

## **UPPER NEUSE WATERSHED MANAGEMENT**

### **ISSUE BRIEF: *REVIEW OF LOCAL CODES AND ORDINANCES AND THEIR POTENTIAL TO PROTECT WATER RESOURCES***

(By Chris Dreps, Upper Neuse River Basin Association, and Ben Bearden, Triangle J Council of Governments)

#### **Purpose**

The Upper Neuse Watershed Management Plan recommends that six counties and eight municipalities implement a host of management strategies to protect stream and reservoir systems in the watershed. The management strategies include nitrogen and phosphorous performance standards for new development, stormwater "low-impact development" education, and watershed restoration. In addition, many of these communities are required to meet basinwide Neuse Rules for nitrogen reduction and federal Nonpoint Source Discharge Elimination System (NPDES) stormwater requirements. Truly, meeting future stormwater requirements and protecting water systems will be a major undertaking.

Are we prepared to tackle stormwater management? In order to answer this question, we must first examine the rules that govern development in our communities. Do these rules protect water resources? Are they strong and flexible enough to allow innovation? Ten local governments in the Upper Neuse have begun examining their local development codes and ordinances using the Center for Watershed Protection's Code and Ordinance Worksheet (COW). This worksheet is a questionnaire that asks the respondent to measure local development rules against a set of model development principles for the protection of water resources.

This draft Issue Brief provides background information about the Code and Ordinance Worksheet, a summary of the model development principles, general results of the analysis, and general conclusions.

This Issue Brief is currently under review by members of the Upper Neuse River Basin Association's Technical Advisory Committee (TAC). The comments and suggestions of TAC members and others will be incorporated into the final document.

#### **Background**

Sustainable development combines economic growth with protection of the natural environment. Communities have long struggled to achieve this goal. However, we often find that our development codes and standards can actually work against our own efforts to achieve sustainable, "low-impact" development. For example, local codes and ordinances often require inflexible standards that result in overly wide residential streets, expansive parking lots, and mass clearing and grading of forested areas. At the same time, local codes often give developers little or no incentive to conserve natural areas.

The Upper Neuse River Basin Association's *Watershed Management Plan* recommends Development ordinance revisions for protecting water resources throughout the watershed. Among the recommendations are innovative stormwater management practices such as water quality performance standards and "Low-Impact Development." The Center for Watershed Protection's Code and Ordinance Worksheet (COW) addresses the question of local ordinance readiness to protect water resources. The COW is an in-depth review of the standards, ordinances,

and codes that shape how development occurs in our local communities. To date, ten local governments in the Upper Neuse Basin have used the COW to assess the extent to which development rules protect water resources. Six counties (Durham, Franklin, Granville, Orange, Person, and Wake) and four municipalities (Creedmoor, Durham, Hillsborough, and Raleigh) have completed the survey.

The COW guides the participant through a systematic comparison of a government's local development rules against a set of *model development principles*. Institutional frameworks, regulatory structures and incentive programs are included in this review. The worksheet consists of a series of questions that correspond to each of the model development principles. Points are assigned based on how well the existing development rules agree with the site planning



**Clustering houses and retaining open space**  
<http://www.djc.com/news/en/11135654.html>

benchmarks derived from the model development principles.

### **Overview of the Model Development Principles**

In 1996, the Maryland-based Center for Watershed Protection convened a Site Planning Roundtable of diverse interests involved in planning, designing, and building new communities. This group worked for nearly two years to develop a set of 22 model development principles for the protection of water resources. Applied together, the model development principles can measurably reduce impervious cover, conserve natural areas and reduce stormwater pollution from new development.

Application of these principles can enhance both the natural environment and improve the quality of life in local neighborhoods. Some of the benefits of these principles include:

- Protection of local streams, lakes, and estuaries
- Reduction of stormwater pollutant loads
- Reduced soil erosion during construction
- Reduced development construction costs
- Increases in local property values and tax revenues
- More pedestrian friendly neighborhoods
- More open space for recreation
- Protection of sensitive forests, wetlands, and habitats
- A more aesthetically pleasing and naturally attractive landscapes
- Safer residential streets
- More sensible locations for stormwater facilities
- Easier compliance with wetland and other resource protection regulations
- Neighborhood designs that provide a sense of community
- Urban wildlife habitat through natural area preservation

A community's codes and ordinances can allow, encourage, require, or prohibit activities based upon desired outcomes of the community (usually stated in comprehensive or land use plans). It is important to note the language used in local ordinances. The terms "allow" or "encourage" are very different in meaning, just as the terms "prohibit" and "do not allow" can have different meanings.

