocean comes in. Well right after they bulldozed they set the vegetation line in 1998. On bulldozed sand which had a lot of salt in it and didn't have time to grow back and we're using that as the vegetation line on Oak Island. Yet, none of these houses on the mainland, now the ends of the islands I agree with you one hundred percent they wag like a dog's tail. They are going to be six hundred feet from the ocean one year and its going to be lapping under your porch on the next. But what is ironic about that is there are three lots at the very end of Oak Island where you permitted them to build and yet ten or fifteen years ago it was under water. These things just don't make sense and I think you are trying to apply a regulation to fit everybody and I have been in the real estate business for fifty years and there isn't one. Real estate is not standard. It is just all over the place. You can't write one rule that fits everybody. I really think you need to look at this vegetation line on Oak Island. It is wrong. It has caused a lot of headaches. You have cost the county more money than any erosion problem that could happen on that island. Just this regulation itself. And what is going to happen, these people are not going to maintain these properties when you have a hurricane and they knock them down or they fall down from termites. Who is going to take over? The property owner isn't, he will say you can have it. Oak Island is faced again with what to do with these buildings. Fifty percent damage, well if you have a half a million dollar piece of property and four hundred thousand is in the land the building is not worth but one hundred. Fifty thousand dollars in damage and you can't build it back. Hello. You can't build anything back. So I am asking you again to look at this regulation and by the way these are southern facing beaches. We do not have a shadow that creates sand for the female turtle. That was the purpose of the 2,000 square foot limit to limit the height because it cooled the sand so female turtles wouldn't hatch. We don't have shadows on the beach because we are a southern faced beach. There is another problem you have with your regulations. Please look at this and give it another thought.

CRC Study of the Feasibility and Advisability of the Use of Terminal Groins

Bob Emory stated the Legislature directed the Coastal Resources Commission to do a study on the feasibility and advisability of the use of terminal groins in North Carolina. That study has been done. There has been a steering committee made up of members of the CRC and CRAC that has met with the contractor that did the study to more thoroughly understand the study and will make some recommendations to the Commission. Tomorrow the Commission will develop the recommendations on the advisability and feasibility of the use of terminal groins in North Carolina for the Legislature.

Anne Deaton stated I am on the CRAC and was involved with the terminal groin subcommittee, but I am here to present the letter from the Director of the Division of Marine Fisheries. The Division of Marine Fisheries has reviewed the final terminal groin study prepared by Moffatt and Nichol for the Coastal Resources Commission. After reviewing this information the DMF does not believe the scientific evidence and conclusions of this report support a change in North Carolina's policy on hardened structures on oceanfront shorelines. The General Assembly asked the CRC to assess the environmental effect of terminal groins. The effect of terminal groins on fish use was not assessed. The consultant found no fish or benthic invertebrate monitoring data associated with any of the five study groins. However, they draw the conclusion that the marine resources continued to use the sites. This statement is based on no data. The report does mention some of the potential impacts to fish and fish habitat reported in the literature. For example, they include information on potential impacts to fish larval transport. Research in North Carolina has found that jetties adjacent to inlets block the natural passage for larvae into inlets, reducing recruitment success. It was estimated that the proposed Oregon Inlet jetties would reduce larval entry by 60-100%. Although groins are shorter, there is no information currently available to know how those structures will affect currents and larval transport. Because the majority of the North Carolina's important fishery species spawn offshore and must pass through inlets to reach their nursery grounds, any impact on nursery recruitment could have serious effects on fish populations. The conclusions of the environmental section underplay the impact that anchoring a barrier island with a terminal groin will have on barrier island processes, which in turn will negatively affect fish, shorebirds, and the estuarine system overall. Barrier islands sustain themselves under rising sea level conditions through overwash processes and shifting inlets, which move sand to the back side of the island. Without the continuation of these processes, long term impacts will occur, including loss of sand flat habitat and back-barrier marsh. The former provides critical habitat for some bird species and the latter provides critical nursery areas for estuarine dependent fish such as red drum, croaker and shrimp. By preventing barrier island migration, an island is more vulnerable to inundation by rising sea level, which would greatly affect the estuarine environment. Stabilizing the inlet will also result in a deterioration of ebb and flood tide deltas. However, the document fails to mention the effect that inlet stabilization will have on these shoals, and consequently, fish habitat. These shoals are important foraging areas for numerous fish, including summer and southern flounder, red drum, speckled trout, Spanish mackerel, and weakfish. The study states that use of terminal groins does not eliminate the need for beach nourishment and that once a terminal groin is constructed, regular beach nourishment is conducted on a regular basis. Because nourishment projects were not done adjacent to inlets prior to groin construction, the amount of beach nourishment will actually increase after a groin is installed. Beach nourishment results in a temporary reduction in

the abundance and diversity of the intertidal benthic community, which is the dominant food source for surf fish such as pompano, kingfish, spot and croaker. Recovery time of the beach community varies from a few months to over two years, depending on sediment compatibility, length of beach filled, frequency of nourishment, and other factors. If there is no net reduction in beach nourishment with use of terminal groins, this hardened structure would result in increased environmental impacts and increased economic costs, and therefore does not appear to be advisable. This study failed to demonstrate that the use of terminal groins alone would be an effective erosion control technique and therefore feasible. While beach width increased immediately next to the groin, erosion was observed on the updrift beach (on the opposite side of the terminal groin) for a limited distance, and also downdrift of the terminal groin after about the first mile, indicating use of terminal groins may cause impacts to adjacent beaches. In addition, all of the five terminal groins had additional hardened structures associated with them. For example, Oregon Inlet has a wrap around revetment, Amelia Island has a breakwater, and Captiva Island, following the terminal groin construction had a rock revetment, seawall and linear expansion of the original terminal groin added. If a terminal groin alone was effective, why were these additional structures needed? Is North Carolina prepared to allow these other hardened structures as well, after terminal groins are installed and found to be insufficient? The environmental impacts of seawalls, jetties, and breakwaters are well documented. Because this study failed to adequately assess the feasibility and advisability of terminal groins with any certainty, particularly the environmental effects on fish and their habitat, DMF respectfully requests that the CRC recommend to the General Assembly that they maintain the current ban on all hardened structures on ocean shorelines and rely on the existing exemptions authority to allow terminal groins where applicable. Providing an alternative option to allow terminal groins under certain conditions sends a confusing and misleading message that the scientific evidence supports the use of terminal groins, which it does not. The CHPP Steering Committee met last week and no one from the Steering Committee could be here today but they did write a resolution which was submitted to the CRC acknowledging that they are concerned about the use of terminal groins and asked the CRC to take into consideration the possible negative habitat effects on fish habitat. The US Fish and Wildlife service submitted some comments with concerns on the environment.

Marty Cooke stated I would like to thank you for coming to Brunswick County. You now see why we have such a concern for terminal groins. You have been to our beaches and I can say that you have brought beautiful weather with you. I want to say that I have learned a great deal from you. I have listened to all the studies on terminal groins, everything from what a terminal groin may be to what it isn't. We have looked at terminal groins in North Carolina as well as in Florida. We looked at adverse impacts. We looked at environmental impacts. We looked at cost benefit ratios. I am sure there are some things that may be adverse. I am sure there may be some aspects that may impair something. But I also think of things like this, out west when we have wildfires it may be beneficial to the nature to continue to allow wildfires. We put them out when people are habitating the same area. If you come and look at the beaches that we have here in Brunswick County we have sandbags. We have to continually renourish those area. It is tragic because these people did follow the rules. They followed the policies and they followed ordinances. These aren't just individuals who have wealthy, deep pockets. These are people who have had these properties in their families for years. The infrastructure is laid in there. They have utilities, a tax base, and tourism economy. Our families enjoy the beaches. That

being said, it is tragic to see the receding situation coming about by storms or by other natural form. When we look at 150 inlets and jetties that are taking place throughout this country from Maine to Texas that 72 of them actually have some kind of engineered remediation. North Carolina does not. We have seen that it did seem to save a bridge. We looked at miles down the road. Every two months they evaluated it and there was no adverse impact. We looked at a historic fort at Fort Macon. You yourselves had the opportunity because it was only 4.5 miles from where you were meeting. You saw how the stability was there. We also look at those three beaches down in Florida and how it is the same. I think that it is an effective tool and it brings long term stability. It brings a way that our towns and our cities can be able to hold what we have. We would hope that this committee would bring forth this to the Legislature and say it is a viable tool. We have researched it and we have looked at it from every single way we possibly can. We must have this type of stability.

Steve Candler stated I would like to thank you for coming to Brunswick County. I am the chief executive officer and governmental affairs director for the 900 member Brunswick County Association of Realtors. We would like to thank you for having multiple opportunities to speak about this issue across the state. I guess my approach is going to be that a technical report which is what the Legislature required is a very easy piece of paper to hide behind. We know that required science is something that the Legislature likes to have and can say here is the report. They do a lot of reports and study a lot of things in the Legislature. I would like to refer to Pete Peterson's comments that he wrote down as part of the comments on the website. The major finding of the study is that we do not have sufficient data with sufficiently reliable analysis to predict with confidence the consequences of building terminal groins. Back in 1984 the same expression was that the CRC adopted a ban on oceanfront hardened erosion control structures to reflect the conclusion. There was no way to fully anticipate the consequences of building such structures. Twenty-six years later here we are again saying that there is no data to support what it is that we think may or may not be a good idea. What I would like to propose is what I would call the Abilene paradox. A family goes on vacation to Abilene Texas. This family would go there for 20-25 years. Why do they continue to go? Because that is what they have always done. It is not a great place to go to. There aren't a lot of rides and there aren't a lot of beaches in Abilene Texas. The point is that we can continue to do the same thing over and over again because we are comfortable with doing it. Let's try something new. Let's just say we can solve this. We can get in a room and sit down and try something new. What I would like to propose is that if there are no structures out there that we are satisfied with and if there are no structures that give us the data we want then let's put one in ourselves. Determine the parameters, control the data, and measure the data. If we go before the Legislature we can ask them for money. We can get money from other sources. All the stakeholders together can come up with some funds so we can put in a project ourselves. We do it how we want to and that is the data that we can use to determine if something needs to be changed. Thank you for your time.

