Morgan and Little Creeks Local Watershed Planning Initiative

Meeting Announcement & Summary

Wednesday, October 22, 2003 meeting held at the Totten Center

Next meeting:

February 18, 2004

2:00-4:00 pm

Totten Center, NC Botanical Gardens

Directions to the Totten Center:

From I-40: Take exit 273 from the West, 273-B from the East. Turn right onto Highway 54 W, go 2.4 miles; turn left at the traffic light onto Finley Golf Course Road. Go 0.6 mile and curve right onto Old Mason Farm Road. Go 0.7 mile, see North Carolina Botanical Garden sign on left; turn left into parking lot.

From the 15-501 and 54 Bypass (Fordham Blvd.): Look for the brown landscaped wall on the south side of Fordham Blvd., 0.6 mile west of the Hwy 54 overpass. Turn onto Old Mason Farm Road at the east end of the wall. See North Carolina Botanical Garden wooden sign on immediate right and turn right into parking lot.

Maps can be found at the following URL: http://www.unc.edu/depts/ncbg/info.htm#Directions

February 18th Meeting Agenda

- ► Welcome and Introductions
- ► Review and approval of October minutes
- ► Stream Stability Assessment
- ► Habitat Assessment
- ► Draft Assessment Report
- ► Codes and Ordinances Worksheet
- ► Plans for Next Meeting

Team members present at 10/22/03 meeting:

Shari Bryant, NC Wildlife Resources Commission
Patricia D'Arconte, Town of Chapel Hill
Ed Holland, Orange Water and Sewer Authority
Sydney Miller, Triangle J Council of Governments
Sharon Myers, UNC-Chapel Hill
Doug Nicholas, Triangle Land Conservancy
Jonathan Parkinson, Friends of Bolin Creek
Johnny Randall, NC Botanical Gardens/Morgan Creek Valley Alliance
Fred Royal, Town of Chapel Hill
John-Ann Shearer, US Fish and Wildlife Service

Team members not present:

Brent Bogue, Natural Resources Conservation Service
Jim Blose, Dept. of Environment and Natural Resources
Lorelei Costa, Triangle Land Conservancy
Ren Ivins, Orange County
Karen McAdams, Cooperative Extension Service
Kat Oury, NC Cooperative Extension Service
Garland Pardue, US Fish and Wildlife Service
John Thomas Jr., US Army Corps of Engineers
Dave Stancil, Orange County
Richard Whisnant, UNC-Chapel Hill School of Government

Guests Present:

Ed Harrison, Chapel Hill Town Council
Susan MacKinnon, Little Creek Watershed Resident
Meg Holton, UNC-Chapel Hill Energy Services

Support Staff Present:

Deborah Amaral, Cape Fear River Assembly
Jason Doll, TetraTech, Inc.
Bonnie Duncan, N.C. Wetlands Restoration Program
Don Freeman, Cape Fear River Assembly
Samantha Sheehy, Cape Fear River Assembly
Cherri Smith, N.C. Wetlands Restoration Program

Summary of the 10/22/03 Meeting

Meeting Agenda / Stakeholder Introductions

Deborah Amaral of the Cape Fear River Assembly opened the meeting and reviewed the agenda items. Participants then introduced themselves and stated which organization they represented. Minutes of the August meeting were reviewed, and a request to clarify a part of the University Lake Assessment section was made. The section mentioned will be re-evaluated, and the minutes will be submitted for approval again at the December meeting.-

Nutrient Assessment Results

Jason Doll of Tetra Tech presented the results of the nutrient loading and eutrophication assessment. This assessment will help to determine how to allocate nutrient allowances to mitigate the nutrient loads, and should be kept in the context of the Jordan Lake Total Maximum Daily Load (TMDL) process. The North Carolina Division of Water Quality (NCDWQ) has recently established a target goal of 35% reduction of total nitrogen loads to the Upper New Hope Arm of Jordan Lake, which is a significant decrease. Therefore, it is crucial to determine how best to distribute the allocation to get the most effective reduction possible.

The nutrient loading model being used focuses on annual total nitrogen and total phosphorus loads delivered to Jordan Lake from the Morgan and Bolin/Little Creek watersheds. The nutrient loading analysis for this Local Watershed Plan includes, and will continue to be improved by, results from Tetra Tech's assessment of nutrient loading in the University Lake watershed on behalf of the Orange Water and Sewer Authority (OWASA) as that analysis progresses toward completion. In the LWP analysis loads produced and delivered are being evaluated on a subwatershed scale. The model takes into account nutrient trapping within stream reaches and within University Lake, and both the existing conditions of land use as well as possible buildout scenarios of land use are being evaluated at the parcel level. The model estimates unit loading rates for 19 land uses, including 6 residential (plus 4 repeated with septic), 3 urban, 2 agricultural, 2 natural area (forest, wetland) and 2 other (barren lands, open water). The rates are estimated using the Generalized Watershed Loading Functions (GWLF) model with a 10 year simulation (1990-2000). The subwatershed scale load is a product of both the loading rates and the land uses.

