NRDC

Outer Bank Hydrology Management Committee

Report of Findings

November 3rd, 2005

1.0 INTRODUCTION

When there were live dune fields and windswept beaches, rainwater quickly infiltrated into the landscape and replenished fresh water lenses that lay under the sand. In some places this freshwater supply was suspended in the soil, perched upon a shallow clay layer; in others, it floated under the sand upon the denser salt water. These waters eventually move out to the ocean or estuary by underground seepage.

Away from the burning coastal winds, in protected areas, forested wetlands and pocosins grew between dune ridges pocketed with ponds and swamps. In these systems, the majority of rainwater was processed by evapotranspiration (ET) (Daniel, 1983). ET occurs when plants take up water and nutrients to grow. The excess water is off–gassed into the atmosphere through their leaves. As a result, coastal ponds can be full of water in the winter and, once leaves emerge in the spring, the plants consume the water, often drying out the ponds completely.

Historic documents and local stories portray visions of the Outer Banks with abundant fish stocks, healthy waters, thriving wildlife, and lots of insects! However, with all ecosystems, much changes with time. On the Outer Banks, the landscape has changed considerably within the last two generations. The catalyst for this change has been both man and nature-driven, but regardless of the cause, in every sector of our community, there are sincere concerns about the health of our natural and human ecosystems. Much of this concern is focused on the impacts related to stormwater. Research has demonstrated that even in low density urbanized areas, the majority of rainwater that falls on the landscape rapidly drains to create excess surficial ground, storm and flood water (White et. al., 1999). This water can often be highly polluted (White et al., 1999). Rain itself is not typically considered a pollutant, but when it contacts the landscape and picks up nutrients, organic matter, pathogens, sediment, metals or volatile organic carbons (VOCs), then the water becomes a pollutant too. The extent of the threat can vary, but the fact that polluted water has the potential to do harm, cannot.

Impacts associated with polluted runoff water have also been found in watersheds with farming and forestry activities (White and Line, 2004). This can be attributed to the fundamental way that grading, soil compaction, ditching, draining and vegetation removal — not just pavement -- alter watershed hydrology. These facts demonstrate that sustainability will require a new management paradigm.

Watershed hydrology, water budget, and hydrologic cycle are all expressions referring to various processes that comprise the mechanisms and vectors involved in cycling water through the landscape and atmosphere. That is, when it rains, some portion of water runs off (some is normal), some infiltrates to ground water (both surficial and deep), and some returns to the atmosphere via evapotranspiration or ET from plants or ground surfaces. What is normal? It

varies by watershed. Studies conducted in coastal forested pocosin systems document that as much as 70-80% of the water that falls on the landscape is processed by plant-driven ET (Daniel, 1983). Conversely, empirically collected data also provide documentation that as much as 70% of the total volume of rainfall falling on developed land leaves the system as runoff twice as fast as in a vegetated landscape (Line and White, 2004). Simply put, developed landscapes do not store as much water as long as natural landscapes.

Stormwater runoff problems are further complicated on the coast by the seasonally high ground water levels. Areas that are paved or built upon are no longer available to process rainfall so the remaining landscapes can become over-saturated and flood. Another complicating factor is that plant removal reduces the amount of water removed from the landscape by evapotranspiration. Plants can consume a tremendous amount of water, and tree losses can significantly affect stormwater runoff volume levels costing communities millions of dollars to build stormwater management infrastructure to replace the services trees once provided for free((American Forests, 2005).

The dynamics and impacts vary from street to street, neighborhood to neighborhood, but these are the basic mechanisms contributing to excessive stormwater and flooding on the Outer Banks. These problems have created a multitude of negative consequences from "posted" beaches and closed shellfish waters to damaged property--leaving no segment of our coastal community and aquatic ecosystems free from the effects.

Senator Basnight challenged us to work on this problem when a series of large and frequent rainfall events in July and August of 2004 exhibited the extent of the problem. The Senator noted in his letter to the committee members that, "First and foremost, I see this problem as needing a multi-governmental solution. Indeed, there are problems that are being caused by inadequate management of road drainage, but there are also many problems being caused as a result of less than friendly development practices. To that end, I would propose that a group be established to study this issue and develop recommendations for adoption that will get at these problems." (See Appendix for complete version of Senator Basnight's letter).

The Outer Banks Hydrology Committee, made up of representatives from Dare and Currituck county governments, all the towns in northern Dare, the NC Division of Water Quality, NC Division of Environmental Health, NC Department of Transportation, NC Homebuilders and Realtors Associations, Dare and Currituck Natural Resource Conservation Districts, Dare County Water System, NC Department of Transportation, and NC Coastal Federation convened on September 21. The committee held 11 meetings, participated in over 45 hours of contact time, heard 15 speakers on topics such as coastal hydrogeology, water reuse, drinking water, transportation, low impact development and green building (See Appendices for meeting notes). After the generous contributions of time by many expert speakers as well as by committee members sharing their expertise with each other, the members realized that the Outer Banks water budget is grossly out of balance. They also agreed that water resource management on the Outer Banks needs (for both problem identification as well as solution development) a holistic approach addressing the entire hydrologic water budget and working across government and agency jurisdictions. The committee agreed that we cannot "restore" the hydrology of the Outer

Banks, but we need to reconstruct and manage the system in a manner that we hope will "do no harm".

The rainfall events which occurred in July and August, 2004 dumped an excessive amount of water on the Outer Banks, overloading the landscape and stormwater management systems--ditches, creeks, yards, and pipes filled spilling over to flood roads and homes during a year when extreme and frequent rainfall events had saturated the groundwater table. Were the problems witnessed during the summer of 2004 primarily attributable to excessive rainfall? Or is it attributable to increased runoff from all the development which has occurred on the Outer Banks in the last 15 years? Yes and no to both. The committee realized that these events afforded us an opportunity to see the consequences if we do not take action. Outer Banks communities have an opportunity to improve as well as reduce potential future problems through proactive management.

To develop the recommendations in this report, the committee reviewed how we develop and manage three distinct areas of the Outer Banks: 1) the landscape; i.e. the land area of the watershed that we use for our homes, businesses; 2) the streets, roads and associated rights of ways (ROW's); and one fairly unique feature, 3) the ocean and sound outfalls. Their findings are organized into a review of the causes of the problems, solutions, and closing with implementation strategies.

2.0 CAUSES

2.1 Landscape Issues:

Losses in vegetation associated with land development--lot clearing, filling, and grading—have significantly reduced the mechanisms by which water is removed from the landscape via evapotranspiration (ET). The problem has accrued incrementally, stem by stem, lot by lot.

Land development has caused incremental reductions in small wetland areas resulting in lost storage and assimilative capacity throughout the watersheds. Further compounding lack of storage capacity is the increased areas of impervious surfaces (compacted gravel, clay, paving, rooftop, patio or driveway). These areas cannot infiltrate water and generate more runoff. The cumulative effects are too much water for too few places, and during large rainfall events, flooding.