Charles Baldwin stated I am the Village attorney for Bald Head Island. I brought some photos I would like to pass around. The Bald Head Island Conservancy recently prepared and posted on its website a comment on the loss of dune habitat that had occurred between March and October of 2009. This document is available to the public. I have submitted a copy for the record along with a written submittal. They concluded that there was a substantial loss of back dune habitat that given the imperiled nature of this habitat that Bald Head Island still has some of the best

examples of an intact and functioning dune system on the east coast. Protection of these sensitive areas should receive a high priority, yet little to no action was taken by state and federal agencies to protect this area when the Bald Head Island Conservancy reported a loss of this habitat due to non-natural erosion at a rate measured at three to five feet per day. It is not any secret that at Bald Head Island we have had substantial loss of beaches and dunes as a result of the shipping channel maintenance dredging. The report goes on to state that loss of back dune habitat will enable future storms to begin to penetrate the maritime forest. We contend that back dunes are important for the integrity of the whole island. Without this important vegetated area with established dunes and a diversity of plants and animals, the island is more vulnerable to storm impacts and erosion, natural and non-natural. The report concludes we ask that environmental agencies examine their tool kit in order to best protect this habitat. That is but one example of the environmental cost of not having terminal groins. At Bald Head Island our experience is that non-natural erosion from the harbor channel is causing us substantial loss of beach and dune habitat. This affects rare and threatened species of plants and animals. A terminal groin in a particular location by its ability to mitigate erosion and stabilize an inlet may be necessary and appropriate in certain circumstances to address environmental harm from inlet dredging activities. One of the things that this debate has been replete with are statements of policy that are far beyond the express dictate that the General Assembly included in its instruction to the CRC. The General Assembly directed the CRC to study the feasibility and advisability of using a terminal groin to control erosion at the end of a littoral cell or side of an inlet. The instruction was not to study whether terminal groins should be allowed throughout North Carolina or whether they should be allowed at a particular location. I was excited at the get go that we might be able to look at Bald Head but that is not what this is about. The report definitely answers the question of feasibility. It describes examples in North Carolina and other states where these structures exist. They can be built. The report describes engineering concepts and principles that are used to build them and even analyzes the costs of using various materials to build them. So the feasibility question is answered. The remaining issue is advisability. Moffatt and Nichol's final report contains several substantial conclusions in that regard. Quoting from the report, the presence of a terminal groin in concert with a shoreline protection plan may provide long term infrastructure protection, shoreline benefits and beach access to public recreational facilities. One of the reasons CAMA was set up was to guard those assets. The report also concludes a consequence when the structure is built on the downdrift side of the inlet is the stabilization of the inlet by preventing migration of the inlet channel as an additional substantial benefit. The report says in all cases the shorelines on the structure side of the inlet were eroding prior to construction of the terminal groin. After construction the shoreline on the structure side of the inlet were generally accreting. The terminal groin flipped it from eroding to accreting in all cases. That is a big benefit. The report also states, as Bald Head has experienced that dredging can have significant impacts on the inlet morphology and sedimentation processes of the ebb tidal delta. It can change the natural processes and what is out there. While this may be obvious, it is worth stating that the more significant the dredging activities, the potentially greater the impacts on adjacent shorelines, the greater the potential need for more nourishment and/or more substantial stabilization structures. I understand from the steering committee meeting that this body is considering three proposals. The first proposal is no change and preserve the status quo and the absolute ban with the existing exceptions. Making this recommendation would require you to conclude that terminal groins are neither feasible nor advisable in all circumstances. That conclusion simply cannot be drawn from the report and the

substantial benefits that I just read. The second thing under consideration is to amend the law to restore the CRC's former authority only for terminal groins through an expanded variance procedure. A variance procedure may sound like a good idea but if you think down the process, it doesn't really make sense. First an applicant would have to do a lot of work with no instruction as to what they need to do. So they have engineers and consultants doing work. Then they apply to DCM. DCM has no choice but to deny the application. Therefore it goes up as a variance process. That is a quasi-judicial court type proceeding in which the rules of evidence and what can be done and heard and considered are very limited. The CRC may want to do some studies to go look at the site. These would be things that aren't contained in the small record that Staff has prepared. Those things cannot be considered. That would appear to be contrary to the intent to do a good study and a site specific, location specific, groin specific basis. These outside of the record things would be prohibited. Just as the existing ban does not facilitate site specific and well reasoned decisions about terminal groins, neither would the variance approach. The final thing under consideration is to restore the CRC's former authority only for terminal groins at inlets, to develop procedures for permitting terminal groins with a petition. A petition would make a lot more sense. The CRC could be actively involved. You could guide the type of studies and there would be a roadmap that people could follow. It would be on a site by site basis and would appear to be the best way of making an informed decision. Sometimes such as at Bald Head Island manmade effects require a manmade solution and we encourage the CRC to give full consideration of that.

Sam Pearsall stated I am the southeast regional manager for land, water and wildlife for Environmental Defense Fund. Many issues have been raised already. I presume that many more will be raised after I shut up and sit down. I want to raise a single issue. That is the fact that the sea is rising. The sea is presently rising at the rate of .2 inches per year. That is indisputable. It is a measured fact resulting from measurements taken at tide gauges and ocean buoys using satellite telemetry confirmed by air photos. It's predicted that the sea will be rising an inch per year by the year 2100. That is a less certain prediction as all predictions are. It is also conservative. There are a number of variables that could increase the rate at which the sea rises by 2100 that are not taken into account. We know conservatively that we can expect by 2100 roughly an inch per year. Every terminal groin that has ever been built and every terminal groin that has ever been studied has been studied in the context of the present rate of sea level rise or less. No terminal groin has been evaluated in the context of the predicted rate of sea level rise which we face over the coming decades. That makes any study of past behavior of terminal groins somewhat dicey in terms of its ability to tell us how they will behave in the future. Our only hope for our coastal systems to adapt to this expected unnaturally high rate of sea level rise is that our sands and marshes and shores and channels be allowed to move as they naturally and normally always have and always need to do. Building any groin is maladaptive. It is a strategy that will reduce the ability of islands, of people, houses and ecosystems and coastal landforms to adapt gradually to this accelerated rate of rising seas.

Len Pietrafesa stated I am the professor emeritus at North Carolina State University. I am here to talk about presenting an understanding of how barrier islands actually survive. They survive by moving. They must move during a period of falling sea level or rising sea level. This is a period of accelerated sea level rise on the order of two tenths of an inch per year. More importantly what has happened over the last 40 years is that sea level is now as high during the

winter months as it had been during the summer and the fall months 40 years ago. Which means that the impacts that we have seen on sediment resuspension and redistribution, which are known as erosion and deposition, but you can think of it as sediments being resuspended and then moved during the passages of storms. Those kinds of phenomenon will occur more frequently during the winter and they will be more hurricane-like. North Carolina experiences 15-45 winter storms per year, in fact we spawn 54% of all of the extra-tropical cyclones that are created in the North Atlantic. What we are going to see is more movement of sediment during the winter months that is actually going to be comparable to the summer months. Why is that important? During a period of sea level rise barrier islands must be allowed to move towards the mainland. The mechanisms that move sediments or the mechanisms that allow the barrier islands to move are transport of sediments across the island but also through the inlets. Any structures that are put in place that obstruct the natural flow of sediments through the inlets will not allow the island to move on the backside. That is where the sediments eventually are deposited. This will lead to a flattening of the islands and literally the death of the islands over some periods of decades rather than allowing the islands to maintain their integrity. The other thing is that the issue is if you harden a structure such as at the tips of an island what you do is trap sediments on the side of the structure. What you also do is you capture those sediments and the downdrift that would occur of those sediments to the other end of the island is obstructed. Sediments will not be available to maintain the beaches on the downdrift side. On the east coast of the United States, particularly the North Carolina coast, that downdrift direction is north to south and east to west. Anything in between denies sediments to the south end of an island if the island is aligned north to south. If it is aligned northeast to southwest it will deny it to the southwestern part of the island. If it is aligned east west then the west end of the island is denied sediments. When I say the west end of the island for example, the first half mile will accrete sediment but the rest of the island will be denied sediment because there is no natural source which is provided during the passages of storms principally. Finally the statement that the young lady who spoke first made about estuarine dependent finfish cannot be understated or estimated. Structures at the tips of islands in fact reduce the volumetric flux through the island. There are dynamical reasons for that and North Carolina's fisheries relies to the degree of about 80-90% of the annual yield comes from estuarine dependent finfish. That volumetric flux of those larvae and the juveniles will be obstructed if you put jetties also through the inlets. It will change the natural transport pathway and the processes that bring those estuarine dependent finfish into the primary nurseries which will in fact automatically deplete the number of adults that will be available to our commercial and recreational fisheries. Thank you.