Current Land Use

The current land use information was estimated from a combination of parcel, zoning, land use, and land cover data. The parcel data was used for residential, commercial, and institutional land uses, and the commercial and institutional parcels were adjusted using planimetric data, in order to account for grass or forested land within those parcels. For example, the conference center near Jordan Lake is categorized as commercial, but it is 90% forested! Similarly, for large, rural, residential parcels with significant portions that remain forested, the analysis worked on the assumption that the first three acres of these lots were residential, and the remainder was categorized as forest.

Forest, pasture, and row crop were assumed to take up the remainder of land use within each subwatershed, according to their relative proportions as reflected by the National Land Cover Database (NLCD) developed by the Multi-Resolution Land Characteristics Consortium (MRLC). However, because the NLCD analysis is ten years old, these areas were updated using parcel information. The pasture and agriculture portions were reduced because of recent land development, but the relative percentages of each were maintained. Septic tanks are a significant source of nitrogen loading. Their density was based on parcel data, sewer service boundaries, and personal communication with OWASA, the Triangle J Council of Governments, (TJCOG), and Chatham County.

Looking at a map of the current land use break down, a large portion of the watershed is still forested, and many areas of rural residential parcels also exist. The only highly urbanized sites occur in the lower Bolin Creek and lower Morgan Creek areas, which reflect the density of downtown Chapel Hill.

Buildout Land Use

The buildout land use data was estimated from a combination of future land use plans, watershed overlay zoning restrictions, known protected areas (land conservancy easements, federal property around Jordan Lake, and the University Lake buffer), and personal communication with area professionals. The assumption that after the first three acres, rural, larger residential plots are forested was still maintained. For sewer/septic use at buildout, Chapel Hill, Carrboro and Durham were all considered sewered within the 20-year urban transition zone. Chatham County allows a 2 -acre minimum residential lot size within the University Lake watershed, while Orange County maintains specifies a 5 -acre minimum, although some lots have grandfathered rights to create a limited number of 2-acre parcels. At full buildout, the watershed area would be developed except for the protected areas. Other remaining portions of forest would exist on the large residential lots, but development would overtake almost all of the former forested area.

Nutrient Trapping

The nutrient loading assessment was based on the, USGS SPARROW approach. SPARROW refers to spatially referenced regressions of contaminant transport on watershed attributes. The SPARROW approach was used to determine instream nutrient reduction and losses as a function of travel time and an exponential loss or decay rate. This empirical model, which has been widely used, implicitly takes into account losses from multiple sources, as nutrients are subject to both biological and physical processes, such as being bound in plants, or settling out at the bottom. Nutrient trapping in University Lake was evaluated separately based on recent Tetra Tech modeling, giving this portion of the nutrient loading analysis a strong basis. Flow was estimated using GWLF unit runoff and land use for accumulated watersheds, while travel time and the resulting delivery ratio were based on velocity and reach length. Loads were accumulated and attenuated through successive reaches

from all subwatersheds within the LWP study area to Jordan Lake. A team member asked if stormwater management rules could act as a reduction factor in the model, and Jason explained it was impractical for the scale of the study, but will be critical when approximating the reductions resulting from this local watershed planning team's efforts.

Maps were displayed showing the total nitrogen and total phosphorus delivery ratios, which represented the amount of nitrogen/phosphorus from a given subwatershed that is predicted to be delivered, on average, to Jordan Lake. Highest delivery ratios were in the southwestern part of the watershed nearest to the Lake, while the lowest delivery ratios were in the headwater portions of each watershed, reflecting the longer flow paths and travel times from those areas. Total phosphorous delivery ratios were a little lower than the nitrogen levels, with a minimum around 17-18% at the headwaters area.

Also shown were maps of the current exerted loads of total nitrogen and total phosphorus, which represent loads generated at the subwatershed level and transported to Jordan Lake. To illustrate predictions of future conditions, the buildout exerted loads of total nitrogen and total phosphorus were shown also. For total nitrogen, the current exerted load of 5-7 lbs/acre/year increases to 9-11 lbs/acre/year for the Town of Chapel Hill, after buildout. The headwaters area of Bolin Creek doubles in its exerted nitrogen loads after buildout. For total phosphorus, the Chapel Hill/Carrboro/Durham area also shows increased loads with buildout, but the increase is not as dramatic as for nitrogen.

