

**FLOOD DAMAGE REDUCTION TASK FORCE
FINDINGS AND RECOMMENDATIONS
OCTOBER 30, 2007**

INTRODUCTION

The Asheville City Council in action taken on May 23, 2006, appointed a Flood Damage Reduction Task Force with a mission “to establish a regional approach in developing a long-range plan based on best practices models to protect our floodplains/floodways and manage our watershed.” A presentation was made to City Council on June 12, 2007, with the promise of this more detailed White Paper to follow.

This paper, along with the text and graphics of the presentation, contains the recommendations of the Task Force.

Relying solely on the recorded history of floods on the Swannanoa River and our recent experience with extensive and expensive damage from the floods of 2004, we urge a quick response by Council, beginning with the **High Priority action list** (attached).

Also on the basis of flood history, we recommend a **plan for every flood**. The 100 year and greater floods will inevitably overwhelm both physical structures and careful strategies, but the real danger to life and property presented by the more frequent events demands the attention of governing bodies across the watershed.

Council is to be congratulated for recognizing the significant **importance of regional planning** demonstrated in appointments for membership of the Task Force. Thank you for convening this group representing residents, businesses, municipalities and agencies throughout the Swannanoa watershed. A presentation was made to Buncombe County Commissioners in September and they have expressed interest in these recommendations; there are tentative plans to present to the Montreat, Black Mountain and Swannanoa Pride Community Coalition boards. We urge Council to initiate meetings for consideration and implementation of these regional recommendations.

The Task Force is optimistic that finding a **balance between economic development and responsible flood mitigation** is possible as well as necessary. The proposals of the city’s River Redevelopment Plan and the Wilma Dykeman RiverWay Plan demonstrate that with careful and creative land use, and willingness to compromise, both sets of goals can be met.

After study and analysis, the group emphasizes that the three categories of recommendations – **Flood Mitigation Strategies, Education and Communication** – are **of equal importance**; no two can stand without the other. All communities of the Swannanoa Valley must understand flood mitigation, agree on its necessity and then work together to build and finance strategies and structures to keep their people and their property safe. The following recommendations of the Task Force to Asheville City Council are dedicated to that goal.

FLOOD MITIGATION STRATEGIES

We will not be able to control the weather and climate that will cause flooding in our region. However, we can plan for every level of flooding in order to decrease the impact of flooding on our region's people and their property. This plan will have to take into account the balance between flood mitigation and other drivers (including limited resources and future economic development), but always focus on preserving people's lives and properties. In addition, the plan must take the entire community into account. We all share the benefits of living here – we must also share in the responsibility for maintaining it. This is tied to the “No Adverse Impact” approach – in other words, the actions of one property owner should not negatively impact other property owners as measured by increased flood peaks, flood stage, flood velocity and associated erosion and sedimentation.

A fundamental premise of flood damage reduction is that current dollars invested in mitigation today will significantly reduce the demand for future dollars by reducing the amount needed for emergency response, recovery, repair and reconstruction following a flood-related disaster.

The primary focus for successful flood mitigation is the planning and implementation of physical measures to reduce flooding. This management of flood water can be divided into three main categories that are easy to remember and communicate with others:

1. Keep it out!
2. Slow it down!
3. Get out of the way!

These three points can be applied to the entire region, and can help establish Best Management Practices (BMPs). BMPs can be regulated by ordinances that can be successfully implemented and enforced by city and county employees. By acting now, a successful plan can be implemented that will save lives and significant property in the future. In addition, all BMPs should be based on a future build-out scenario for the watershed. In other words, regulate based on a total plan for the future, not a point-specific plan for today.

Keep it out!

- “Keep it out” deals with issues related to building codes in the watershed that will:
- Enact and enforce floodplain and stormwater management ordinances for both the city and county.
 - Limit building in the floodway and flood fringe zones, so fewer people and buildings are in harm's way.
 - Adopt requirements for Low Impact Development (LID) standards. This allows a greater percent of stormwater to soak into the ground rather than to run off, subsequently lowering the total amount of water that will flood downstream.

- Insure that the steep slope ordinances relate to flood and stormwater issues.

Detailed discussion of “Keep it out” issues

Adopt key ordinances – The City of Asheville must work with Buncombe County and the other municipalities (Black Mountain, Montreat and others) to frame an integrated plan for instituting key ordinances to help prevent or mitigate flooding. All parties must “share” in the flood preparation. People upstream cannot negatively impact people downstream.