**How the Review is Organized**

The 22 development principles generally fall into one of three categories that have been designated as follows:

- Residential Streets and Parking Lots
- Lot Development
- Conservation of Natural Areas

This Code and Ordinance review is divided into five sections. The first provides the overall scores from the COW survey. The next three sections address the results of the COW based on the Model Development Principle general categories. Within each category, there is a general discussion about how local ordinances address the model development principles. All discussion comes directly from answers to COW questions provided by representatives of each participating government.

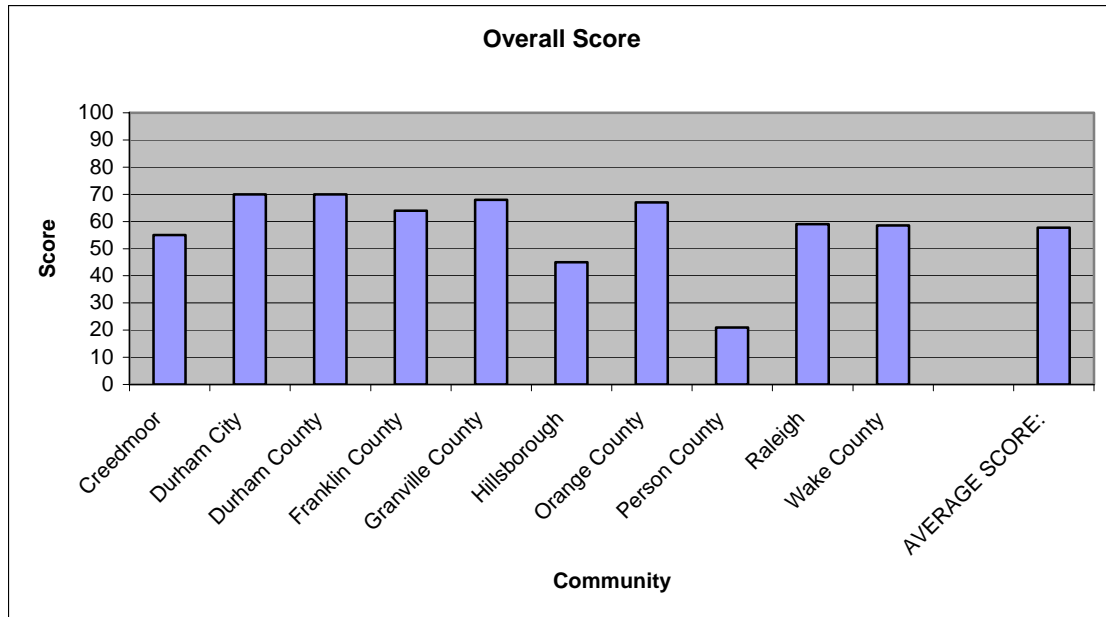
As an example, principle 3 states, "Wherever possible, residential street right-of-way widths should reflect the minimum required to accommodate the travel-way, the sidewalk, and vegetated open channels. Utilities and storm drains should be located within the pavement section of the right-of-way wherever feasible." The questionnaire asks, "What is the minimum right-of-way width for a residential street?" A response of less than 45 feet is awarded points. The questionnaire also asks, "Does the code allow utilities to be placed under the paved section of the ROW?" A "yes" response wins points. Once all 68 questions are answered, scores can be tallied.

**How Local Ordinances Address Model Development Principles**

Ten local communities completed the COW during the summer of 2002. This section provides a general description of how local ordinances stack up against the model development principles in their ability to protect local water resources.

**Overall Scores**

The overall COW scores are presented below:



The Center for Watershed Protection uses the following scoring system. Although this scoring system cannot apply to every community, the scores above can indicate whether a community is a leader in the protection of streams, lakes, and wetlands or whether a community's ordinances are candidates for improvements.