Ongoing Efforts

In the University Lake effort, Tetra Tech is creating a response model for the reservoir, and the model calibration portion of the project has just been completed. Possible management scenarios are also currently being reviewed.

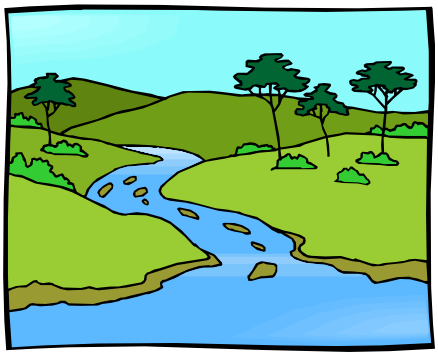
For the ongoing stream stability assessment, modeling is being conducted in some parts of the watershed, while field survey assessments are ongoing in the entire watershed. The field sampling portion has been completed in upper and lower Morgan Creek, as well as in Booker Creek, and only Bolin Creek remains. However, Tetra Tech may use some existing survey data for the unfinished portion of Bolin Creek, so either way, the field sampling is almost finished. A draft of the Preliminary Findings Report will soon be posted to the Cape Fear River Assembly website: www.cfra-nc.org/wrp, and any questions or comments can be directed to Jason Doll at Jason.doll@tetratech.com.

Ongoing Restoration Opportunities

Cherri Smith of the NC Wetlands Restoration Program (NCWRP) implementation team next gave a presentation about ongoing restoration opportunities in the local watershed area, and helped to define the selection criteria for WRP projects. There are many different projects that could be undertaken to improve watershed functions, but the WRP funds can only be focused on areas needing wetlands restoration, stream restoration, or riparian buffer restoration. Some key overriding criteria for all proposed projects include: (1) that the proposed site is within a NCWRP Targeted Local Watershed, (2) the site must, at minimum, have a permanent conservation easement, and (3) there must be access to the site for construction. Overriding considerations include a minimal number of landowners, and minimal utilities, such as power, sewer, bridges or culverts.

Cherri then showed pictures of ongoing restoration projects in the watershed area. In Alamance County, the WRP is helping cattle farmers create stream buffers, and is encouraging farmers to leave woody vegetation near stream banks to help fight erosion. In rural areas like this, for maximum benefit to the stream, it is best to start restoration projects at the headwaters area. In terms of urban and suburban areas, the WRP gets calls from landowners who request restoration projects on their property, but because a requirement of the projects includes a permanent conservation easement, its unlikely many projects can be undertaken on so many small parcels of contiguous private land. However, the WRP is interested in working with landowners and developers, such as in an area south of Wake Forest, where a developer contacted the WRP and worked to have the stream restored before development of the land began.

Golf courses are areas that are subjected to erosion and stream problems, because of the lack of vegetation and trees on the banks. The WRP is currently working with Hillendale Golf Course to restore a 6,000 ft. stream using vegetative planting that maintains the aesthetics of the course and does not negatively impact the game. The example of the Hillendale project demonstrates how the WRP is trying to focus on restoration in a watershed context, and is attempting to restore areas on a watershed scale. Sometimes, municipalities are so eager to have projects conducted in their area, they are willing to go to great lengths to meet the selection criteria. In Hillsborough, south of Murphy Farm, there is a massively eroded stream adjacent to a rural road that runs parallel to a sewer line, making it unfavorable for a WRP restoration. However, the town of Hillsborough has moved the sewer line to the other side of the road in order to make the area more likely to be restored.



The restoration process starts with agreement in the community about what needs to be done, and then a concept plan and design plan are created, and finally permits must be secured. The total time from initiation to the start of a restoration project is about one to one and a half years. Community members sometimes approach the WRP, perhaps by filling out a landowner form on the WRP website, and the WRP also actively seeks out projects. This is all important information to consider in the upcoming few months, as in the Morgan and Little Creeks LWP, team members will be creating a slate of possible restoration sites.

EDUCATIONAL VIDEO: Down the Drain

The LWP team next watched a video created by Bill Hunt of NCSU College of Agriculture and Life Sciences called, "Down the Drain: How North Carolina Communities Manage Stormwater Runoff". The video explained how stormwater runoff is rainfall that does not soak into the ground, but runs over

impervious surfaces and picks up waste and pollutants before reaching storm drains that empty into local water sources. The most common stormwater pollutants are excess amounts of nitrogen and phosphorus, which are present in fertilizer, pet waste, and yard waste. The excess nutrient levels cause massive algal blooms, which suck up all of the oxygen from the water and can suffocate species like fish which need oxygenated water to survive.