Runoff water overwhelms ditches and swales as well as vacant lots, which act as coincidental storage, because they weren't designed to handle the increased volume of water associated with the activities and impacts noted above. Additionally, many swales on state, town, and private subdivision roads have been filled and planted with sod by adjacent property owners. Property owners also tend to grade their lots and driveways to drain to the street—adding an unknown quantity of water to the system which it is also not designed to handle. Furthermore, many existing ditches and swales need maintenance. In most cases, the responsible agency is unaware of the problems or does not have the resources to maintain them. Lastly, but not the least of the causative factors, is that many projects add fill material to their lots to accommodate septic systems, facilitate views, and reduce risk of flooding — independent of its affect on adjacent landscapes or the capacity of stormwater systems.

Another exacerbating factor is irrigation. Property owners unwittingly contribute to the saturation and flooding problem by irrigating without any management. Sprinklers are regularly observed operating irrespective of rainfall and even during storm events.

The complexity of managing stormwater effectively is compounded by the myriad of regulatory and governmental agencies whose responsibilities are co-mingled, but not coordinated or understood by each other. Stormwater –related development impacts occur at the parcel scale, which are largely unregulated. Neither the Coastal Area Management Act program nor the NC-DENR stormwater program require stormwater management practices if the individual parcel is built under the low density option (less than 30% total impervious surface area per lot). The sediment and erosion control program administered by the NC Division of Land Quality only regulates stormwater if more than one (1) acre is to be disturbed.

2.2 Roads, Highways, ROW's, and the Outfalls:

Roads and highways generate but predominantly collect and transport stormwater. DOT and town roads also suffer from similar impacts resulting from uncoordinated and unplanned stormwater management. For example, portions of US Highway 158 were originally elevated, but over the years, filling to accommodate adjacent development has made it difficult for the road to drain properly. Additionally, the number of pipe connections to the road side drainage system has increased so the increased volume of water frequently causes flooded roads and ditches. Stormwater management is currently not coordinated between local government and North Carolina Department of Transportation (NCDOT) because the resources to review every property and site plan do not currently exist.

Ocean and sound outfalls were installed to prevent flooding on the highways, and work as designed. However, stormwater carries a wide variety of pollutants, and the discharge reduces water quality and poses an unknown level of threat to public health. It is the recommendation and goal of this committee that if at all possible, the necessary assessment and mitigation activities be implemented to remove the outfalls, or at a minimum, that the frequency of discharging events be greatly reduced.

3.0 SOLUTIONS

There is no single magic bullet to solve the stormwater and flooding problems. The causative factors for the problems evidenced on the Outer Banks in the summer of 2004 were generated incrementally with changes in land use associated with the development process. To "fix" the flooding problems without compromising water quality in the ocean and the estuary, there will need to be a long term commitment to find ways to integrate jurisdictional responsibilities and foster implementation of flexible strategies that can be applied at a variety of scales and jurisdictions to sustain both the human and environmental ecosystems.

3.1 Landscape Issues

Hydrologic conditions need to be quantified for all the watersheds on the Outer Banks. One approach was recommended by an expert hydrogeologist, Ed Andrews of Andrews and Associates at one of the early meetings. It involves mapping the location and distribution of the perched ground water layers, developing a 3-D map of the water table, and intersecting that data with the spatial map of the complaints. This would identify areas with both systemic and functional commonalities. This approach facilitates developing strategies for problem repair.

However, in the short term, and as a first step, communities need to reclaim their roadside drainage ditches. This will greatly improve storage and infiltration capacity, and a targeted effort to address chronic problem areas is advisable. Also, in the short term, because damage caused by lost vegetation is long term, communities should enact a vegetation protection ordinance or protection review process. Some communities, which have done this, have appointed a local committee specifically to review site plans to implement the ordinance or to make sure provisions of the ordinances are followed. However, other communities have found that they can be effective using existing site plan review procedures.

Water conservation and landscape guidelines are needed. These programs can help to reduce plant losses caused by unnecessary land disturbance, guide landscaping choices towards natives, which need less water and fertilizer, as well as establish good irrigation practices to reduce ground water saturation problems, and reduce incidences of activities that drain additional water to the streets. Good housekeeping guidelines can be included that reduce pollutant load associated with fertilizer use and improperly managed pet wastes.

Water conservation guidelines and landscape ordinances are commonly practiced in many parts of North Carolina, so guidelines for these programs are readily available.

3.2 Low Impact Development (LID) Guidelines:
One promising approach that may offer some solutions for managing stormwater is using the strategies suggested in Low Impact Development (LID).
The Five goals of LID are as follows:
1. To conserve native landscapes
2. To minimize impacted areas.
3. To increase time of concentration and retention of rainwater in the landscape.
4. To implement stormwater management methods which reconstruct predevelopment hydrology.
5. To prevent and minimize pollution sources.

The philosophy of LID is to implement best management practices so that the post-development hydrology of a land unit mimics its predevelopment condition. Sounds simple, but there are two critical components to the implementation of LID that must be quantified in order for it to work successfully. First is the determination of each land unit's pre-development hydrologic condition, that is, how much water infiltrates, runs off, or evaporates. As recommended above, areas having similar conditions such as seasonal ground water levels, soil type and land cover are delineated, grouped, and these water budget functions are quantified. The second step involves determining the management practices that can be used to maintain the hydrology for a given development project and its impacts. These practices can take a variety of forms: conservation, constructed features, green building techniques and so forth. Ideally, a menu of treatments could be compiled and rated for the functional service each provides allowing each development project to choose how they wish to maintain pre-development hydrologic conditions. One note of caution, because LID assessment and implementation methods are new; there are essential analyses which need to be conducted to understand how to integrate it into current development, planning, and stormwater management programs. However, LID, may offer Outer Banks

communities more flexibility to increase densities in some areas as well as incentives to protect landscapes that are near sensitive resources. This should increase opportunities for economic development, habitat protection, and conservation.

2.3 Highways, Roads, ROWs, and Outfalls:
Ocean and sound outfalls are problematic because they are needed to keep highways and homes from flooding, but the discharge from them is polluted to an unknown extent. Given the data collected in other locations, the EPA considers the discharge water to be a public health threat; so any time there is water flowing through the system connected to the outfalls, the beaches, in the vicinity of the discharge, are posted with warnings.

A short term issue is that maintenance is presently needed for the outfalls to function and remove water efficiently from the road ways and connected drainage structure. Funding and resources within NCDOT need to be directed specifically for outfall drainage maintenance—both to address compromised roadside infrastructure and outfall pipes.

However, the committee agreed that the outfalls are not an ecological or water quality asset. An important and desirable goal is to remove the outfalls if possible, but at a minimum to reduce the events during which there is discharge. To begin this process, we need to know more about the watershed areas contributing water to discharge from the pipes. How much water flows during typical events? How much water flows during catastrophic events? How polluted is the water? How much water is contributed from various parts of the landscape? To know the extent of water quality treatment and volume control practices needed, these outfall drainage areas need to be assessed.