Tracy Skrabal stated I am with the North Carolina Coastal Federation. I am also one of the subcommittee members charged with making recommendations to the CRC and a CRAC member, but I want to speak to you today as a coastal geologist and a former regulator. I have lived in other states Virginia, Maryland and Delaware and while I lived there working in coastal management and as a regulator, North Carolina was known up and down the coast for its strong and progressive regulations and statute. It is also known for the fact that it placed the benefit of all of its citizenry at the heart of these regulations and programs. I would have to say that every state that I have lived in had hard structures on their shorelines and it is in fact enviable to be able to live in a state where we have natural beaches. I want to say the other thing about the CAMA program is that it doesn't just do nothing. The CAMA program has outlined many options for dealing with coastal hazard mitigation and a progressive approaches. Currently your

staff is working on sea level rise recommendations and responses and adaptive management. All of these programs are going to provide some benefits and some approaches over the next couple of years to deal with the problems that not just those adjacent to inlets are facing, but those on all of our barrier islands. The gentleman spoke and mentioned that the report said that terminal groins might provide protection. It is true the report showed in the first mile there was accretion where there had formerly been erosion. But it also showed that in three of the five study sites you had increased erosion in mile two. No response or no change beyond mile two moving away from the groin. It also showed mixed responses on the other sides of the groins on the other sides of the inlets. In some cases you actually increased erosion on the other side of the inlet. What about those folks? I don't imagine that it would be very long before those folks are going to be demanding of the legislators and of you all. Is our erosion no less important than those that happen to live in the most hazardous place that we have which is our shifting inlets? As a coastal geologist I can think of absolutely no defensible scientific argument that you could present why they shouldn't be allowed to have the same types of structures if you are going to make the decision that those next to inlets should have hardened structures to protect that first mile. As a former regulator I will say that when you start getting into a situation where you go from an absolute ban that has in place numerous exceptions for things like bridges that are vital to public safety, federally registered historic sites, and exceptions for commercial navigational channels. You have exceptions to these. When you start talking about basically repealing this ban, you are opening a door that I don't envision can be closed. When you start talking about you can have a groin only if and list however many caveats you want to place on it. I think you are done. As a former regulator I have written statutes and regulations and attempted to defend them in court over issues like impracticable. The burden of proof in North Carolina is on you all. I would say that you are going to get some incredibly powerful and scientifically valid application in the door as soon as you open this up. It is going to be extremely difficult if not impossible for you all to counter why they shouldn't be allowed to put that groin in based on their arguments that it is impracticable to do anything else. I would caution you. You have an excellent statute in place right now. Once you open it up, not only would I envision that it's going to be virtually impossible for you to say no to the applicants coming in the door, but it is going to be virtually impossible to say no to the next series of structures that are going to be proposed up and down the coast. I have read the report and in all five cases where they evaluated terminal groins, there were other structures there associated with those study sites and adjacent to those structures. I would say that that should tell you something about whether terminal groins work by themselves. Thank you.

Harry Simmons stated I speak to you today as the mayor of the town of Caswell Beach and the chairman of the Brunswick Beaches Consortium, which is all six beach towns here in Brunswick County. The reason we are discussing terminal groins at all is because a majority of the oceanfront local governments have inlets. Both municipalities and counties have asked that this tool be considered for use in North Carolina, much as it is in almost every other coastal state. No one has said that terminal groins would preclude the need for continuing the proactive nourishment of our beaches. What has been said is that nourishment of beaches at inlets cannot be successful without a terminal groin. Beach nourishment must continue and must be a part of the beach management process easily fixing many hot spots that might be created. Has the terminal groin at Pea Island been a success? Those that I have heard from tell me that without it the Bonner Bridge as we know it would already have ceased to exist. Keep in mind that there are

some among the opposition to terminal groins who probably think that would be just fine. Has the terminal groin at Fort Macon been a success? The historical treasure that is Fort Macon is safe and sound primarily due to the relatively passive contribution of that terminal groin. Much noise has been made and will be made about the study that was mandated by the North Carolina General Assembly and what it does and does not tell us. While some will try to suggest that it is inconclusive, I suggest you look more closely. I suggest that in the absence of solid evidence of significant problems being caused by the many terminal groins now in place along America's coast you should recommend that we try a few more terminal groins in North Carolina in addition to the two that are functioning as designed at Pea Island and Fort Macon. I remind you there are exceptions already available in both statute and rule. Some structures already exist on our coast and others could be permitted right now if proper conditions existed and local sponsors applied for them. The existence of current structures has not driven us even close to the brink of armoring our coast which I believe all of us here continue to oppose. There is concern that a terminal groin will sprout up at every inlet destroying the pristine nature of much of our coast. That will not happen. There may be only a handful of logical sites for terminal groins on the North Carolina coast. One would never consider putting one at a pristine inlet, on an uninhabited island or at any location where man's hand had not already been felt by decades, even centuries, of manipulation mostly from constant inlet dredging. Of North Carolina's 320 miles of ocean coastline at least half of it is already perpetually ensconced in a national seashore, state park, wildlife refuge or coastal preserve. You may remember that much ado was made almost two years ago about a letter signed by 43 scientists, most from outside of our state, telling us that terminal groins are bad. About a half dozen of the signatories are or were members of your own coastal hazards science panel. Yet not one of those who signed that letter has offered any peer reviewed data to substantiate their claims of doom and gloom despite having many opportunities to do so. With regard to changing the law banning hardened structures, may I again respectfully remind you that the person most responsible for changing the rule to statute back in 2003 is the exact same state leader who supports the change that is being proposed now to allow terminal groins. Finally, the few locations in North Carolina that would be likely candidates for a terminal groin all have one major thing in common, sandbags. Massive piles of critically important, but unsightly fabric bags causing far more of a challenge to public access and coastal habitat than any terminal groin ever would. A terminal groin would result in more public recreational beach and would actually create additional public beach access. For those who wish to see it with your own eyes, a caravan of vehicles awaits us outside this building to take you on the 10 minute drive to the east end of Ocean Isle Beach immediately after this public hearing. Don't make a decision on this issue without at least seeing what the impacted local governments on our coast see every single day. I urge you to recommend to the General Assembly that they allow the permitting of terminal groins in North Carolina in conjunction with beach nourishment and that the DCM staff and CRC by a thorough, site-specific review of each petition be given the authority to grant such permits. Thank you for the opportunity to comment.

Todd Miller stated I would like to start out by saying that I appreciate the process this Commission has been through and I know it has been a long and difficult journey. I am the Executive Director of the North Carolina Coastal Federation. There is a story I frequently tell about a well know politician in Carteret County who I won't identify. At a very controversial public hearing he stood up, looked at the crowd of 400 people in the room and said I have friends that are for this proposal and I have friends that are against it and I stand with my friends.

Unfortunately you are not in a position to be able to do that. I think the Legislature has thrown the ball to your arena and I think in doing that they asked for your best professional and talented experience in dealing with these issues. I hope when you make your recommendation to the General Assembly that it is based on what you believe is really going to work for the future of our coast and not based on trying to make somebody happy. With that you have heard many of the arguments for and against and you are going to have to make a decision tomorrow. Thank you.

Tom Jarrett stated I am here representing myself although I sit on the science panel and I am one of the original members of the science panel established back in 1996. There are just a few points of clarification I want to make. Importantly with regard to the terminal groin up at Pea Island, there was an attempt made by the consultants to remove the effects of beachfill, but that process that they went through to do that is not proper. A lot of the fill that was credited to being placed on Pea Island was really material placed in the nearshore and not directly on the beach so taking that out of the shoreline change data tweaks it one way. The bottom line is if you look at the survey data of the shoreline behavior on Pea Island post-groin versus what was going on on Pea Island based on DCM's own data you will see that there is a vast improvement in our reduction of the amount of erosion on the northern four miles of Pea Island. There has been a tremendous amount of erosion down in Rodanthe, but that erosion was occurring well before the terminal groin went in. There is no physical way you can associate what is going on at Rodanthe with anything going on up at Oregon Inlet. I challenge anyone to provide me with scientific reasoning and scientific data that would show a link. Pea Island is much better off today than it was prior to the construction of the terminal groin and you can twist the beachfill anyway you want to, but the bottom line is the combination of the terminal groin and beach nourishment has worked up there. The study didn't touch on the dredging issue as was brought up earlier by Ms. Deaton. We have four or five examples in North Carolina where beachfill has been repeatedly tried next to inlets and each and every one of those attempts have been miserable failures. The report talks about the impacts of terminal groins on the formation of sand flats yet there is nothing in the document that supports that conclusion. My comments on the executive summary should be part of the record and I strongly suggested that the conclusions that are not supported by information in a report be removed from the executive summary. With regard to the size and location of the terminal groin, it is not related to whether an inlet is being dredged. It is related to whether or not there is development there; the dredging takes place because there is development. The terminal groins are put in to protect a certain shoreline reach that is being impacted by inlet processes. Some of those processes may be impacted by the dredging, but the terminal groin size is not based on how much dredging is taking place. It is based on the size of the inlet and the area of the shoreline that you need to protect. The association that is implied or given in the report that terminal groins are needed only at places where dredging takes place is not correct. All one has to do is take a look at Fort Fisher. The state rules did allow the construction of a revetment at Fort Fisher to protect that historic site. This was a very proper move. The impacts of that structure conducted by the Corps of Engineers for the state of North Carolina since 1996 show that there have not been the dire impacts of that revetment down the coast. If you get down and look at the details of what is going on at Fort Fisher you will see that the revetment hasn't caused the acceleration of erosion down coast. My comments are based on 44 years of experience in coastal engineering, 34 years of that was spent with the Corps. I have seen the application of terminal groins up and down the coast of the U.S. Like my colleague,

neither one of us has ever come across a terminal groin that has exhibited characteristics that would be classified as a catastrophic failure. If there are instances where there may be a hot spot transferred from the inlet to some other location the application of these structures are part of an overall shoreline management scheme that will include beach nourishment. If you transfer erosion to another site, my guess is that erosion that is created somewhere else is a lot less than what is taking place at the inlet and can easily be handled through the proper application of fill. I appreciate the opportunity to comment.