Best management practices, or BMP's, have been established in order to slow down stormwater runoff and treat stormwater pollution before it empties into local streams and lakes. For example, Greensboro is an urban city with lots of impervious surfaces. In 1992, stormwater requirements were put into place to protect local water sources. These included a joint project between NC State, the NC Cooperative Extension, and the Master Gardeners, who created bioretention areas, or strips of land used to filter out pollutants. These "rain gardens" consisted of layers of vegetative plants, mulch, soil, and clay particles that filter much of the water pollution before the stormwater reaches a pipe at the bottom of the garden. A large, beautifully landscaped rain garden in Wilmington was created as part of a public park, and the filtered water flows over to a nearby body of water. Not only is the nitrogen and phosphorus absorbed, but also litter and motor oil is filtered out using the rain garden system. The bioretention areas are currently being used as a teaching element for school children, homeowners, and developers, who need to be educated about how to deal with stormwater runoff. Yet another creative solution to the runoff problem is the use of "permeable pavements", where rainwater will soak directly through to the ground below.

Many people are unaware that storm drains empty directly to streams and lakes, and that any pollutants that are washed down the drain will end up in their local waters. Charlotte has a great program that educates the public about storm drains and frequently checks for sewer leaks in the storm drainage system using underground cameras. Creeks are also sampled for pollutants, and illicit discharges are found using infrared aerial photos. The program in Charlotte has been very successful, as public reporting of pollution has been rising, and violations have been decreasing.

Rural communities, such as in Alexander County, are subject to stormwater runoff problems as well. Adjacent to a local school parking lot, a "stormwater wetland" was created to treat polluted runoff. The area consists of a shallow pond with a diverse ecosystem of plants growing on top of it. The terrain beneath is variable, so that little micro habitats with differing depths are created to make a complex environment with all different kinds of plants, each with the ability to filter out excess nitrogen and phosphorus.

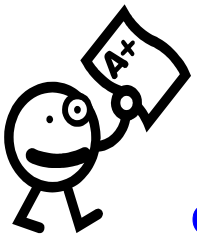
Yet another solution comes in the form of a "green roof", where a building roof is covered in soil media with planted vegetation, so that when it rains, the roof acts as a sponge, and stormwater is slowly released down a pipe instead of running off of the roof all at once.

In summation, the video talked about actions homeowners can take to help prevent stormwater runoff pollution. These include: cleaning up after pets so pet waste does not wash into waters, using established car washes with sewer systems to handle runoff as opposed to washing your car in your driveway, and stopping oil/antifreeze leaks by using a pan to catch drips instead of letting it leak onto the ground. Also, it's important to not let grass clippings, fertilizer, or pesticides stray onto sidewalks, where they can be washed into a nearby storm drain.

Better Site Design: Code and Ordinance Review

Deborah Amaral then talked about a voluntary initiative that is being coordinated among local watershed communities in the Local Watershed Planning process. Members of one local watershed team have approached the WRP asking for guidance in creating site designs that are simple, justified, and enforceable. The support staff has found an excellent handbook put out by the Center for Watershed Protection entitled "Better Site Design: A Handbook for Changing Development Rules in Your Community", that does just that. The handbook contains 22 model development principals that focus on topics like buffer systems, stormwater runoff, open space management, parking, conservation, and street design. One very helpful tool in the book is a "Code and Ordinance Worksheet", consisting of a questionnaire about local development rules with a scoring area at the end. Completing the survey can help communities evaluate how efficient current regulations are, and help to identify areas where improvements could be made. The final goal would be to compile the results from Orange County, Chapel Hill, Carrboro, Wake County, Durham, Fuquay-Varina, Lillington, and Apex, and to share them with local government team members and planners, so they can begin to integrate new concepts and designs. The Code and Ordinance Worksheet has been e-mailed to team members already, but anyone willing to help complete the survey in their jurisdiction is encouraged to contact Deborah Amaral at: amarda@mindspring.com. Additional information about the Center for Watershed Protection can be found at www.cwp.org. The meeting was then adjourned.

The National Association of Development Organizations (NADO) has recently awarded the Morgan and Little Creeks Local Watershed Plan their award for solving local watershed problems and issues! Thank you to all team members, you are doing a fantastic job for your community!



CONGRATULATIONS!