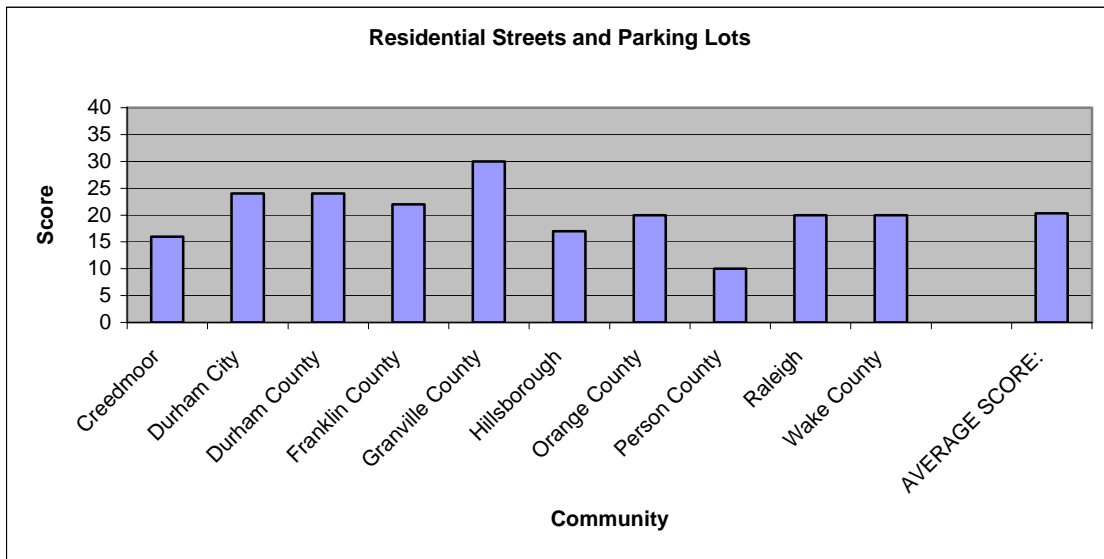
- 90 – 100** Community has above-average provisions that promote the protection of streams, lakes and estuaries.
- 80 – 89** Local development rules are good, but could use minor adjustments or revisions in some areas.
- 70 – 79** Opportunities exist to improve development rules. Consider making a site planning roundtable.
- 60 – 69** Development rules are likely inadequate to protect local aquatic resources. A site planning roundtable would be very useful.
- < 60** Development rules need to be examined carefully in order to determine where obstacles to resource protection occur as well as how to overcome these obstacles.

**Residential Streets and Parking Lots**

Principles 1-10 focus on those codes, ordinances, and standards that determine the size, shape, and construction of parking lots, roadways, and driveways in the suburban landscape. The amount of impervious cover in a watershed is strongly correlated with the amount of runoff and the quality of surface waters. Rules and incentives can encourage or require smaller amounts of impervious surfaces through, for example, maximum street width or parking space requirements.

**Summary of COW Scores**

The following chart depicts the distribution of scores for this section of questions from the COW worksheet:



Out of a possible 40 points, scores range from a high of 30 points (75% of possible), to a low of 10 points (25% of possible), and the average score for all communities is 20 points (50% of possible). The average score for residential streets and parking lots is the lowest, percentage-wise, of the three sections reviewed. This low average score may indicate that there is still much room for improvement in the area of rules and incentives for residential streets and parking lots.

Below is a discussion of how each community's regulations match up with the corresponding model development principle. Specific scores are presented in an appendix at the end of this report.

### Principle 1: Street Width

**Design residential streets for the minimum required pavement width needed to support travel lanes; on-street parking; and emergency, maintenance, and service vehicle access. These widths should be based on traffic volume.**

#### Results

- Most communities require minimum street widths of between 18 and 22 feet, the exceptions being Raleigh and Wake County. Street width minimums are weighted heavily in the COW scoring scheme, which reflects how significantly street width contributes to overall impervious cover. Lower street width minimums would allow for less impervious cover.
- Wake County and Granville County have the only ordinances that explicitly allow parking lanes to occasionally serve as traffic lanes, thus allowing reduction of the overall amount of pavement needed to meet parking and transportation needs.

### Principle 2: Street Length

**Reduce the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length.**

#### Results

- According to responses provided on the COW, Creedmoor, Person County, and Orange County do not have street standards that promote the most efficient street layouts to reduce overall street length.
- **All other responding jurisdictions have some form of these standards.**

### Principle 3: Right-of-Way Width

**Wherever possible, residential street right-of-way widths should reflect the minimum required to accommodate the travel-way, the sidewalk, and vegetated open channels. Utilities and storm drains should be located within the pavement section of the right-of-way wherever feasible.**

#### Results

- Only Creedmoor, Granville County, and Franklin County have a minimum right of way width of less than 45 feet for residential streets.

- All other responding jurisdictions either have no minimum ROW or have a minimum that is greater than 45 feet.