Molly Diggins stated I am the state director for the North Carolina chapter of Sierra Club. The Sierra Club has about 16,000 members here in North Carolina. I appreciate the opportunity to comment today. Sierra Club has supported the current ban on hardened structures since the beginning of this debate. I personally have been attending public hearings on this matter easily for two decades. What strikes me is how much the debate has changed and how much more urgency there is. Panels such as this are trying to grapple with the pressures on our coast both from population increase, but most notably from sea level rise. For people across North Carolina the current policy is perhaps the single most important assurance they have that the public's beaches will be there and will be natural for themselves, their families, their children and into the future. You are all aware that there are very important studies going on that affect North Carolina. Federal resource agencies have identified that we have one of the three most vulnerable coastlines in the nation to sea level rise. There are studies underway to help North Carolina figure out how to best adapt and what best land use policies to have with respect to sea level rise. The Division of Coastal Management is working with the Division of Emergency Management and experts on risk to try to help the state decide on the best management strategies. It makes little sense to us to consider the matter of terminal groins in isolation from those other policies. Lacking anything in the consultant's study that would make a definitive case as to why current policy is not serving the state well we would urge you to join federal resource agencies and state resource agencies in upholding the current policy which we also believe gives you the most flexibility as you consider the many tough decisions that are coming your way in the next few years. Relaxing or eroding the current ban would put intense pressure on development in the most vulnerable parts of our coast, the inlets. This simply takes us in the wrong direction at a time when these kinds of decisions should be made in coordination with what we know about what pressures are coming to the coast and what advice is going to be forthcoming from these expert bodies. I do want to point out that we have submitted a letter on behalf of the Sierra Club, North Carolina Conservation Network, Environmental Defense Fund, North Carolina Audubon Society, and the Conservation Council of North Carolina. Together these groups represent tens of thousands of North Carolinians who urge you to uphold the current policy. Thank you.

Jeff Achterberg stated I appreciate this opportunity to speak. I have no studies and I have no data. I happen to live on the east end of Ocean Isle Beach. We purchased a home there about five years ago and I am here to put a personal face on this whole debate. I have neighbors and friends that I talk to each and every day. Some of them have lived there for over 20 years. I have neighbors across the street who are battling with sandbags and the ocean hits their house to the point where they move to a hotel every time we have a bad storm. Their name is Tom and Mable Blevins. They are in their eighties and they bought this house over 30 years ago as a retirement home. They by no means are rich, wealthy beach house owners. This is all they have

left. This is their retirement. They bought this house as a fifth row house on the east end of Ocean Isle Beach. It is now not just oceanfront, it is part of the ocean. Chris McKenzie is a contractor who owned property next door. He in the downturn of this economy had battled and battled with the inlet erosion on the east end of Ocean Isle Beach. His kind heart helped those of his neighbors who could not afford the sandbags. He lost his battle. He no longer owns the home. He no longer has his construction business the way he had it running before the downturn in the economy. I hear arguments nature and wanting things to be natural. I would like them to remain the way that I have seen them. I have been coming here for over 12 years. I also know that what we have is not natural. We dredge inlets. We have an Intracoastal Waterway. We have a huge boating population. It is increasing every year. The inlet at Ocean Isle Beach, which is called Shallotte Point or the River Inlet, is dredged. When I first came here 12 years ago there had been a beach renourishment before I started coming to Ocean Isle Beach. At that time the beach had been stabilized and everyone was happy. I have heard stories about how things were saved and there was more beach for more people to come down to the beach and enjoy. Recently we had another beach renourishment. That beach renourishment I observed out my front porch. It only lasted three to four months when the last beach nourishment lasted years. We keep dredging the inlets. I keep hearing we want things to remain natural. We should stop dredging the inlets and let the island shift and close off the inlet to let the sand to where it may. I still understand that we want to keep the Intracoastal for national security and for tourism and for the fisheries. We either stop dredging inlets or we do something to mitigate the damage that we cause. If humans are causing damage then we have to do something to mitigate it.

Debbie Smith stated I am not a scientist and not an engineer. I can't talk technicalities with you. I have read these monitoring reports and I have an opinion of my own. I want to remind you that you know what a long last couple of years this has been. Even before it got to you, the towns and counties in North Carolina have been to the legislature trying to seek some relief to a problem we have adjacent to our inlets. I will back up what Tom Jarrett said. My town has spent money to renourish the beach adjacent to the inlet to no avail. It was a very expensive experiment. We have not lost adjacent to Shallotte Inlet just since the inlet has been dredged. That inlet was never dredged before 2001. We have lost row after row after row of homes and street after street for the 55 plus years I have lived there. The first house we lived in was about two and a half blocks from the ocean. It is now a second row house. One major storm will make it oceanfront. It is not isolated to the last few thousand feet of the island either. It is making a constant creep right up the island. It is a very serious issue to us and a very serious issue to many towns and counties in North Carolina. I would like to remind you that there are 14 towns and counties in the state of North Carolina that have banded together to attempt to have another tool to protect our shoreline. They have spent time, effort and money and they directly represent several hundreds of thousands of people that live in these towns and own property in these towns. They also represent many visitors that come to our beautiful beaches to enjoy it. I would like to reiterate what Harry said and I would like to invite you to the east end of Ocean Isle Beach and let you see firsthand what it looks like today. I think every one of you has enough vision that you can see what a terminal groin may protect there. It is not just homes; it is roads, sewer systems, cable wires, telephone wires and water lines. We have moved man holes off of the beach. I don't want to continue to do that every year or every other year. Those 14 towns and counties that represent those hundreds of thousands of people in North Carolina, Brunswick County and Dare County, Town of Nags Head, Town of Carolina Beach, Town of Caswell

Beach, Town of Holden Beach, Town of North Topsail Beach, Village of Bald Head Island, Town of Oak Island, Town of Ocean Isle Beach, Town of Topsail Beach, Figure 8 Island Home Owners Board of Directors, Emerald Isle, and New Hanover County. They are begging for another tool to protect their livelihoods and their towns and counties. I hope you will consider a favorable report to the Legislature to give us a tool to protect what we are charged with protecting. It is in your hands to give us those tools to protect our properties and our towns. Thank you.

Representative Frank Iler stated this is our fourth or fifth visit together. I welcome you to Brunswick County. We have mayors and representatives in the room today from several of our communities. Brunswick has 19 towns in the county limits, six of which are beach communities. At least three of those have inlets and beaches which are seriously threatened. You have heard from mayors and citizens and attorneys from those towns. I have lived in five counties in North Carolina. Four of those five counties basically felt left out when it came to their state government in Raleigh. When I came to Brunswick County eleven years ago I saw a profound distrust of our state. Whether it was tourism, fishing regulations, road funds, or other issues Raleigh in the people's opinion was not being helpful. I think this is something everyone in the room would like to change. I understand your recommendations will be done tomorrow. Since we don't really know the result of the terminal groins that we have been talking about, this will give you a chance to study a terminal groin or whatever number you approve to help you manage the coast. Some of the studies I have been hearing today seem to be very selective about what they choose to talk about. We have to admit that man has created a lot of the problem on the barrier islands and created the barrier islands themselves by dredging the Intracoastal Waterway. I was told that my town of Oak Island was not an island before we dredged the Waterway. Doing nothing is suddenly very progressive, but that was a new one for me. Instead of continuing to guess, why don't we all study a new site? Let the study of that be a real-time, current example. We haven't been able to study what hasn't happened yet with sea level rise and fall. I think it would be very hard to study what hasn't happened yet, but I don't have a PhD. Doing nothing should not be an option. I implore you to not do nothing. This week you have the opportunity to partner with some of these towns and communities on the coast to solve some serious problems. Correct the blanket regulation barring terminal groins, give the towns a chance to make their case and recommend the Legislature give the CRC the authority to permit terminal groins on a case by case basis. The Senate has already approved Senate Bill 832 that would give you the power to manage the coast and permit terminal groins on a case by case basis. Give us a chance to vote on it in the House by recommending that the Bill come out of the House Environmental Committee and give us a chance to vote on it. I have said this before, but I hope the next time I say it it will be on the floor of the House. If not this, then what? If not now, then when? Thank you very much.

Jean Hutchinson stated I am from Sunset Beach. I am not a scientist either. I am not an expert nor do I claim to be an expert on this particular issue. In my past life I was the environmental advocate for the Virginia Department of Environmental Quality. In the summers we head north and live on Lake Champlain in Vermont. Both of these areas do not deal with terminal groins at all. However, it does deal with the environment. One thing that I have learned is if man screws up the environment it is very difficult to put it back to rights. If you can do it, it costs the Earth. We only have one of those. I am puzzled why our Council would ever agree to go along with

terminal groins. In Sunset Beach we believe they are going to have a very negative impact on our pristine white beaches. That may sound terribly selfish and it is. Before you, and I don't envy your position, you have conflicting viewpoints from engineers and scientists that say on one hand terminal groins differ from traditional groins by allowing some sand to pass over it thereby negating erosion downward from the groin. However, there is a great majority of some of the top coastal scientists in North Carolina who believe any structure placed at the terminus of a barrier island will interrupt the natural sand movement and cause negative impacts on adjacent islands. North Carolina State University has a fantastic book out that shows how the barrier islands or inlets have moved over the last 40-50 years. It is an amazing that these islands move. Man has got to adapt to that and although I feel for Ocean Isle Beach and what they are going through I don't know that terminal groins are the answer. I would like a whole lot more information. A letter was recently written to the Brunswick Beacon, our local newspaper, that a groin on the east end of Ocean Isle Beach will deprive sand from half a mile west of Shallotte Inlet including central and the west end of Ocean Isle and all of Sunset Beach. While groins at Bogue and Oregon Inlet have pointed out as success, in fact massive erosion has occurred at the beaches downdrift and they have required massive amounts of renourishment to rebuild those damaged beaches. Our own island has probably benefited from the jetty at the end of Bird Island, but the area downdrift from that jetty has also required continuing beach renourishment to keep those beaches functioning. We don't want to be in the position where we suddenly require expensive beach renourishment to keep our own beach healthy. There can be no question that it is not in the best interest of Sunset Beach to support any change with the current policy banning terminal groins. Where you have such divergent positions amongst scientists about what the net results of the change might be. I really thank you for coming to this area and taking the time for this. I don't envy your position and the decisions you have to make. Thank you.

MINUTES

Lee Wynns made a motion to approved the minutes of the February 17, 2010 CRC meeting. David Webster seconded the motion. The motion passed unanimously (Weld, Cahoon, Elam, Webster, Mitchell, Wilson, Wynns, Simmons) (Peele, Shepard, Old abstained) (Leutze, Carter absent for vote).

EXECUTIVE SECRETARY'S REPORT

DCM Director Jim Gregson gave the following report.