In addition, management practices to treat and reduce the volume of water coming into the system need to be identified, designed, and built. The reinstatement of the roadside ditches by both the towns and DOT on their state roads to increase retention and infiltration functions has been noted and is much needed. There may be potential using water control structures to reduce the number of discharge events.

The committee also recommends that DOT investigate redesigning flood-prone highway areas for treatment and storage opportunities that may be integrated with the highway infrastructure. For example, the median could potentially be made into a rain garden or constructed wetland—storing and treating excess rainfall. Another option would be to install an underground water storage facility. The stored water could be made available through bulk hauling for fires, washing, or other non-potable application.

Flooding may also be alleviated by raising the elevation of the existing roadway. It was also suggested that excess water accumulating on US 158 could be pumped to an artificial wetland island in the sound created from dredge spoil—thereby recreating habitat that has been lost due to shoreline hardening and erosion—however, concerns about environmental impacts were strongly expressed, and this idea was not discussed fully.

The committee strongly recommended that coordination on planning, design, review and permit process between DOT and local jurisdictions regarding curb cuts, driveways, pipe sizes, and road

side storage is needed. Communication is also needed to address cross jurisdictional management of drainage from individual lots and subdivisions, discharge into and the maintenance of road side swales and ditches, and size and frequency of driveway connections. However, in order for these recommendations to be implemented, the mandate for NCDOT needs to be expanded. They need to have the authority to coordinate with the localities within which they work. NCDOT staffing will need to be increased and dedicated to focus specifically on permit coordination and review.

4.0 IMPLEMENTATION ISSUES

A tremendous amount of work needs to be done, and the committee agreed that an Outer Banks Hydrology Management Consortium should be established, made up of representatives from each community, to foster and guide the initiatives recommended in this report. The consortium can provide coordination and consistency between communities. It can also provide a forum by which communities can share and help each other.

Cost is a concern with regard to implementing these recommendations. Local governments should commit funding to support this consortium and to help initiate these efforts more quickly. The consortium can work together to find, manage and focus funding as well as help coordinate and direct educational efforts . Communities may need to implement stormwater utility districts to enact one time fees, develop incentives, or charge recurring fees to help generate the needed funds. To develop the needed information to implement these programs, consultants will need to be hired to conduct the assessments, develop guidelines and procedures. In the interim however, efforts to reduce wetland impacts, conserve and maintain open space, and limit fill are needed to minimize additional problems.

The consortium can also provide a venue for coordination with Dare County agencies which currently have no stormwater responsibilities. In particular, there are incongruities between the goals of this report and day to day implementation strategies utilized by the Department of Health. For example, the Department routinely recommends fill as a standard practice to permit new septic systems, and this can contribute to stormwater management local problems. Their participation in the consortium would assist with coordination of the Health Department's permitting process with the towns' and counties' stormwater management strategies.

Other activities which could be coordinated by an Outer Banks Hydrology Management Consortium would be to help develop consistent incentive-based or cost share programs that would encourage communities to use these ideas—particularly with regards to the implementation of LID. Critically, an effort is needed to facilitate the use of hydrologic curve numbers, end the exemptions for filling wetlands, increase buffer and native vegetation protection under CAMA, but conversely allow communities to increase densities through density trading (conservation areas traded for increased density to protect habitat).

The consortium could help garner the involvement of the watershed's citizens as well as provide a venue for partnering with other agencies such as the NC Department of Transportation (NCDOT) and NC Ecological Enhancement Program (EEP). The consortium could also assist with the delivery of watershed education programs, which will be needed to successfully implement these initiatives.

5.0 Additional comments regarding reuse:
While the committee initially had a strong interest in the potential for water reuse as a solution to excess stormwater, but there are several road blocks to implementing this idea on a regional scale. First and foremost, because the Outer Banks has no community wide sewer system, there is no infrastructure in place to collect and redistribute the water. It cannot be collected off the ground because becomes too dirty and difficult to treat for any type of reuse. However, LID and green building both recommend the use of cisterns. Decentralized cistern use on individual buildings has great potential to address many water –related problems. Cisterns can reduce the demand on potable water supplies. Since the Outer Banks invests substantially in water infrastructure to meet summer water demands, the use of cisterns could alleviate pressure on the supply during the summer peak season. Cisterns, properly designed, are also an effective stormwater reduction and treatment device. Reuse of the rainwater at a later date, redistributes the volume of water to reduce storm event-related impacts.

6.0 SUMMARY
The problems manifested on the Outer Banks late in the summer of 2004 are not unique to this region. Across the state of North Carolina, hydrologic management addressing both quantity and quality is coming to the forefront as one of the preeminent environmental issues of our time. Changes in watershed hydrology affect groundwater recharge rate, stream base flows, and aquatic habitat structure in ways that affect water quality, fisheries, and overall stream ecosystem function. Increases in polluted runoff into stream systems add to damages caused by hydrologic impacts. Scientists struggle with developing research fast enough to provide relevant data that will assist public policy makers in their decisions, but indicators such as fisheries losses, algal blooms, shellfish closures, and increasing property damage to homes and roads mean we what we have been doing is not sustainable.

The members of the Outer Banks Hydrology Management Committee include a diverse array of interests, from municipal and county governments to representatives of the real estate industry and conservation community. We submit these recommendations with the belief that they provide a solid framework for conducting a truly innovative and sustainable stormwater management and hydrologic reconstruction program for the Outer Banks.

Respectfully yours,

Committee Members and Participants:

Wayne Mobley/ NC DEH
Tricia Huffman/ Town of Kitty Hawk
Tom Reeder/ NC DWQ
Ted Sampson/ NC DCM
Steven Shriver/ Dare County
Rufus Croom/ NRCS – Dare SWCD
Robert Tankard/ NC SWD
Randy Metzger/ Town of Kill Devil Hills
Nancy White/ UNC Coastal Studies Institute

Mike Hejduk/ Town of Southern Shores
Mike Doxey/ Currituck Soil and Water
Kevin Schwartz/ Outer Banks Homebuilders Assoc/Outer Banks Assoc. Realtors
Jim Rivera/ Martin's Point Homeowner's Assn
Jim Butz/ Walnut Island Assn
JD Potts/ NC DEH Recreational Waters Program
Jan DeBlieu/ NCCF
J. Webb Fuller/ Town of Nags Head
Gil Falasco/ Currituck County
Gary McGee/ Town of Kitty Hawk
Erin Burke/ Town of Manteo
Ed Sampson/ NC DCM
Dwane Hinson/ Albemarle RCD
Debbie Diaz/ Town of Kill Devil Hills
Dave Clark/ Nags Head Public Works
Darrell Merrell/ Town of Kill Devil Hills
Dan Shields/ Southern Shores Town Council
Dan Scanlon/ Currituck County
Chris Layton/ Town of Duck
Bob Oreskovith/ Dare County Water
Allen Russell/ NC DOT
Alan Saunders/NC Shellfish