Floodplain Ordinance – No net fill in the flood fringe. Any net fill in the floodplain will result in increases in flooding in the floodway.

Stormwater ordinance – The current ordinance regulates the 10-year storm event. The revised ordinance should consider the impact of the 25-year storm in flood prone areas.

Steep Slope Ordinance – The steep slope ordinance should recognize that there is a direct tie between the amount of development on the slopes of the watershed and the amount of new “flash flood” waters entering the watershed. In addition, steep slope building increases the risk of landslides (one of the primary causes of loss of life during the 2004 hurricane-related storms).

Increase staff to enforce ordinances – The city and county need to budget for increased staff to provide education and enforcement for flood-related ordinances. New ordinances require a new mind-set for the community. In addition to education, direct enforcement is required to change behavior that is no longer sustainable in the watershed. We appreciate Council’s recent approval of additions to stormwater staff.

Require extensive Best Management Practices (BMPs) – BMPs are recommended to ensure no increased stormwater runoff from development. Both retention and detention strategies should be employed. BMPs for mitigation of stormwater can include both above ground and underground structures, and also include (but are not limited to):

- Wet detention ponds
- Dry detention ponds
- Underground storage chamber systems
- Sediment control with aquatic buffers
- An acre of open space (i.e., flood control, greenway, park) set aside for every acre that is developed in the floodplain. Public greenways should be a key part of any streamside project.
- Rain gardens and green roofs
- Stormwater wetlands
- No curb and gutter
- New structures that do not impede flow and that are built to a higher environmental standard to prevent increased stormwater runoff

Buffers – There should be a minimum buffer (measured from top of stream bank) on all streams unless a variance is granted for hardship reasons. The Task Force recommends a 100-foot minimum buffer along the Swannanoa and French Broad Rivers, a

50-foot buffer on primary tributaries and at least a 35-foot buffer on all secondary streams. Buffers are a key part of the new stormwater ordinance.

Incentives for Developers - Allow incentives for builders that employ BMPs. Reward developers who meet strict environmental standards with a higher density development. Require a bond be placed to ensure the standards are met.

Low Impact Development (LID) - Adopt requirements and incentives for LID standards. The goal is to mimic a site's pre-development hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Many LID practices are easy, cheap and low-tech.

The hydrologic cycle (natural water cycle) describes the way that water cycles through the phases of precipitation, evaporation and transpiration, surface runoff, and groundwater recharge. Pre-development there is approximately **1% surface runoff**, 40-50% evaporation and transpiration, 20-40% groundwater recharge, and a significant portion for shallow groundwater. Post-development there is **20-30% surface runoff** (note the significant increase), 20-30% evaporation and transpiration, 10-20% groundwater recharge and very little shallow groundwater. This increase in surface runoff can significantly alter the stream flow by reducing base flow and increasing storm flow. To better mimic the natural water cycle, new development should limit the amount of impervious surface and preserve the maximum amount of trees and plants. BMPs also include limiting the amount of speculative grading and adopting a no-net-loss of canopy philosophy.

Slow it down!

Despite best efforts to keep flood water volumes to a minimum, certain stormwater events will overwhelm the streams and cause potential flooding. "Slow it down" deals with issues related to:

- Management of the Asheville reservoir (North Fork)
- Building of retention ponds and reservoir impoundments
- Channel and conveyance improvements in the floodway

Detailed discussion of "Slow it down" issues

Management of the North Fork Reservoir – The City of Asheville has constructed a good management plan that balances drought and flood mitigation. This plan needs the active support of City Council to fund its continued operation.

Building of retention ponds and reservoir impoundments – One of the best ways to slow floodwater down is to have a series of retention ponds and reservoirs that can be operated to better regulate the flow of water during stormwater events. Downstream of the North Fork Reservoir, there are numerous locations that can be designed to serve this purpose. The city and county should acquire these properties wherever possible for

retention ponds and institute an active management plan. In addition, existing retention ponds and reservoirs need to be kept free of sediment and dredged if necessary. Other possible detention areas that should be examined or employed include Warren Wilson College's farm and pasture lands and Kenilworth Dam.