#### Principle 4: Cul-de-Sacs

**Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover. The radius of cul-de-sacs should be the minimum required to accommodate emergency and maintenance vehicles. Alternative turnarounds should be considered.**

#### Results

- Orange, Wake, and Granville Counties have minimum cul-de-sac radii of under 35 feet, and Franklin County and Raleigh have minimum cul-de-sac radii of between 36 and 45 feet. The remaining communities have cul-de-sac minimum radii of greater than 45 feet.
- Allowing lower cul-de-sac radii would allow for less impervious cover.

#### Principle 5: Vegetated Open Channels

**Where density, topography, soils, and slope permit, vegetated open channels should be used in the street right-of-way to convey and treat stormwater runoff.**

#### Results

- Durham City, Durham County, and Raleigh require curb and gutter for most residential streets.
- **Relaxing this requirement could allow for increasing the time it takes for stormwater to flow into streams and, thus, increasing the amount of stormwater infiltration.**

#### Principle 6: Parking Ratios

**The required parking ratio governing a particular land use or activity should be enforced as both a maximum and a minimum in order to curb excess parking space construction. Existing parking ratios should be reviewed for conformance taking into account local and national experience to see if lower ratios are warranted and feasible.**

#### Results

- Residential parking minimum ratios were all less than or equal to 2 spaces per single family home, with the exception being Creedmoor.
- No municipal or county government had minimum parking ratios of fewer than 3 spaces per 1000 feet<sup>2</sup> of gross floor area of professional office buildings.

- Shopping Centers in Granville County, Franklin County, Person County, Wake County, and Raleigh fared better with minimum parking ratios set at less than or equal to 4.5 spaces per 1000feet<sup>2</sup> of gross floor area.
- No municipal or county government had parking requirements that were maximums or medians. Maximum parking requirements can limit the amount of parking, while minimums have the tendency to encourage more spaces than needed.

### Principle 7: Parking Codes

**Parking codes should be revised to lower parking requirements where mass transit is available or enforceable shared parking arrangements are made.**

#### Results

- Hillsborough and Wake County do not promote the use of shared parking.
- Raleigh, Durham City, and Durham County have model shared parking agreements.
- Creedmoor, Person County, and Wake County do not allow parking ratios to be reduced with shared parking.
- Only Durham City and County allow reduced parking ratios if mass transit is offered nearby.

### Principle 8: Parking Lots

**Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas.**

#### Results

- All county and municipal governments allow minimum parking stall widths of 9 feet or less, allowing for lower amounts of impervious cover necessary to meet parking requirements.
- Except for Durham City and County, no municipal or county ordinances required 30% of spaces at larger commercial parking lots have smaller dimensions for compact cars. Such requirements would reduce the amount of pervious material required for such lots.
- Person County, Orange County, and Wake County do not explicitly allow pervious pavement in spillover parking areas. Allowing pervious pavement could contribute to the reduction of impervious cover in parking lots.

### Principle 9: Structured Parking

**Provide meaningful incentives to encourage structured and shared parking to make it more economically viable.**

#### Results



- None of the ordinances provide any explicit incentives for developers to provide structured parking rather than surface lots. Structured parking allows developers to meet parking requirements with less ground area covered with impervious material.
- Incentives such as...could encourage more structured parking.

**Principle 10: Parking Lot Runoff**

**Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands.**

**Results**

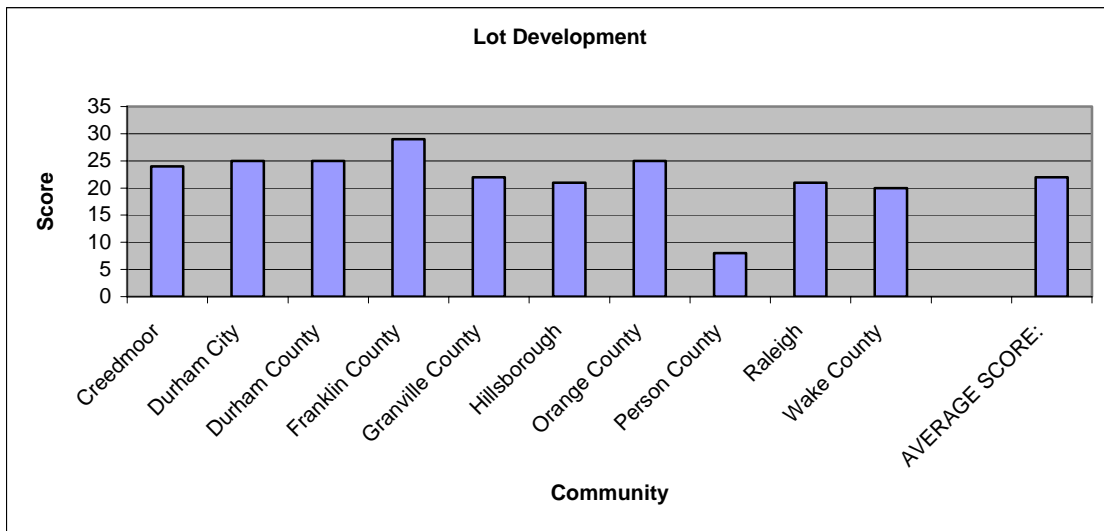
- Franklin County, Person County, and Wake County currently do not allow bioretention islands and other stormwater BMPs within landscaped areas or setbacks. Such practices would greatly enhance the opportunity for mitigating negative impacts of pollution in stormwater runoff.
- Who does allow it?