Sea Level Rise Report

Dr. Overton will present some information on the Science Panel Sea Level Rise Report. The CRC's Science Panel on Coastal Hazards has released its "North Carolina Sea Level Rise Assessment Report." The full report is currently available on DCM's web site. This report is part of the CRC's initiative to examine relative sea level rise in North Carolina, in an effort to help the Commission prepare to address the potential effects of rising seas through policy development and adaptation planning. The Science Panel recommends the adoption of one meter (39 inches) of sea level rise as a rate for future policy and planning purposes. Tancred

Miller presented the report to the N.C. Legislative Commission on Global Climate Change last week.

Terminal Groin Study Public Comments

The CRC and the Division have received numerous comments on the terminal groin study over the past several months, both written and in person at public hearings. These comments are from environmental groups, county governments, local governments, state agencies, scientists, engineers, coastal property owners, and other NC citizens. In looking at these comments, we found about 53 specific comments in favor of terminal groins; 19 that had no specific opinion, but expressed the hope that the CRC would look carefully at the issue, or were simply commenting on scientific issues in the study reports; and 1,059 individual comments that were not in favor of using terminal groins for erosion control. Please note that of the comments not in favor, 1,034 are from members of the NC Sierra Club and NC Audubon Society. We are continuing to receive more of these comments from Sierra Club and Audubon members each day.

In addition, some others on both sides of the issue have commented multiple times. All comments received on this issue are available in a PDF file on the Terminal Groin Study web site. The file is updated as we receive new comments.

Clean Marina

The Southport Marina in Southport is the latest facility to be certified as a North Carolina Clean Marina. To earn the certification, the marina's owners have prepared spill prevention plans, safety and emergency planning and strongly limit boat maintenance activities.

Staff News

Pat Durrett has been hired part-time as the Clean Marina Coordinator. She'll also eventually be taking on the Pumpout Grant Program from Mike Lopazanski. Pat is a former employee of the Division of Water Quality and brings a good deal of experience in outreach activities which will be an asset in assisting DENR with establishing criteria for pumpout facilities and pumpout services as mandated by HB 1378 "Clean Coastal Water and Vessel Act". She'll be located in the Morehead office.

Our Minor Permits Coordinator, Ed Brooks, is recovering at Duke Hospital following a double lung transplant earlier this month and cardiac bypass surgery. Ed remains in intensive care in the isolation unit. Please keep Ed in your thoughts.

CHAIRMAN'S COMMENTS

Chairman Emory stated 2010 has been a blur. The sea level rise symposium on the heels of our January meeting and since then numerous terminal groin meetings. I would like to say a little bit about the terminal groin process. If nothing else, I think it has been an open process and that was our plan from the start. We have had steering committee meetings and several Science Panel meetings which have all been open to the public. All of the comments that we have received have gone on to the DCM website immediately. The legislation called for three public hearings and we have had five. Whatever we end up thinking at the end of the day we should remind

ourselves that this has been an open process and everyone with an opinion has had the chance to express it.

CRAC REPORT

Dara Royal, CRAC Chair, stated the CRAC had a full afternoon yesterday. We started with a presentation from staff of the Department of Transportation and Wildlife Resources Commission about their new memorandum of agreement for providing public access at D.O.T. bridge crossings. This is a common sense approach that allows D.O.T. and the WRC to coordinate prior to bridge projects so that public water access could be installed or preserved. Our local government members were very encouraged to see this MOA and to have the opportunity to work with agencies to preserve our historical accesses as well as to add potentially new facilities. Phil Prete, senior environmental planner with the City of Wilmington, gave a presentation of some work that the city is engaged in to prepare for sea level rise. The city did a benchmark study of 26 other cities around the country to evaluate policy measures that those cities had adopted. The study ranked the efficacy, impacts and political feasibility of the different policies. The City of Wilmington can use this analysis to consider policies of their own. According to Mr. Prete, local governments like the City of Wilmington need state technical assistance, data, and regulatory guidance in order to further prepare themselves to adapt to sea level rise. We had the opportunity to revisit the issue of local government takeover of federal nourishment projects. Doug Huggett reported the results of a meeting among representatives of the CRAC, Corps, and DCM Staff. The meeting was requested by the CRAC for the purpose of evaluating whether it is administratively feasible for local government to take over the responsibility for completing a beach nourishment project in situations that the Corps isn't able to do so. The CRAC wish to avoid having local governments undertake the time and expense of preparing environmental review documents since the Corps had already done so and wanted local governments to be able to use the Corps' environmental reviews in their permit applications. Doug said that DCM offered two options. Local governments could either apply for an express permit or for what Doug called a programmatic Major permit that would in essence be a duplicate authorization for the Corps project. Doug said that in either case the local government work proposed would have to be identical to the proposed Corps project and that local governments could probably rely in the Corps' environmental documentation. The details of the programmatic permit are yet to be worked out, but the CRAC feels that these options are a workable resolution to what has been a major administrative problem. Finally the CRAC had a discussion about DENR's draft boards and commissions report. Frank Rush and I, working with DCM Staff, proposed a reduction in the size of the CRAC and changes to the composition and appointment method. However, the Council feels very strongly that the current size and composition was established for good reasons which continue to be valid today. The Council decided unanimously that any changes should only happen over our protest and we will be submitting comments to DENR recommending that the existing structure would be retained.

ACTION ITEMS

Land Use Plan Certifications and Amendments

John Thayer stated both items before you are certification requests. The first is Tyrrell County/Town of Columbia joint land use plan. This is a request for certification of the plan per the new guidelines. The second is a land use plan amendment by the Town of Atlantic Beach.

They previously received certification on their updated land use plan in 2008. This amendment is to ensure that the land use plan and their local zoning code are complimentary. Their amendment involves map changes and text changes in the document to ensure compatibility. Staff's recommendation is that the plan has met the substantive requirements of the 7B guidelines and there are no conflicts. You will note in the recommendation that we also recommended determination regarding policy 97 that is not enforceable for state and federal consistency purposes. This policy statement is similar to policies in some of the other rural counties, especially in that area. It basically opposes the OLF. There was an opportunity for the public to submit written comments and none have been received. Staff recommends certification with the determination that policy 97 is not enforceable for state or federal consistency purposes.

Bill Peele made a motion to approve Staff's recommendation to certify the Tyrrell County/Town of Columbia land use plan. Charles Elam seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Webster, Mitchell) (Carter, Leutze absent for vote).

Charles Elam made a motion to certify the Town of Atlantic Beach land use plan amendment. Joan Weld seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynns, Peele, Weld, Shepard, Simmons, Webster, Mitchell) (Carter, Leutze absent for vote).

PRESENTATIONS

Sea Level Rise Update

Dr. Marjorie Overton, Chair of the Science Panel, stated this effort by the Science Panel began in the fall when we heard that the Division of Coastal Management was considering sea level rise and the Panel asked to be a part of that process. The outcome worked pretty well. There was a question at the sea level rise forum where I was asked about our next plans and stated that my plan was to keep the Science Panel together. A lot of conversation about sea level rise first happens with trying to convince people that sea level rise actually exists. For some it is obvious in the record. In the Science Panel there are a number of geologists and you will see in the technical report there is evidence in the geologic record for sea level rise. One that speaks to other people is the evidence in the water gauges or tide level gauges that we have around the state. A rate was shown for how much vertical water rise was observed in the data plus or minus a standard error. The length of time of the record is also considered. In our discussions, because of some issues in the Wilmington gauge relative to navigation of the dredging of the channel and changes in the record, many of us felt like the Duck gauge gave a reliable, reasonable near-term reliable water level record of what sea level was doing. We adopted the thought that at a minimum or at least from our record that using 4.27 mm/year you could take that and extrapolate out to see where we would be in 2100 assuming that things stay the same. The conversation on climate change argues that things are not staying the same and that water level rise is evidenced by changes in temperature, expansion of water, melting of ice caps, etc. and there will be acceleration. Using the literature we went to two estimates in 2100. They are supported in a number of the papers as reasonable thought of what might occur. It is one meter. There are some in the literature that are arguing 1.4 meters and even two at this point as far as worst case scenarios. The group felt that 1.4 is a large enough value for you to think and plan. One meter is

a reasonable thing to begin discussions. I do not want you to think that we know precisely in 2065 exactly what the mean water level is going to be. This is a conceptual idea of how we are going to get from today to the future. The science and the data are changing rapidly and we will continue to look at what the specific information is in North Carolina through the gauges. We will revisit data and issues at a five year increment.

Terminal Groins Study Recommendations (CRC 10-13)

Bob Emory

Paul Tschirky of Moffatt & Nichol stated House Bill 709 was the overall study organization. The legislation directed the Coastal Resources Commission to conduct a study of the feasibility and advisability of the use of a terminal groin as an erosion control device. This part of the study was the fact gathering and analysis to support it along with the six parts of the legislation. The legislation said that this study should consider the scientific data regarding the effectiveness of a terminal groin constructed in North Carolina and other states in controlling erosion. We have called this the physical assessment in the study. The study should consider scientific data regarding the impact of terminal groins on the environment and wildlife habitat. This is the environmental assessment portion of the study. The study should consider information regarding engineering techniques used to construct terminal groins and any new technologies to limit impacts on adjacent shorelines. The fourth part of the legislation said the study should include information regarding current and projected economic impact to the state, local government and private sector from erosion caused by shifting inlets including the loss of property, public infrastructure and tax base. This is the economic portion of the study. The study should include information regarding public and private costs of construction and maintenance of terminal groins. The study should address whether the potential use of a terminal groin should be limited to only inlets that were navigable and dredged.