Guest Speakers:
Ed Andrews, Andrews and Associates
Joe Anlauf, Quibel and Associates
Larry Coffman, LID Strategies, Associate Director, Dept of Natural Resources, Prince George's County, Maryland
Mary Tod Winchester, Chesapeake Bay Foundation
Bill Hunt, Stormwater NCSU Extension Specialist
Barbara Doll, Sea Grant Water Quality Specialist
Christy Perrin, Program Coordinator, NCSU Watershed Education For Communities &Officials.
Jennifer Plat, Town of Cary
Betsy Pearce, Town of Cary
Dave Henderson, NC DOT
Allen Russell, NC DOT
Anthony Roper, NC DOT

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APPENDICES

Letter from Senator Basnight

September 8, 2004

Dear :

Thank you so much for your participation in the stormwater summit last week. I was very pleased with the interest in this most important subject and the willingness to address this critical situation in our area. I have given much thought to those things that we should be doing to correct this problem and am ready to make a few recommendations that I believe will get us on the path of resolution.

First and foremost, I see this problem as needing a multi-governmental solution. Indeed, there are problems that are being caused by inadequate management of road drainage, but there are also many problems being caused as a result of less than friendly development practices. To that end, I would propose that a group be established to study this issue and develop recommendations for adoption that will get at these problems.

In structuring this working group, I would propose that Nancy White, director of the Coastal Studies Institute, chair this working group. In addition to Nancy, I believe a representative from each municipality and each county should serve on the group. These individuals should be appointed by each of the respective boards and should be an individual that will be willing and available to devote a serious amount of time to the task, perhaps the town or county manager or the town or county engineer. Finally, I believe that it is important that representatives from various agencies of the state join in this discussion from the perspective of technical practicality and permissibility under state laws and regulations. Specifically representatives of the Divisions of Environmental Health, Water Resources, Water Quality, Coastal Management in the Department of Environment and Natural Resource and the Department of Transportation should be invited to attend.

After a cursory review of the situation and based on my site visits I believe that a myriad of solutions could be implemented. First on the acute issues, I believe the drainage problems at Gooseander are best remedied by elevating the properties and I will be sharing my thoughts with the homeowners there. Although I believe that DOT is contributing some portion of the stormwater standing on the properties, our efforts to correct the DOT problem will not resolve all their needs.

On the long-term front, I believe that we must develop a phased approach to stormwater that applies the concepts of retention, collection, treatment, reuse, and discharge. Under retention, we must examine the various ways that we can accept stormwater on our properties and retain them for personal use including irrigation, fire suppression and individual plumbing needs.

After maximizing our retention efforts, we must find a way to collect the stormwater presently generated in a comprehensive and efficient collection system. Indeed our current

collection mechanism is grossly inadequate to meet the needs of chronic everyday rainfall events, not to mention those catastrophic events that occur. An efficient collection system would have at its core the ability to taken a given amount of rainfall, for instance the first 3 inches in a fashion that water does not stand on property.

Upon reaching an efficient collection strategy, we should target our efforts at ensuring that any water taken in by the collection system be treated. My limited research indicates that there are numerous treatment strategies available on the private market. These strategies should be investigated for their feasibility of use in our area. Indeed, the working group may decide to develop an RFP for the engineering community to consider that would join our collection and treatment goals. This RFP could be reviewed by the working group and then proposed for adoption by the various governmental entities.

Once treated, I personally believe that we should examine the goal of reuse. As I stated in my discussions with you earlier, my impressions of the facilities at Walt Disney World in Florida are the wave of the future and are examples of exactly what we ought to be doing to protect the environment. As mentioned earlier, reuse strategies such as irrigation, fire suppression and alternative plumbing system seem to be very practical and easily implemented solutions for this problem. I would encourage this group to look very closely at the ideas and I would offer my office up to assist in making contacts with the folks at Disney for presentation.

Finally, that water that cannot be reused but is still treated should be allowed for discharge into adjacent water bodies so long as there is no degradation to the surrounding water body as a result of the discharge. Discharge should be viewed as a last resort. Indeed with the water needs that I am certain our area will be facing in the near future, the promise of using stormwater to help address these needs will provide us all just the resolution that we need to help "kill two birds with one stone." However, I am also cognizant of the need to be prepared in the event that we are unable to take all the water on. To that end, ensuring that the resultant discharge is clean is of paramount concern to me.

These strategies will all involve some additional cost to us. I believe the working group should look at these costs in addition the strategies that they set out. In many areas, the availability of a stormwater fee would help finance these costs. For instance, the City of Raleigh currently has enacted a fee to help maintain and repair their existing stormwater drainage system. All parties in the city are assessed a flat amount commensurate with the type of development they are in – commercial, residential, etc. Some thought should be given to such a fee in our area to help field the costs of this system. Perhaps the localities may choose to establish a stormwater drainage district in a given area and assess the residents of the district. This would allow for stormwater problems to be targeted to a specific area of need with those folks in the district bearing the cost.

These ideas that I share with you are but one way to address the issue of stormwater in our area. I encourage you to give careful thought as well to this problem. It is an issue that I am confident that we can address if we put our minds to it. In order to begin the work of the committee I have asked Nancy White to convene the first meeting of the work group on Tuesday, September 21, 2004 at 10 A.M. at 108 Budleigh Street, Manteo, North Carolina.

Thereafter, I would propose that the group meet every other Tuesday through the end of the year with periodic progress reports for the various elected officials. It is my hope that the working group will bring forth recommendations during this time period to address the issues as outlined above and any legislative proposals that the collective bodies deem appropriate prior to the convening of the 2005 Session of the General Assembly. I look forward to hearing from you your thoughts on this proposed process and your appointments to the working group. Please contact Anne Kenny at 252-475-3663, x. 24, to let her know of your appointments and attendance at this meeting.

Again, thank you for your strong interest in this issue and please let me know how I can continue to help facilitate a resolution. It is a pleasure to serve you.

Sincerely,

Marc Basnight

MB/rb

Meeting Notes

Outer Banks Hydrology Management Committee Meeting
Tuesday, Sept. 21, 2004
10:00 a.m.
108 Budleigh Street, Manteo, NC

Present: See attached Sign - In Sheet

Convened by Nancy M. White, Director, UNC Coastal Studies Institute.

Dr. White presented asked the group to consider how they would like to proceed with the tasks they have been asked to address, and noted that committee has a unique opportunity to contribute to the development of policy that will affect development and land management on the Outer Banks.

Those present introduced themselves, stated which agency/ town they represented, and their primary issues and concerns.