**Lot Development**

Principles 11 through 16 focus on the regulations that determine lot size, lot shape, housing density, and the overall design and appearance of our neighborhoods. These development design features can also significantly impact the healthy functioning of a watershed.

**Summary of COW Scores**

The following chart depicts the distribution of scores for the ten participating communities for this section of questions from the COW worksheet:



Out of a possible 36 points, scores range from a high of 29 points (81% of Possible), to a low of 8 points (22% of Possible). The average score for all communities is 22 (61% of Possible), which is only slightly lower, percentage-wise, than found for the third section, on natural areas conservation.

Below is a discussion of how each community's regulations and incentives match up with the corresponding model development principle. Specific scores are presented in an appendix at the end of this report.

### Principle 11: Open Space Design

**Advocate open space development that incorporates smaller lot sizes to minimize total impervious area, reduce total construction costs, conserve natural areas, provide community recreational space, and promote watershed protection.**

#### Results

- Currently, all municipal and county ordinances except for Person County allow open space or cluster development.
- With the exception of Person County, community ordinances allow flexible site design for developers that use open space or cluster development.
- Creedmoor, Franklin County, Person County, Granville County and Raleigh have ordinances in which submittal and review requirements are greater for open space design than for conventional design. Having greater requirements for open space design may discourage developers from taking a risk and implementing such design.
- Hillsborough, Raleigh, and Person County do not have land conservation and impervious cover reduction as major goals of their open space design ordinances.

### Principle 12: Setbacks and Frontages

**Relax side yard setbacks and allow narrower frontages to reduce total road length in the community and overall site imperviousness. Relax front setback requirements to minimize driveway lengths and reduce overall lot imperviousness.**

#### Results

- All communities except for Hillsborough allow irregular lot shapes.
- All communities except for Raleigh and Wake County have minimum rear setbacks of less than 25 feet for residential lots.
- All ordinances, except for Franklin County's, do not allow a minimum front setback of less than or equal to 20 feet for residential lots.
- All ordinances, except for Franklin County's, do not allow a minimum side setback of less than or equal to 8 feet for residential lots.

- Interpret here--are these adequate or is there room for improvement?

### Principle 13: Sidewalks

**Promote more flexible design standards for residential subdivision sidewalks. Where practical, consider locating sidewalks on only one side of the street and providing common walkways linking pedestrian areas.**

#### Results

- Only Franklin County and Hillsborough require minimum sidewalk widths of 4feet or less.
- Only Creedmoor, Franklin County, and Granville County require sloping sidewalks so that they drain into yards rather than into streets.

### Principle 14: Driveways

**Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.**

#### Results

- In all communities, ordinances allow shared driveways in residential developments. Shared driveways allow for less required impervious cover for development.
- Orange and Wake Counties do not explicitly allow pervious materials to be used for single-family home driveways.

### Principle 15: Open Space Management

**Clearly specify how community open space will be managed and designate a sustainable legal entity responsible for managing both natural and recreational open space.**

#### Results

- With the exception of Person County, all ordinances define allowable and unallowable uses for open space in residential areas.
- Only Durham City and Durham County require consolidating open space areas into larger units.
- Only Franklin , Orange, and Wake Counties require managing a minimum percentage of open space in a natural condition.
- In Person County and Raleigh, a third party using land trusts or conservation easements is not explicitly allowed to manage open space. DO OTHERS EXPLICITLY ALLOW?