Five sites were selected for the study. One of the findings is that the terminal groins trap sand and they are dissimilar to a jetty. Terminal groins are commonly built on either or both sides of inlets. A consequence of when a structure is built on the downdrift side of an inlet is the stabilization of the inlet by preventing migration of the inlet channel. Dredging can have significant impacts on the inlet morphology and sediment processes of the ebb tidal delta. Shoreline change includes all of the impacts between the two times in which the shorelines were measured that includes beach nourishment and dredging that have occurred in each area. Looking at shoreline change alone does not solely represent the impact of a terminal groin. Quantitative analysis were performed for the shoreline change and converted to volumetric changes based on these shoreline changes. The volumetric changes are calculated after subtracting out all the beach nourishment and nearshore placement activity and adding back in effects due to dredging. In all cases, the shorelines on the structure side of the inlets were eroding prior to construction of the terminal groin. After the construction, the shorelines on the structure side of the inlet were generally accreting. The data on the opposite side of the inlet in these five case sites does not display a clear trend. A positive result indicates an improvement and does not always mean that we have gone to accretion. A negative change means the converse. On the terminal groin side of the inlet there was a significant positive net result on the first mile of shoreline, except at Amelia Island where the positive result only occurred on the first half mile. For Oregon Inlet, Fort Macon and Amelia Island there is a moderate negative

result over the second mile and much less of a change in the third mile. Oregon Inlet was the case where we had six miles of monitoring data and in each other case we looked at three miles on each side. For Oregon Inlet, further down the Pea Island shoreline there is a positive result present over the fourth mile and minimum changes when we get to the fifth and sixth miles. On a cumulative basis for Fort Macon and Oregon Inlet the positive result is significantly greater, approximately 150,000 cubic yards per year, than any of the negative results over the shoreline reaches analyzed. Amelia Island does not show a net positive result, but an adjustment in post construction shoreline that occurred during this short post-construction analysis interval. For Captiva Island and John's Pass the positive result is apparent basically over the entire three mile analysis length of the shoreline with cumulative positive results. Looking at the opposite side of the inlet the changes show there were typically a minor to moderate negative result over the first $\frac{1}{2}$ to $\frac{3}{4}$ mile. Whether this is an effect of the terminal groin or from other impacts is not possible to definitively conclude from the data available. For Captiva Island, John's Pass and Shackleford Banks the results turn positive after the initial distance with net cumulative positive results over the shoreline analyzed for Captiva Island and John's Pass and a negative result for Shackleford Banks. At Oregon Inlet the negative result continues for this second mile with minimal change over the third mile. How do we separate out dredging effects? Much like nourishment, the influence of dredging material from the inlet system must be accounted for when we attempt to assess the impact of the terminal groin. The results showed that one must assume about 25% of the material dredged from the inlet would have naturally reached Shackleford Banks for the negative effects from pre to post-construction change over the three mile section of shoreline to turn into a positive one.

Dawn York of Dial Cordy and Associates stated the legislative language did consider the impacts of terminal groins on the environment and natural wildlife habitats within these systems. The environmental effects of a terminal groin structure alone could not be assessed in the study for the sites without considering the associated beach nourishment activities. The potential effects of terminal groins in conjunction with shoreline management such as beach nourishment on natural resources does vary according to various factors of conditions including the type of construction equipment used, the nature and location of sediment discharged within the study area as well as the time period of construction and maintenance in relation to the various life cycles of resources or organisms that could potentially be effected within the study area. The construction of a terminal groin as well as beach nourishment and dune construction does prevent overwash and inlet migration thereby contributing to a loss of habitat for breeding and non-breeding shorebirds and water birds including the threatened and endangered piping plover. Terminal groins are typically used in combination with long-term shoreline protection program such as beachfill. In areas where pre-project shoreline conditions are generally degraded already with limited potential sea turtle nesting activity. According to the results that we collected in the study the historical nature of the terminal groins at Fort Macon, John's Pass on the northern end of the inlet, as well as Redfish Pass, the trends of the effects of these groins on the resources is somewhat limited. We were lacking pre-construction data for these sites therefore making empirical determination impossible. During the study we did use control sites and or regional sites which helped strengthen the ability of the study to infer an impact from a detectable change, however because we were unable to have pre and post-construction data we were unable to determine from statistical evidence a change. We also lacked complete data sets and high levels of confidence in the quality of the data, therefore statistical analysis was precluded. The

development that is located at most of these study sites and the use of some of these sites basically precluded unrestricted utilization by various natural resources. Sea turtles, avian species, and marine species do continue to make use of these managed sites although it is on a limited basis. The terminal groins at both Oregon Inlet and Amelia Island are more recent construction projects. Pre and post-construction natural resource data was readily available and was evaluated. The more recent data collected since construction does indicate an increase in public interest and participation as well as increased funding for various monitoring of these resources. Although shorebirds and sea turtles do utilize these locations, neither significant trends nor adverse effects were discernable from the available data. The resources present at both Amelia Island and Fort Macon locations were compared to undisturbed neighboring and barrier islands where the data does indicate that those resources at the control sites were more prevalent. Anchoring the end of a barrier island may curtail an inlet's natural migration pattern thereby minimizing the formation of various habitats such as sand flats. Resources do continue to use these terminal groin sites where these structures do exist, however if habitat succession does occur we do understand that species suitability may be effected.

Johnny Martin of Moffatt & Nichol stated one of the other portions of the study was to look at engineering techniques to limit impacts on adjacent shorelines. The summary findings of all five study sites consist of rubble mound rock groins. Terminal groin design is very site specific. The length, height and permeability of the groin will determine how effective it is at trapping sediment on the updrift side of the groin and on the overall impact of the groin on sediment transport. Long groins that are built above the seasonal high water level or are completely impermeable will most effectively block sediment, however short groins with high permeability may not block enough sediment to be effective. In reviewing the literature the recommendations are that terminal groins should be just long enough to retain the required beach width without causing an undue reduction in sediment transport downdrift. Ideally the groin height should be limited to just above the beach level. Rock is generally the most widely used material because it is readily available and highly durable. Concrete and steel are also suitable for building shorter mid to shallow water groins, however these materials do tend to be a little cost prohibitive. Timber and geotextile groins are less expensive alternatives and can be adapted to a variety of beach conditions, but they are limited to their applicability to shorter shallow water conditions. Concrete, steel and timber structures do have the advantage of being adjustable with the beach profile without having to rebuild or remodel the groin. Groin notching is an emerging technique that allows for adaptive management and allows sediment to bypass the groin where it would normally be trapped. This may prove to be a cost effective alternative to groin removal. It appears that for shorter groins the interruption of lateral transport is smaller compared to the overall magnitude of sediment transport and muted impacts seen updrift and downdrift of the inlet. There seems to be a threshold for both length and height where adjacent impacts become more pronounced. While it is possible that the dredging impacts may be responsible for this threshold crossing, it underlines the importance to consider the overall length of structure in relation to the other exterior manmade and natural processes that also drive sediment transport at the inlet. The permeability of the structure also has a significant impact on adjacent shorelines. Amelia Island has allowed material to bypass the structure and limit impacts downdrift; however the structure has also had a limited impact on the updrift shoreline mainly within the first half mile. Other structures that have an impermeable core appear to hold more sand for a greater distance updrift of the structure.

Paul Tschirky stated the economic portion of the study was a little bit different in the sense that it doesn't look at the five study sites that were selected, but attempts to look at economic evaluation both projected and current. The proposed 30-year risk areas that were developed by the Science Panel were looked at. Lines were drawn within the inlet hazard areas and Dr. Dumas looked at the economic value oceanward of those lines. The economic value risk within the 30-year risk areas for developed shorelines varies greatly from about 27 million at Ocean Isle to over 320 million at Bald Head Island. It must be noted that not all of these properties could be protected by a terminal groin. The second part of this was to try and look at current economic value and it looked at the sandbag database and looked at properties that were imminently in danger. The economic value at current or imminent risk for developed shorelines varies from just under 3 million at North Topsail Beach to about 26 million at the north end of Figure 8 Island. Dr. Dumas used county parcel data to come up with the valuations and also looked at the tax value and tax revenue and used the 2007-2008 reevaluation numbers for North Carolina. The barrier island and municipal tax bases ranged from 409 million for Caswell Beach to over 4.2 billion for Emerald Isle. The county wide tax bases range from 3.8 billion for Pender County to 29.1 billion for New Hanover County. The full value of residential property may not be lost in the event that properties themselves lost to shifting inlets as some of the property values associated with these oceanfront or soundfront locations may then transfer to oceanfront property. Additional factors that will affect the economic value in inlet areas were reviewed but not specifically quantified because of lack of data. Beach recreation value, shore surf, beach fishing, primitive hiking, camping values, wetland recreation values, the value of non-game wildlife in beach and coastal wetland areas, value of wetlands in supporting recreational fishing, values of wetlands in protecting property from hurricanes and wind damage and values of national seashores and refuges were looked at.

Johnny Martin stated construction costs of terminal groins can vary greatly depending upon construction materials, length and beach profile. Construction costs range from one million dollars from some of the shorter ones up to about 24 million for the structure at Oregon Inlet. In developing what potential cost might be in North Carolina, four cost scenarios were developed. What we found was the cost for rubble mound or rock terminal groins could range from about \$1,200.00 per linear foot up to \$5,200.00 per linear foot depending on the length and steepness of the beach. Steel or concrete sheet pile or timber terminal groins could range from \$4000.00 to \$5000.00 per linear foot. Initial project costs included constructing the terminal groin, initial beach nourishment, and permitting and design fees. This ranges from 3.5 million dollars to over 10 million dollars. Annual project costs for maintenance, repair, annual beach nourishment and monitoring could be in a range of \$700,000 per year to over two million dollars per year depending on the length of the structure. Terminal groins are constructed as a part of a broader beach management plan and may make nourishment adjacent to inlets feasible, but they do not eliminate the need for ongoing beach nourishment. These costs could vary substantially based on site conditions and design parameters. The legislation asked whether terminal groins should be limited to navigable, dredged inlet channels. The summary findings were that a vast majority of structures considered for this study were at inlets that were adjacent to navigable, dredged channels. No terminal groins were identified as being located at the end of a non-inlet littoral cell. The more substantial, longer, higher, or less permeable terminal groins were typically found where the greatest amount of dredging activity occurs. The more significant the dredging

activity, the potentially greater impacts on adjacent shorelines, the greater the potential need for more nourishment or more substantial stabilization structures. These dredging activities may greatly outweigh any potential long term shoreline changes resulting from the construction of a terminal groin. With respect to locating terminal groins on updrift and downdrift sides of an inlet, both sides were represented among the five study sites. While initial thought might be that terminal groins should be located on the updrift side of an inlet in order to capture sediment, it must be noted that typically sediment moves in both directions along the shoreline near an inlet dependant on the wave activity. Based on the existing sites and literature, the impacts of terminal groins on adjacent shorelines are difficult to identify if they exist at all if located adjacent to a highly managed navigation inlet. The relative impact of these structures on adjacent areas is likely increased when sited next to a natural or minimally managed inlet.