Chris Layton, Town Manager from Duck, said he is learning about and concerned with stormwater flooding problems especially on NC 12. He says that issues related to minimizing flooding and keeping the road open are complex. He noted that Duck does not have ocean outfalls, possibly one sound outfall, and no stormwater infrastructure. Duck has hired a consulting engineer on staff from Quibel. They also have the Council's the commitment to share the cost of a study. Layton will be working on the study and with this group concurrently.

Erin Burke is the Town Planner from Manteo. She noted that the town has just gotten a grant to work on water quality issues. The town currently has six (6) outfalls. They have already hired a consultant. The grant is to for planning not implementation.

Steve Shriver is the Dare County Engineer. As such his responsibilities cover the unincorporated parts of the County which has a wide range of land use types many of which are unique. The basic stormwater management strategy has been roadside and lot-side drainage ditches. The County does not have any roadway responsibilities.

Alan Russell is the Dare & Currituck Counties Maintenance Engineer for NC DOT. Dave Henderson couldn't make it today, but he will also be attending in the future. Alan commented that he feels like he knows where the problems are today, but that could change tomorrow. Their policy on when to pump during storm events is when they are requested to do so by NC Emergency Management.

Dan Scanlon is the County Manager for Currituck County. He noted that the County does not have a stormwater management plan, but has hired an engineer to study the problem. He noted that they have created a stormwater district at Whalehead. Dan expressed concern about how store the volume of water needed to alleviate flooding and where/how to discharge? They have one permitted discharge into the ocean for county water system. He expressed interest in studying deep acquifer storage as an possible alternative.

J.D. Potts from DENR Shellfish Sanitation stated that his program monitors recreational waters and use EPA guidelines whether or not to post swimming and contact advisories. They have found that runoff is responsible for 90% of water problems.

Wayne Mobley, Section Chief for DENR Shellfish Sanitation stated that their responsibility is to monitor and advise recreational waters and shellfish harvesting areas. He also noted that they have a LOT of data and the obvious trend is that development equals increased bacteria levels which lead to increased closures. They want to find a solution and are very willing to work. Solutions will be good for everyone.

Debbie Diaz from the Town Kill Devil Hills stated that they have a Stormwater Management Plan. They do not have an engineer on staff, but have a consultant. Over the past 10 years the Town has made a lot of street and drainage improvements including management of nuisance flooding. At a recent meeting on storm water issues, Dave Clark, with the Town of Nags Head, made a point that some of the lots that were now being developed were some of the less desirable ones and she felt Kill Devil Hills was experiencing this, also. Some of these properties require a lot of fill, creating a much higher elevation than the adjoining lots.

Debbie said they have a Street Improvements Subcommittee that is currently reviewing drainage-only projects and will be making a recommendation to the Board of Commissioners. At a recent meeting the Kill Devil Hills Board of Commissioners requested staff review the funding ratio between street improvements and drainage only improvements. A concern was voiced that

funding for drainage improvements tends to affect very specific areas rather than generally as streets improvement do. In Kill Devil Hills commercial development is required to have an engineered storm water plan while residential development is not. This may be reviewed by the Board of Commissioners again in the future.

Dan Shields from the Southern Shores Town Council said they do not have a plan. They have asked an engineer to study and recommend an approach for developing a plan. The Town never had this problem before.

James Butz from the Walnut Island Association said they have some road problems. They are trying to figure out what permits they might need and where to send the excess water. They are looking for direction on where to go and what to do about it.

Dave Clark is the Public Works Director for the Town of Nags Head. Dave said Nags Head developed their Stormwater Management Plan in 1980 and revised it in 1995. This year with all the rain, many problems have been caused by individuals compromising the approved system(s) within their subdivision. They are planning on using LIDAR maps to determine factors that may be contributing to problems with stormwater and groundwater management, and as an aid in solving those problems. They are cautious that engineered solutions may not necessarily work in all cases. They have five (5) outfalls (four in town and one just south of town). He expressed a need to look at it in a coordinated fashion.

Webb Fuller, the Town of Nags Head Manager, said that Dave Clark is their official representative, but he wants to be active and involved in the process also. They want to make sure that some of the $15M set aside in most recent State budget for DOT drainage work in the coastal area gets to the Whalebone Junction project.

Dan Shields noted that some solutions will need to be looked at regardless of existing rules and regulations. A lot of the problems start with development and that possibly part of solution is to change the building codes.

Webb noted that public education and public involvement have to play a big part in the solution. The government can be responsible for people who make bad decisions.

The guests at the meeting inlcuded Mike Muglia from the UNC Coastal Studies Institute, Anne Kenny from the UNC Coastal Studies Insitute, Kevin Schwartz from the Outer Banks Home Builders Association, a reporter from the Sentinal, Jan DeBlieu of the NC Coastal Federation, and Ted Sampson of the NC Division of Coastal Management.

Dr. White invited Ted to join in the discussion. Ted stated that development within CAMA areas of concern (AECs) is a growing problem. DCM doesn't control permitting of development. He also noted that there has been a large incremental loss of wetlands as areas are developed and those areas are where runoff used to go. We need to keep the eco-system working when determining solutions.

A open discussion followed.

It noted that this committee will concern itself with this district of the NE region of NC.

Dan Shields noted that for those that are not entirely familiar with the reason/causes of the problem having a presentation/s by an engineer would be helpful. He further noted that once folks have a basic understanding of the problem might be better able to make decisions.

It was recommended to contact Joe Anlauf from Quibel might be appropriate to come speak to the group as he has done a lot of work on the OBX. .

Other local experts familiar with problems are Richard Spruill, Bob Oreskovich, Ed Andrews.

It was discussed by the group we need to understand the volume of water generated by storms and the total water budget. How high is the ground water table? Are all the changes making a difference? Is there a trend?

Concern for water storage capabilities were discussed. Will we need to consider sending it offshore? How far would be far enough? Would this be an option only for catastrophic events?

Should localities continue to use septic drain fields? Should we consider central wastewater treatment? Properly installed and maintained septic systems work very well vs. a central wastewater treatment facility.

Does there need to be a land use plan for the entire Outer Banks? Could land use density transfers, conservation, and transfer of development rights be used successfully for mitigation?

It was decided that the next meeting will have two invited speakers to talk about the causes of stormwater. It will be held October 5, 2004 at the Nags Head municipal building. It will be planned for 10-2 with a working lunch.

Dr. White's office will transcribe and distribute the minutes from this meeting along with the attendance list.

Meeting adjourned at noon.