Channel and conveyance improvements in the floodway – If the water is not retained in ponds, it needs to maintain a steady flow in the floodway. Unplanned dams caused by debris piling up against structures cause a great deal of local flooding. Ways to improve the conveyance include:

- Keep the floodway cleaned up by active debris removal. Nothing should impede the flow of water in the floodway.
- Do not obstruct the primary channel with bridges, sewer lines, or buildings. This work must be done with MSD and NCDOT to ensure safe operations and balance the flow of water with the flow of traffic.
- Identify pinch points and work out ways to resolve. Pinch points occur where the channel has been constricted artificially. If the channel becomes too constricted, it causes flooding upstream and increased velocity of floodwater downstream. The altering of river channels by property owners in attempts to "stabilize" river banks often results in narrowing the channel. This is particularly true in the Biltmore Village area and extending east along Swannanoa River Road. The law(s) that deal with altering a river's bank needs to be explained to all property owners.
- In Biltmore Village 20% of the channel was compromised when MSD put their trunk line into the channel.
- Buy properties if necessary. Seek funding for buyouts of land along the Swannanoa River that are currently for sale. Re-examine plans for the Biltmore Avenue Bridge to assure maximum flow capacity.

Get out of the way!

Even the best engineered stormwater and flood control systems will not handle the amount of water caused by “100 year floods” and extreme quantities of water. Our community knows these events happen – we experienced this level of flooding in 1916 and 2004. Even lower levels of flooding in other years, on an approximate 20-year cycle, caused loss of life and severe property damage in Buncombe County. For these reasons, “Get out of the way” issues address:

- Removal of flood prone structures in known hazard areas, and
- Improving emergency response and warning systems.

Detailed discussion of “Get out of the way” issues

Removal of flood prone structures in known hazard areas – Identify key properties within the watershed, particularly those within the floodway, to target for conservation. Make contact with the property owners and leverage financial incentives to purchase development rights and convert to conservation easements.

Improve and publicize an early warning system for people who live downstream from the North Fork Dam. This is of immediate importance. If our community experiences a flood situation similar to the one we had in 2004, significant loss of life could occur below the North Fork Dam should the dam break. This is not a very likely scenario, but one that we need to plan for and anticipate. In addition, other residents along the Swannanoa River need to know what to do and where to go in the event of a flood. Key parts of the plan include:

- Existing flood operations plan – operate the reservoir to provide flood control, but balance this with maintaining a drought response plan
- Emergency Action plan – protect the dam and water supply from extreme events
- Advance Flood Warning system – notify Emergency Management (procedures in place) and citizens

Plan based on future regional build-out

The Task Force looked at how other communities have addressed flood mitigation efforts. Charlotte/Mecklenburg County has taken a very proactive approach, and have tied all of their floodplain and stormwater ordinances to a future build-out scenario. In other words, community stakeholders met and discussed what the watershed would look like in 20 years, based on demographics and development trends. Based on this level of development, future flood levels were calculated. All current building in flood prone areas must meet flood standards predicted from this future scenario. In Buncombe County, we should follow a similar path. Census data indicates that there will be an additional 30,000 people in Buncombe County over the next 20 years, putting continued pressure to build along the river in the floodplain and adding mountainside development that puts more runoff in the river.

We must begin now to seek funding for this watershed plan. The local Army Corps of Engineers office is willing to work with us on this plan. We must begin to plan with other regional groups for this future build-out.

To construct a build-out scenario for our area, we must:

- Start with the city's existing River Redevelopment Plan and improve upon it. Re-examine the Plan to further limit the amount of allowable impervious surface.
- Make sure the plan is put in place soon. Current development activities are having a negative impact and the next storm could create even more problems.
- Map the floodplain based on a build-out scenario and base all planning and regulation on that future floodplain, not on the current model that will soon be outdated. Plan for a 50 year flood, not just the 100 year event.
- Follow a management strategy based on the full build-out scenario. It does not make sense to put expensive new structures in areas we know flood regularly.

The bottom line is that the City of Asheville must work with Buncombe County and the other watershed communities (Black Mountain, Montreat, Swannanoa and others) to frame an integrated plan. Separate stormwater, steep-slope and planning ordinances make

it difficult to achieve this integration. All parties must “share” in the flood preparation – people upstream should not negatively impact people downstream.

An integrated plan will be prototyped in the upper reaches of the watershed by working with Black Mountain and Montreat:

- Take the current 2006 revised FEMA maps and tie in current building and impervious data.
- Look at the trend in the past 20 years and project what development might do in the next 20.
- Use a hydrology model to determine new flood levels based on the projected increase in impervious surface, and ensure that new building requirements match these levels.

Following the development of the Black Mountain-Montreat prototype, integrate the rest of the Swannanoa watershed, and finally expand to cover the French Broad as well.