Marjery Overton stated this process has been quite fascinating and I think the Science Panel has been actively involved from the first meeting until the last meeting. The Science Panel is a very diverse group with a lot of specific technical background in the issues as well as opinions about the issues. We have met at least five times, maybe six. We started with very direct and concrete input in picking the five inlets. I think that went well. It was a good meeting and at the end of the day we were amazed that we found structures that would suit the needs of the study and potentially help answer questions for the CRC. We had input and wide ranging conversations. Moffatt and Nichol was patient with us and listened to us. We scrutinized proposed methods for analysis and input and focused them on acquiring the kinds of data they needed. They did not do everything we recommended, but it was not our expectation that they should. The economic section was difficult for us to wrestle with. There was a very interesting meeting as we started to turn the corner and the draft report came out. It was acknowledged at the end that what we were doing was not peer review. We were consulted, we were part of the process and we gave them feedback. This meeting had an important impact on the way the final copy came out with our comments about readability and consolidation of material. At the last meeting held, we had discussion about what the final report meant and in the end there are still people talking about whether it should have been designed differently or whether we should have done site specific studies in North Carolina. With respect to the quantitative analysis there wasn't a strong signal to say don't do this. These are very complex systems. The shorelines don't tell the whole story. Moffatt and Nichol wrestled with the nourishment that was going on and the impacts of the dredging. These systems are hugely fascinating and interesting because they don't stay the same in space or time. We have a very difficult time predicting what they are going to do in the absence of human intervention. The more we know the more we want to know. There was a strong discussion about the value of going back to 1993 at the time the CRC had the option to do the variance before there was a ban. No formal vote was taken. The Panel would not want me to go one way or the other on this issue. The Panel is neutral and you will hear from individuals.

Chairman Emory stated he made an attempt to set the background for why we are engaged in this. The particular thing I would like to call our attention to is what the Legislature asked us to do. The Legislature asked us to do a study to determine if it was feasible and advisable to basically amend the state ban on hardened structures to consider the installation of terminal groins. We were asked to do a study and make a recommendation. We need to remind ourselves that is what we are asked to do. You are familiar with the six questions that the study called for. Several alternatives for Commission recommendations have been provided to each Commission

member for discussion based upon the study. These recommendations were reviewed by the Steering Committee and alternatives for Commission recommendations are provided for discussion. We could recommend that the use of terminal groins in North Carolina is feasible but not advisable and recommend no change to the current policy. Another option would be that terminal groins could be considered but only if a list of factors can be effectively addressed with an attempt to steer clear of process.

Charles Elam made a motion that the CRC recommend option B on page 10A of draft document dated March 23, 2010. This would be a recommendation that the use of terminal groins in North Carolina is feasible but advisable only if the eight factors listed could be effectively addressed. Renee Cahoon seconded the motion.

Renee Cahoon made a substitute motion that the CRC adopt the recommendation below to be submitted to the General Assembly. Jim Leutze seconded the motion. The motion passed with eight votes in favor (Old, Wilson, Elam, Cahoon, Wynns, Simmons, Leutze, Mitchell) and five opposed (Peele, Weld, Carter, Shepard, Webster).

The General Assembly directed the CRC to conduct a study on the feasibility and advisability of the use of terminal groins as an erosion control device. The study determined that terminal groins, in combination with beach nourishment, can be effective at controlling erosion at the end of barrier islands. The individuality of inlets necessitates site-specific analysis. The study findings were mixed regarding the effects of terminal groins on wildlife habitat and marine resources. If it is the desire of the General Assembly to lift some of the limitations specific to terminal groins, due to the individual nature of inlets, the following factors must be effectively met:

1. In light of the current policy favoring a non-structural approach to erosion control, the use of a terminal groin, should be allowed only after all other non-structural erosion control responses, including relocation of threatened structures, are found to be impracticable.
2. The effects of a terminal groin on adjacent beaches are variable and a primary concern. Any use of such a structure should include siting and construction that avoid interruption of the natural sand movement to downdrift beaches.
3. The nature of terminal groins and the potential effects on coastal resources adjacent properties necessitate a full environmental review. Any proposal for the construction of a terminal groin should be accompanied by an environmental impact statement that meets the requirements of the NC Environmental Policy Act (NC G.S. 113-4).
4. To ensure the adequacy of compliance with SEPA and the protection of the public interest, third-party review of all environmental documents should be required. The cost of third-party review should be borne by those responsible for the project. This third-party review should include all design, construction, maintenance and removal criteria.

5. Since a terminal groin may impact properties well beyond those adjacent to the structure, notification of property owners in areas with the potential to be affected by the terminal groin should be required. This notification should include all aspects of the project likely to affect the adjacent shoreline, including construction, maintenance and mitigation activities as well as post-construction effects.

6. As the post-construction effects of a terminal groin on coastal resources and adjacent properties are difficult to predict, financial assurance in the form of a bond, insurance policy, escrow account or other financial instrument should be required to cover the cost of removing the terminal groin and any restoration of adjacent beaches. Financial assurance should also be required for the long-term maintenance of the structure including beach nourishment activities. (Legislative authorization for requiring financial assurance would be necessary).

7. The use of a terminal groin would need an adequate monitoring program to ensure that the effects on coastal resources and adjacent properties does not exceed what would be anticipated in the environmental documents. All monitoring of impacts of a terminal groin on coastal resources and adjoining properties should be accomplished by a third-party with all cost borne by those responsible for the project.

8. As terminal groins are typically used in combination with a long-term shoreline management program, any proposal for use of a terminal groin in NC should be part of a large-scale beach fill project, including subsequent maintenance necessary to achieve a design life of no less than 25 years.

PUBLIC COMMENT

Bill Cleary stated his comments relate to a question raised by Dr. Leutze and I think Mr. Wilson and then elaborated upon by Mr. Elam. What it deals with is the impact of the terminal groins and whether Moffatt and Nichols' study indicates that the terminal groins don't work or have some negative impact. I have looked at all of the inlets south of Cape Lookout, which number about 15. So I have spent a good bit of my time over the last 40 years looking at these inlets. There is really no data available in either Moffatt and Nichol's study or in anybody else's study that indicates that these terminal groins have a negative impact upon the adjacent shoreline. Yes there is erosion that takes place on the opposite shoulder like Shackleford Banks or on Bodie Island. This stems from the fact that you are dealing with the ebb tidal delta that has been extensively dredged and modified over a period of time. You augment those erosion related issues with storms. I think this wasn't really made clear in terms of the discussion section from the Moffatt and Nichol report as evidenced by these questions. The opposition to terminal groins have absolutely no data. Tracy had mentioned Stan Riggs' study of the Outer Banks which is a great study, but what Stan doesn't do is take a look at the ebb tidal delta which clearly influences

shorelines as much as three miles away from an individual inlet. I think this is what the CRC needs to bear in mind. Tracy mentioned that there was a disservice because Moffatt and Nichol did not look at some of the data. Clearly the disservice to the CRC as well as the public and the communities that are in favor of this terminal groin need to be aware at what they are looking at. I think there has been a lot of smoke screen that has been put forth by the oppositions to this. They have no data from the physical aspect of this. I got booted off of this panel as you know because I was biased. I have worked for some of these communities, but I don't right now. I recommended a friend of mine who is an individual at Boston University, Duncan Fitzgerald. He works with tidal inlets all over the world. He came basically to the same conclusions. I spend two weeks with Duncan and he asked me why this wasn't really made clear in his report. I recommended Duncan because I thought he was the most apt individual to look at this. He has absolutely no political agenda. He lives in Boston, Massachusetts and his information and my information basically indicate that these terminal groins don't impact sand circulation. They simply don't. When I read some of the comments that have been received via e-mail, there is clearly no evidence that they do. I think that is something that you guys need to bear in mind. I can't speak to the environmental end of it, but my last comment is that the opposition has absolutely zero data to substantiate their claim that these terminal groins have an impact. They don't function like short jetties. Jetties are placed at inlets and they have far more problems. I just retired from the University of North Carolina Wilmington after 38 years. I have studied tidal inlets among other things. I was a professor of geology at the University. I have done consulting for the state, I have worked at a number of different places and I am a professional geologist.

Tom Jarrett stated I came down here with the intention of keeping my mouth shut, but after 34 years with the Corps of Engineers and most of that time spent with the Oregon Inlet project and another 10 years in private practice, there were some things that were being said that I just couldn't keep my mouth shut about. The theory is if you put structures up it would block movement into the inlet. This is all theory and there is not real data that substantiates whether or not this is the case or not. The conclusion was that if you block the current then you will block the larvae. The Corps did some numerical model studies and physical model studies to look at transport, but those are inconclusive. Here we are talking about structures, for example Pea Island the beach is all the way out to the end of the structure. There is no stopping of the sand transport or the water transport into the inlet by this structure. The same holds true with the other four examples. The sand is pretty much all the way to the end. You have sand and water going through these structures so physically there is no way that you are stopping larvae from moving into the inlet. It is interesting that the National Marine Fisheries conducts a massive larval transport study at Beaufort Inlet. It has a groin. So if there is some concern over the impacts on larval transport over these structures why would they do the study at Beaufort Inlet? Fisherman seek rocks. The State builds artificial reefs. With regard to the design of the Oregon Inlet structure I am going to emphasize that it was built as one unit. It had two purposes. The first was to stop the inlet from migrating. The second was to rebuild the whole north end of Pea Island out to what it was in the mid 1980's. Why do that? Because the southern part of the Bonner Bridge was relatively low and there was concern that during hurricanes or nor'easters when you have super elevated water and waves on top that waves would come in and hit that bridge and pop the deck off. The part of the terminal groin structure was to begin back at the Coast Guard basin extend all the way around and rebuilt the north end of the island to the 1984 condition. The Fort Macon structures were actually put in there in 1830 when the Fort was built.