Respectfully submitted,
Anne R. Kenny
Admin. Sec.
UNC Coastal Studies Institute

October 5 Commissioner's Meeting Room Nags Head
OBX Hydrology Management Group Meeting
October 5, 2004
10-2PM
Nags Head Town Board Room

Attending
Rufus Croom, NRCS – Dare SWCD
Dan Shields, Southern Shores Town Council
Kevin Schwartz, OBHBA/ OBAR
Robert Tankard, DENR-DWQ
Tom Reeder, DWQ
JD Potts, NC RWQ
Dwane Hinson, Albemarle RCD
Debbie Diaz, KDH
Dave Clark, Nags Head
Dan Scanlon, Currituck Co
Jim Butz, Walnut Island Assn
Jim Rivera, Martin's Point Homeowner's Assn
Mike Doxey, Currituck S&W
Allen Russell, NC DOT
Tricia Huffman, Kitty Hawk
Erin Burke, Manteo
Steve Shriver, Dare Co
Chris Layton, Duck
Gary McGee, Kitty Haw
Jan DeBlieu, NCCF

Sincere thanks to the Town of Nags Head for hosting this meeting as well as to Joe Anlauf and Ed Andrews for taking the time to come and help us.

Meeting Notes Summary:

Joe Anlauf, a consulting engineer with Quibel Associates, explained the hydrologic cycle as it pertains to the OBX, how groundwater is distributed and factors affecting that distribution. Several important points made during his presentation include: 1) The ground water table is the primary factor controlling flooding, and 2) we have had a tremendous amount of rainfall over the last year that has elevated groundwater levels. He also noted that losses in vegetation affect the rate of evapotranspiration, which, prior to clearing is a significant vector for the removal of groundwater. Additionally, incremental losses of wetlands results in lost storage capacity. Our challenge will be how to manage groundwater -- the budget of which varies by location in the landscape. He emphasized that stormwater management goals are focused on the surface water component using the regional design storm curves, which does not address groundwater or total water budget management issues.

Ed Andrews, also a private consultant, concurred with Anlauf in that the management of ground water is key to managing flooding problems on the Outer Banks. He also emphasized that we are dealing with a tremendous volume of water which in the past has been either utilized by vegetation and/ or has flowed to either the sound / ocean via surficial ground water flows in deep sand. An extended discussion followed regarding factors contributing to perched groundwater, how it contributes to flooding, where it occurs and the possible strategies for dealing with it. Ed

mentioned that he has worked on projects where they "punched" through the clay layer to drain excess water to the sand underneath thus allowing the water to be treated, which addresses the committees concerns about water quality, and before it goes from the site to the sound. Ed also noted that the volume of water taken from the deep aquifer for drinking water (and being used for irrigation, car washing, and discharged as waste water) is an addition to the total water volume having to be managed as part of the surficial management strategies—this could be as much as 3-12% of the total water volume "in the system". Ed suggested that the problems and strategies varied by location in the landscape—he emphasized that the maritime ridge and swale areas in particular need to be reviewed. A good strategy for the committee would be to identify the location and distribution of the perching layers, develop a 3-D map of the water table, and intersect that data with the spatial map of the complaints. This would help to identify areas with problems, commonalities in the types of problems in those locations, the underlying system functions which may be contributing to those problems and this would in turn help to identify the categories of water management strategies which may work in those locations.

An effort to independently list the factors contributing to stormwater and flooding problems generated the following list:

Removal of vegetation
Impervious surfaces
Planning deficiencies
High groundwater
Inappropriate irrigation
Regulatory limitations at all levels and scales / permitting gaps
Soils, topography, hydrology
Inadequate and / or compromised stormwater systems
Inter-aquifer transfers
Development
Grade/ cut/ fill
Density management
Incremental management
Growth rate
Roads
Loss of storage (wetlands)
Water quality = good stormwater management
Unmanaged changes in land use
Public ignorance of the problems
Lack of incentives
Undefined goals
Cost prohibitive
Lack of coordination between jurisdictions and agencies

Suggested Sorting for the development of management strategies:

Natural Systems
High groundwater

Soils, topography, hydrology
Inter-aquifer transfers
Grade/ cut/ fill

Local Gov't
Removal of vegetation
Planning deficiencies
Inappropriate irrigation
Inadequate and / or compromised stormwater systems
Development
Grade/ cut/ fill
Density management
Incremental management
Loss of storage (wetlands)
Unmanaged changes in land use
Water quality = good stormwater management

State Govt/ Regional
Regulatory limitations at all levels and scales / permitting gaps
Inter-aquifer transfers
Density management
Growth rate
Roads
Loss of storage (wetlands)
Lack of incentives
Undefined goals
Lack of coordination between jurisdictions and agencies
Cost prohibitive
Public ignorance of the problems
Water quality = good stormwater management

Data or Information needed to develop management strategies/ committee action:
Identification of spatial distribution of the problem areas from the "customer standpoint" each town and county will compile and forward to County to be mapped. One single map of both Dare and Currituck Co will be produced for the next meeting with the problem areas mapped on it.
Delineate areas of hydrologic functions/ natural factors—Nancy will determine who can do this, the information they need, then coordinate with the counties to have the information delineated on the map noted above.

Determine how much of the OBX water budget is from aquifers – Nancy and DWR

Determine how much of the OBX aquifer derived water is used for non-potable applications- Nancy and DWR.

Determine local ordinances or other local conditions (incongruities between towns, development review process, post construction compromises, "upstream development", subdivision covenants, etc) which are facilitating or exacerbating the problems—Each Town and County will compile and bring a list to the next meeting.

Identify jurisdictional gaps—Each Town and County will list and bring to the next meeting.

Approach for meeting on Oct 19:

1) Review the overlay of natural systems delineation with areas of complaint on the two - county map.
2) Using the information provided regarding the type of complaint and the natural system functions -- link problems to causes, look for commonalities for causes (both natural, managerial and jurisdictional as indicated above.
3) Generate draft list of potential solutions.
4) Next steps.

As suggested by Joe Anlauf and Ed Andrews this approach would help identify areas with problems, commonalities in the types of problems in those locations, the underlying system functions which may be contributing to those problems and this would in turn help to identify the categories of water management strategies which may work in those locations.

Next Meeting: October 20, Town Hall, Kill Devil Hills 10am-2PM.

Outer Banks Hydrology Management Committee Meeting
Tuesday, Oct. 20, 2004
10:00 a.m.
Kill Devil Hills Town Hall, 102 Town Hall Drive, Kill Devil Hills

Present: Tricia Huffman/Town of Kitty Hawk, Robert Tankard/Division of Water Quality, Tom Reeder/Division of Water Quality, Kevin Schwartz/Outer Banks Homebuilders Assoc/Outer Banks Assoc. Realtors, Darrell Merrell/Town of Kill Devil Hills, Randy Metzger/Town of Kill Devil Hills, Debbie Diaz/Town of Kill Devil Hills, Rufus Croom/NRCS-SWCD, Dave Clark/Nags Head Public Works, Ted Sampson/NC DCM, Gary McGee/Kitty Hawk, Mike Hejduk/Southern Shores, Chris Layton/Duck, Dan Scanlon/Currituck, J.W. Fuller/Nags Head, Jim Rivera/Martins Point, Wayne Mobley/Shellfish Sanitation, JD Potts/ Shellfish Sanitation, Erin Burke/Manteo, Nancy White/UNC Coastal Studies Institute

This meeting was devoted to a discussion of the issues on a community by community basis.