In addition, this group of planners should re-examine the Urban River District plans to decrease permitted impervious surfaces. The plans could use the Dykeman RiverWay Plan as a model. The proposals of the Dykeman Plan demonstrate that with careful and creative land use, and willingness to compromise, a balance between economic development and responsible flood mitigation can be achieved. The Urban River District plans, the Dykeman Plan and the River Redevelopment Plan need to be integrated and tied into the overall City of Asheville development plan.

EDUCATION

All of the mitigation issues addressed in the previous section need to be communicated to the general public and put into the proper context. This requires a large amount of coordinated education and outreach that contains standard messages and content. This training needs to occur for several reasons. First, we need to raise awareness of the flood mitigation issues. Second, more people need to be involved in the discussion of future build-out scenarios and their importance. This will lead to a better understanding of the competing land use issues that we face in our community when dealing with flood planning. Finally, education and outreach will build support in the community for the level of funding necessary to address the problem, and therefore build support for bond referendums or similar issues.

To address this issue, we first need to determine the audience. Different groups will require different amounts of information. The audience can be divided into these general categories:

- Decision makers, including city, county, regional, state and national
- Emergency responders
- Builders and developers
- General public

The general topics that need to be covered include:

- General science of how flooding in the mountains occurs
- How current ordinances are tied to this science
- Why land planning is important in regard to flood mitigation
- Flood warning system

The primary content should be tied to the Swannanoa watershed. This is especially true for creating integrated products for communities along the watershed. A plan exists for working with Black Mountain and Montreat on the first phase of this integrated process; it just awaits data. This work will be based on prototypes created by the RENCI at UNC Asheville engagement site for the Flood Damage Reduction Task Force. Materials will include hard copy materials, including brochures, articles, posters and presentations. In addition, multimedia content will be created (movies, video clips and websites). One special product already in production is a video called “Water in WNC” that can be shown at meetings, in a three-dimensional immersive dome and online.

These materials will be delivered in a variety of ways. Community meetings will be held to disseminate the message, possibly including quarterly educational forums. To support these meetings, the RENCI outreach van is available (a partnership with Arboretum, RiverLink, Colburn and Land of Sky). These meetings will include presentations and the distribution of hard copy materials. Participants will be directed to companion Web sites that will contain additional materials.

The coordination for this education and outreach will need to come through the City of Asheville due to funding commitments. They will work with Buncombe County,

RENCI at UNC Asheville, Land of Sky and RiverLink to coordinate and schedule. A portion of the \$2.5 million Senate Bill 7 money will be used for this education. RENCi at UNC Asheville will provide expertise and funding, and apply for some additional grant funding if required.

This ambitious education and outreach process has already begun. The RENCi outreach van was delivered in August. The newest FEMA flood maps were delivered for review in early October; these are needed to create “final” products and move into a production mode.

COMMUNICATION

The coordinated education and outreach to the general public will provide the context for community support of needed changes. Communication across and between communities is equally important.

Emergency response teams from Buncombe County and the various municipalities should meet on a regular basis, with a sense of urgency as if the floods of 2004 were yesterday. Flood warning systems should be expanded and updated through a process that includes public safety officers.

Work has begun on an emergency plan for Biltmore Village; when completed, this could be a prototype for other neighborhoods.

Land use planners from local governments should also meet regularly. The most efficient and realistic planning will occur as they cooperate to connect information and projections for the entire Swannanoa Valley.

This flood damage reduction study was hindered by the lack of projections and plans for the future of the watershed. There is an immediate need for the development of a Swannanoa watershed build-out plan. Until planners and engineers know the build-out scenario, the amount and placement of impervious surfaces and designs for flood mitigation will be ineffective.

SUMMARY

This regional approach to developing a long-range plan to protect our floodplains and manage our watershed is composed of three essential parts: flood mitigation strategies, education of the community and all decision makers, and communication between and across communities.

A mix of strategies will be needed to mitigate flood damage in the Swannanoa watershed. Many of these strategies have been proven effective here and in other communities. Community-wide education will lead to community understanding of and support for these strategies. Finally, because the concerns span the entire watershed, effective flood mitigation cannot occur without communication and coordination among local governments and residents.

HIGH PRIORITY ACTION LIST

- Inter-governmental coordination and action.
- Improve and publicize an early warning system for residents below the North Fork dam.
- Initiate work to develop a watershed build-out plan.
- Find and implement funding sources for buyouts of flood-prone properties or where needed for retention ponds.
- Budget for incentives and increased enforcement staff to implement flood-related ordinances.
- Provide resources for public education.