Robert E. Lee designed some of the first structures that were built there. A lot of what you see at Fort Macon pre-existed the current terminal groin. The state of North Carolina did put a terminal groin at the bathhouse subsequent to the groins, but the overall plan for Fort Macon included beachfill. The state opted not to put in beachfill and decided to go with a groin instead. The breakwater for Amelia Island was part of the overall design because of the way the structure was being designed at the inlet. The modeling showed that there would be an erosion upcoast so the designers put a structure up there to create a knee so the island will take a bend at that point. As Moffatt and Nichol pointed out, all of the structures that you see adjacent to John's Pass and Redfish Pass all pre-existed the groin. These were efforts being taken by the residents to control shoreline erosion. You don't see as much application of structures today simply because there has been a vast improvement in dredging technology. Back in the 1960's and 1970's the dredging industry couldn't go outside and dredge effectively. With the improvement of the modern day pipeline dredge and hopper dredge it is now economical. For the most part about every inlet in Florida has an inlet management plan that includes consideration of structures, consideration of dredging, and what to do with material. So if you want to really see what Florida is doing in terms of managing its inlets, all their inlet management plans are published on their website. Groins can be removed. I think the Corps created some gaps in some groins that are on one of the New Jersey projects. They left the main structure in to attract fish and actually enhance surfing, but they took the middle of them out to allow sand transport to continue.

PRESENTATIONS

Amendments to 15A NCAC 07H .0304 AEC's Within Ocean Hazard Areas (CRC 10-14)
Jeff Warren

Jeff Warren stated there are four areas of environmental concern (AECs) in the ocean hazard system. One is the ocean erodible area (OEA), one is the inlet hazard area (IHA), one is the high hazard flood zone which is the same as the V-Zones on the FEMA map, and the last is the unvegetated beach area. We are going to talk about the ocean erodible area and the unvegetated beach area briefly today. This rule 7H .0304 basically defines each of the AECs, what they are and what their boundaries are. The current calculation of the OEA is a formula that uses a storm recession rate and the maximum setback factor. It is basically storm recession rate plus 60 times whatever the applicable erosion rate is. When the CRC updated the setback rules you increased your maximum setback factor to 90. We have a situation now where the definition of the OEA is not consistent with your maximum setback factor in the OEA for the largest structures greater than 100,000 square feet. You actually have a situation where a structure might be required by your other rule 7H .0306 to be setback 180 feet but the OEA might only be 140 feet wide. At 140 feet from the vegetation line it would be out of the CRC's jurisdiction and not require a permit in some cases. To close this potential loophole and to be consistent with the new setback rules we recommend changing the formula for the OEA and just simply increasing 60 to 90.

The unvegetated beach area is an area where if there is significant overwash from a storm or in cases where there is not vegetation the Commission has the ability to go in and develop an unvegetated beach classification where Coastal Management can go and define a vegetation line. The last place that this was used was Hatteras Village after Isabel. There was severe overwash and severe vegetation loss. Coastal Management was able to go in and define a line based on

historical photographs and statistical analysis. That gave them a line from which to measure the setback as they waited for their dunes and their vegetation to recover. That has since recovered.

Jim Leutze made a motion to send 15A NCAC 07H .0304 to public hearing. Charles Elam seconded the motion. The motion passed unanimously (Old, Wilson, Elam, Cahoon, Wynn, Peele, Weld, Shepard, Simmons, Leutze).

Sea Level Rise Initiatives Update (CRC 10-15) Tancred Miller

Tancred Miller stated this is an update since the January sea level rise forum. At the state level there have been several initiatives. You know about Coastal Management's. DENR also has a strategic plan for 2009-2013. Within the plan climate change is one of DENR's top goals for this period. Within climate change they have done a subset of goals within that area. DENR will partner with Emergency Management to make sure we are all coordinated as a state. Sea level rise adaptation is one of DENR's top goals. They have formed a work group on sea level rise at the DENR level. They are looking to DCM and the CRC to do most of the heavy lifting. DENR as well a number of other state and federal agencies just had a workshop of about 400 people trying to put together some ideas for adaptation. Their workshop was "Ask the Climate Question". The workshop focused on daily business and asking the climate question. All of the proceedings from this workshop are online. The EPA also hosted a climate change adaptation workshop in Atlanta. Their goal was to try to get their southeastern region to start working together to answer the climate change adaptation questions. One of the things recognized at the EPA workshop was that there was very little local government involvement. It may have been an oversight when they planned the event. They will do another similar event where it is primarily focused on getting the local governments involved in answering these questions. At the state level we are working very closely with Emergency Management. They are using the Science Panel to help inform some of their scenario planning. We have been involved in a number of their workgroups. We expect to see a close collaboration with them as they move forward. The Legislative Commission on global climate change has just released their draft report after four or five years of work. They are also very interested in what the CRC has been doing on sea level rise. I gave a presentation to them last week and received a lot of questions about the sea level rise survey and the sea level rise report. The CHPP update is underway. The CHPP is incorporating climate change and sea level rise impacts into their habitat discussions. All of the habitat chapters have some component of what sea level rise and climate change means for fisheries habitat. This will be a great tool for us as we look at adaptation strategies. There has been a lot of research put into it and it will be a very good update. There has been a lot of regional collaboration. The Governor's South Atlantic Alliance is up and running. We have four workgroups and we have team members from Coastal Management as well as other DENR agencies who have been working very hard on those teams trying to put together some action items at a regional scale for how we can work together. The plan for them is to have an action and implementation plan by September of this year. The South Carolina Ocean and Coastal Resource Management DEHEC agency received a grant to do some short term sea level rise adaptation planning. They have asked DCM to help them develop some of the strategies. The CSO is very interested in climate change. They have a working group that is preparing a

white paper on sea level rise adaptation. NOAA's sea level rise application and management program is looking at taking scientific modeling and ecological modeling and applying that into policy and resource management. They completed their white paper last year and they are trying to figure out how to use it. The next steps include outreach and education which has been ongoing since the sea level rise science forum in January. The next steps for the Commission would be converting some of the sea level rise science into policy.

OLD/NEW BUSINESS

Chairman Emory stated there are eight commissioners whose terms expire in June. Chairman Emory recommended that if your term expires in June and if you would like to be considered for reappointment then you should contact the Governor's office. Jim Gregson stated that he would provide the contact information.

Commissioner Shepard asked that the State Ethics Commission contact information and website be sent to each commissioner so refresher training can be scheduled.

Bill Peele stated that he has had several members of the farming community talk with him about maintaining natural drainage ways that have existed. The farmland in eastern North Carolina at a low elevation is becoming more and more impacted with not being able to keep the drainage ways clear. I think we need to look at a report from David Moye on how our rules effect these areas along the estuarine shoreline and areas of environmental concern. We are getting more salt water intrusion. We need to look at what we can do to try to establish some clear guidelines for these farmers.

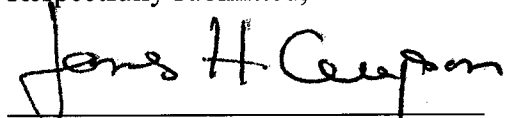
Jim Leutze stated the Legislative Commission on offshore energy exploration is going to make its report on the first of April. It is going to bring attention to the issues related to shore side environmental impact of offshore energy production. This is one of those areas that we have found to be one of the most complicated and difficult to get a feeling for precisely what kind of infrastructure has to be onshore. Oil drilling offshore could require acres of area for pipe and other construction materials. It isn't clear where that is going to happen or where the oil is going to come onshore. The only two possibilities are Morehead City and Wilmington. The Commission finds that Morehead City has all kinds of transportation and infrastructure problems. The City of Wilmington has indicated that it is not interested in an oil depot. Dr. Leutze also stated that he went back and looked at the CAMA to try to get a sense of what the balance in our judgment should be between environmental and economic factors. On the website it says that the CAMA balances environmental protection with economic development. I asked our legal counsel to think about balance. How does the balance work? Is it equal balance? Or is it balance that is tilted toward environmental issues? What should our basic consideration be? Jennie Hauser stated that CAMA does not really speak to how the balancing occurs. Ms. Hauser stated that she will attempt to find federal cases or other state cases that might address the balancing issue, but they will have limited applicability to the CRC's actions because they are no cases interpreting this portion of CAMA for North Carolina. The General Assembly did not find it advisable to give the CRC much guidance on the balancing. On the upside of that they have given the CRC a lot of discretion. Chairman Emory stated the structure of the Commission is one example of balance in that each Commissioner brings their own perspective on what balance

is. Joan Weld stated that this is just one part of CAMA and maybe the Staff should go through CAMA in its entirety in a presentation so we get to look at the whole thing.

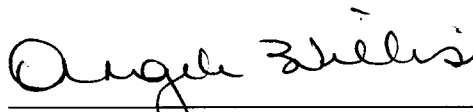
Jim Gregson stated the next meeting is scheduled for May 19, 2010. This will be a one-day meeting at Piver's Island in Beaufort. Keep in mind that we were able to meet at Sea Trail because the funds were already obligated to Sea Trail based on the cancellation of the last contract. Several legal items are anticipated for May. We will hold off on scheduling future meetings for next fiscal year until we see how the budget looks.

With no further business, the CRC adjourned.

Respectfully submitted,



James H. Gregson, Executive Secretary



Angela Willis, Recording Secretary