There was consistency in the issues reported by communities with some variability related to whether the community had outfalls (Nags Head, KDH, Manteo) versus those without outfalls (Currituck, Duck, SS, Kitty Hawk).

Towns with outfalls reported that most of the problems are fixable with local drainage solutions. Most of the problems are related to areas where systems were installed but property owners compromised them. A second type of problem area is generally NOT a town issue, but the land is simply just too low-lying.

All communities felt that an important component is public education so that people don't compromise the drainage systems, don't increase imperviousness, and improve their water conservation and landscape practices.

Communities without outfalls also have problem related to people elevating ground levels and the increased development on marginal lots.

However, there are problems related to lack of control over road and lot management in private developments.

It was noted by the group that cooperation and coordination with DOT is needed to enforcing and preserving the right-of-way ditches for NC 12.

Also, DOT has accepted the drainage from subdivision developments (commercial and residential) which by design had their stormwater/drainage running out to NC 12, which now floods.

Comments Provided by KDH:
The single greatest positive impact DOT could provide for the town of the Kill Devil Hills storm water quality and management system would be the reclamation of the roadside swales and ditches along the entire length of US 158.

Many areas that previously were areas of storm water storage or management have been filled with landscaping or other uses, which has resulted in the loss of valuable storm water storage and retention from their system. Culverts under roadways have also been covered thereby blocking flow resulting in flooding of these areas.

The loss of this huge storage area has severely impacted our storm water management system. In many areas, storm water from the highway dumps directly into our storm water management system, overloading our system and thereby greatly reducing water quality as it exits into our sound and ocean.

If DOT would reestablish these drainage management features within its right of way, it would help our efforts tremendously.

NC 12 - Establishment of a drainage system along the length of this corridor would help remove a great deal of standing water issues on this roadway. At the present time, only a few areas have drainage infrastructure installed.

Drainage right of way areas OUTSIDE of US 158- continue reclamation efforts in these areas with mowing, mucking and the cleaning of culverts and ditches: Starting at the Dare Center on

US 158 to the connection at the Wright Memorial -- The entire length of the ditch within the US Park Service Wright Memorial

Ocean Outfalls
DOT and the town are very dependent on these outfalls as they are the only avenue for drainage in the southern half of the town. Items that could be done to improve these outfalls:
Install anti back flow devises on ends of all existing pipes. We are constantly having problems with them closing up due to wave action.

Upgrade sizes or possibly adding a tandem/adjacent pipe beside each existing one.

Questions provided by Currituck:
What is DOTs position/coordination with local jurisdictions regarding curb cuts/driveway permits?

What is their position regard the numerous subdivisions that, as part of their stormwater plan, include discharging into road side swales and ditches; does NC DOT permit this and are they going to maintain the swales and ditches?

What is NC DOT's position regarding standing water on public streets?
Language provided by Tom Reeder, DWQ regarding DOT and Phase Two:

SECTION 8. Petition Process. - A petition may be submitted to the Commission to request that an owner or operator of a municipal separate storm sewer system (MS4) or a person who discharges stormwater be required to obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management as follows:

(1) Connected discharge petition. - An owner or operator of a permitted municipal separate storm sewer system (MS4) may submit a petition to the Commission to request that a person who discharges into the permitted municipal separate storm sewer system (MS4) be required to obtain a separate Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management. The Commission shall grant the petition and require the person to obtain a separate Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management if the petitioner shows that the person's discharge flows or will flow into the permitted municipal separate storm sewer system (MS4).

Most notably, while the outfalls manage the drainage given the caveats noted above, the question remains as to how do we treat the discharge water, reduce the volume, or combo of reducing, treating, managing and not making the problem worse? What do the communities do that don't have outfalls? Manteo is an example of a community that obtained a grant because it is proposing to remove outfalls by investigating a land-based treatment solution, but what do communities do that have flood/ stormwater problems that DON'T have outfalls??? Or those that don't that don't have the option of removing them?

A discussion of possible strategies for solutions and speakers to discuss them followed.

Community education strategies could be addressed by Barbara Doll and Bill Hunt.

Would like to investigate / know more about the programs at Wrightsville Beach and the Town of Cary where they are regulating imperviousness have water conservation and water reuse programs.

The Southern Watershed Area Municipal Planning District in Hampton Roads has created a regional watershed management program that could provide a model for the Outer Banks.

Nancy offered to construct a matrix of issues and solutions for the group to consider.

The next meeting will be November 2nd at 10 a.m. at the Outer Banks Assoc. of Realtors office off West 8th Street in Nags Head. Turn between the Eckerd's and the ABC store, turn Left, building is on the Right. (105 West Airstrip Road, KDH)

Meeting adjourned at 2:00 p.m.

Outer Banks Hydrology Management Committee Meeting
Tuesday, Nov. 2, 2004
10:00 a.m.
Outer Banks Association of Realtors Offices, Kitty Hawk

Present: Dan Shields/Southern Shores, Tom Reeder/NC DWQ, Gil Falasco/Currituck County, Erin Burke/Town of Manteo, Robert Tankard/NC SWQ, Dave Clark/Town of Nags Head, Steven Shriver/Dare County, Tricia Huffman/Town of Kitty Hawk, Bob Oreskovith/Dare County Water, Jim Rivera/Martins Point, Kevin Schwartz/OBAR/OBHBA, Webb Fuller/Town of Nags Head, Debbie Diaz/Kill Devil Hills, Ted Sampson/NC DCM, Chris Layton/Town of Duck, Jan DeBlieu/NCCF, Nancy White/UNC Coastal Studies Institute, Dan Scanlon and Mike Doxey/ Currituck Co.

Given that there are only five (5) more meetings the group discussed that it needs to focus its efforts to be able to produce a report by January, 2005.

It was noted that it is extremely important that DOT attend and participate since they are a significant developer of land, as well as producer and manager of storm/ flood water.

The group discussed areas needing information in order to move forward. A significant point of discussion pertained to the costs of the drinking water system for Dare County—the reality of the situation is that in order to serve the tourism peak, the system needs significant infrastructure which is difficult to support during the rest of the year when water use is reduced—so water conservation would not help "pay" for the water system.

Topics needing attention are an understanding how to implement and maintain innovative stormwater management techniques, the realities of water reuse, how to implement stormwater districts (to help pay for the infrastructure), DOT processes, procedures for implementing a public education program, and sustainable development and planning strategies.

It was decided that after the Town of Cary's water reuse, conservation and stormwater management presentation that Mike Doxey and Dan Scalon would present the stormwater management districts being developed in Currituck County on November 30. DOT would be invited to present how they plan, permit and maintain roads so the committee could better understand how to coordinate with them. Other speakers suggested were Larry Coffman, an expert on Low Impact Development, someone from King Co, Washington, someone from the Chesapeake Bay Foundation, David Mayes from Wilmington, Barbara Doll and Bill Hunt from NCSU, and someone from the SWAMP.

Nancy noted that she will start drafting the preliminary report.

Each committee representative needs to send to Nancy recommendations for immediate, short-term, and long-term solutions for their community by Dec 21st (via e-mail Word document).

Each committee member also planned to present the preliminary findings to their councils and Boards before Christmas and forward any recommendations to Nancy.

The group will also meet January 11th and then schedule another meeting in Raleigh to be able to present the final report to Senator Basnight.

The group also decided to plan a field trip on Dec 7 to see examples of problem areas and sites that have engineered solutions. CSI will arrange for vans or some other type of transportation so the group can go together. The sites will be decided at the Nov. 30th meeting.

Steve from Dare County noted that he would provide maps with problem areas noted to each community to facilitate the site identification process.

The next meeting, Nov. 17th, will be at the Kitty Hawk Town Hall, with the Nov. 30th meeting at Southern Shores. Locations for the December 14th and 21st meetings are TBA.

Meeting adjourned at 12:45 p.m.

Outer Banks Hydrology Management Committee Meeting
Tuesday, Nov. 16, 2004
10:00 a.m.
Kitty Hawk Town Hall, Kitty Hawk

Present: Robert Tankard/NC DWQ, Rufus Croom/NRCS, Mike Doxey/Currituck Soil and Water, Steven Shriver/Dare County, J.D.Potts/NC Shellfish, Jim Rivera/Marrtins Point Homeowners, Ted Samson/NC DCM, Jan DeBlieu/NCCF, Wayne Mobley/NC DEH/Shellfish, Tricia Huffman/Town of Kitty Hawk, Chris Layton/Town of Duck, Dan Scanlon/Currituck County, Bob Oreskovich/Dare County, Gary McGee/Kitty Hawk, Dan Shields/Southern Shores, Webb Fuller/Nags Head, Debbie Diaz/Kill Devil Hills, Dave Clark/Nags Head Public Works, Kevin Schwartz/OB Assoc Realtors-OB Homebuilders Assoc, Erin Burke/Manteo, Nancy White/Coastal Studies Institute

Below are the proposed speakers and dates:

Nov 30 – Eric Walberg, AICP Principal Planner, Hampton Roads Planning Dist. Comm.? Districts, Dan Scanlon and Mike Doxey, Currituck County Stormwater Management
Location: Southern Shores Pitt Center adjacent to Town Hall.
Dec 7 – NC DOT
Dec 14 – Bob Oreskovich
Dec 21 – Larry Coffman, LID Strategies, Associate Director, Dept of Natural Resources, Prince George's County, Maryland
Evening lecture for the public
Dec 28 – NO MEETING
Jan 10, 2005 – Mary Tod Winchester, Chesapeake Bay Foundation
Jan 11, 2005 –
Bill Hunt, Stormwater Extension Specialist
Barbara Doll, Sea Grant Water Quality Specialist
Christy Perrin, Prog. Coord. For Watershed Educ. For Communities &Officials.

To be considered, whether to schedule a session to discuss plan with Senator Basnight and his staff.

Jennifer Platt, water conservation manager from the Town of Cary, addressed the committee on water conservation and reuse followed by Betsy Pearce, Stormwater Specialist to present the Town's stormwater management program.

Ms. Platt's presentation is attached.

Tricia has a copy of Betsy's presentation that we will pass along with the next set of minutes. NOTE: At the end her presentation Ms. Pearce recommended the group talk to folks at Wilmington since they have already addressed this problem there and it is a similar landscape to the Outer Banks (NOTE Dave Mayes declined to come because he was anticipating a new baby in the house during the time period we needed him to come.).

I thought I would note a couple of points that seemed significant to me that we can use for discussion.

A water conservation program can achieve a 15-30% reduction in water use, which can save costs for new infrastructure and expansion. Their rate structure ramps up quickly, increasing after 4,000 gals/ mo for a residence. They charge and extra fee for the irrigation meter. Collected water for the reuse program can be moved by pumping and through bulk hauling, not just underground infrastructure, then used for street cleaning, fire protection etc. Stormwater treatments are required to be put on private property with required bonds and maintenance plan by the homeowners association. The Town involved the community in a stakeholder input process to get their involvement in the solutions and implementation strategies.

The next meeting is November 30th in Southern at the Pitt Center which is adjacent to the Town Hall, the building on the far Right off the parking lot.

Outer Banks Hydrology Management Committee Meeting
Tuesday, Nov. 30, 2004
10:00 a.m.
Southern Shores Town Hall/Pitt Center

Present: Dan Shields/Southern Shores, Ed Sampson/NC DCM, Steve Shriver/Dare County, Gary McGee/Kitty Hawk, Tricia Huffman/Kitty Hawk, Jan DeBlieu/NCCF, Erin Burke/Manteo, Randy Metzger/Kill Devil Hills, Alan Saunders/NC Shellfish, Jim Rivera/Martins Point, Chris Layton/Duck, Robert Tankard/DWQ, Gil Falasco/Currituck DPW, Tom Reeder/DWQ, Mike Doxey/Currituck Soil & Water, Kevin Schwartz/OBHBA/OBAR, Dave Clark/Town of Nags Head, Nancy White/Coastal Studies Institute

The meeting convened at 10:05. Mike Doxey from Currituck Soil & Water presented a very informative program on setting up Stormwater Service District. He provided handouts.

Mr. Doxey explained the different types of water districts, how to form a service district, what Currituck County is doing and how to service once set up.

He stressed that finding a way to make developments manage and maintain compliance prior to building is best solution because retro-fitting existing development is a challenge. An important point made is that it is nearly impossible to retrofit developments based on a routine fee assessment. A special assessment is generally necessary to generate the funds needed to "fix" a development once it is built and has the problems. It is also important that sufficient funds are generated so that DWQ and the county/ towns can provide necessary monitoring and management.

This discussion led the group to question what solutions would work and how they should proceed with develop specific solutions to specific problems.

The fact is that there is no magic bullet. There will need to be an integrated approach that is implemented at a variety of scales and jurisdictions and some of them may require some innovation. For example, some ideas suggested are 1) Pump excess water to an artificial island in the sound; 2) use natural wetlands for treatment and storage; 3) Put a storage pipe beneath the roadway? 4) Put in a median and plant as bioretention? 5) Adjust rate and fee structure of providing water to pay for infrastructure needed to deal with impacts related to tourism? 6) Use special service districts to do special assessments to generate the funds to implement BMPs needing to reduce runoff? 7) Use the districts to assess fees to pay for management and maintenance? 8) Require that all new development be low impact? 9) Assess fees to monitoring that the LID strategies are maintained?

A discussion followed about how to move forward to develop recommendations…

The group discussed breaking out recommendations into short, medium and long term recommendations; as well as at a variety of scale, individual, community, regional etc.