**Principle 16: Rooftop Runoff**

**Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff to the roadway and the stormwater conveyance system.**

**Results**

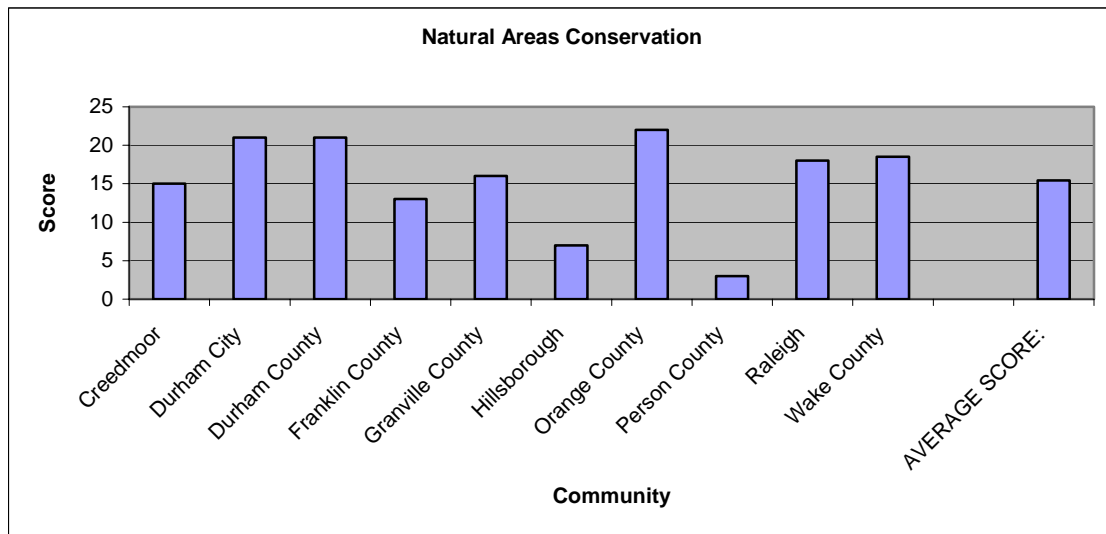
- In all communities, rooftop runoff can be discharged to yard areas.
  - In Creedmoor, Hillsborough, Person County, and Granville County, grading and drainage requirements do not allow for temporary ponding of stormwater in yards. Yards with pervious surfaces can retain rooftop runoff, thereby slowing runoff flow and filtering it before it reaches the larger stormwater drainage system.

**Conservation and Natural Areas**

The remaining principles address codes and ordinances that promote (or impede) protection of existing natural areas and incorporation of open spaces into new development. Protecting open spaces that are critical for stormwater infiltration and groundwater recharge is the most effective method known for protecting water resources.

**Summary of COW Scores**

The following chart depicts the distribution of scores for this section of questions from the COW worksheet:



Out of a possible 24 points, scores range from a high of 22 points (92% of possible), to a low of 3 points (12.5% of possible). Interestingly, this range includes both the highest high score and lowest low score, percentage-wise, of all the sections. This phenomenon is likely an indication that vast differences exist among community ordinances that address conservation of natural

areas. The average score for all communities in this section is 15 points (62.5% of Possible), which is the highest average (percentage-wise) of all the sections.

Below is a discussion of how each community's regulations and incentives match up with the corresponding model development principles. Specific scores are presented in an appendix at the end of this report.

### Principle 17: Buffer Systems

**Create a variable width, naturally vegetated buffer system along all perennial streams that also encompasses critical environmental features such as the 100-year floodplain, steep slopes and freshwater wetlands.**

#### Results

- All of the ten communities responded that they have stream buffer ordinances
- Person, Granville, and Wake Counties have a stream buffer width minimum of at least 75 feet.
- Wake County does not allow new development in 100-year floodplains.
- Durham City and County require buffer widths ranging from 50 to 150 feet, depending upon the location of the water body.
- It should be noted that, while having a buffer width minimum would help protect streams, some communities within the Upper Neuse Basin may opt to adopt buffer ordinances that allow them to meet watershed protection as well as other community goals. For example, a community may want buffers of variable widths that allow increased densities in central business districts in order to encourage development in those areas and away from fringe, sprawling areas. Such an ordinance may also require greater buffer width minimums in rural areas to better protect headwater streams.

### Principle 18: Buffer Maintenance

**The riparian stream buffer should be preserved or restored with native vegetation that can be maintained throughout the delineation, plan review, construction, and occupancy stages of development.**

#### Results

- In all but Person County, stream buffer ordinances specify that at least part of the stream buffer be maintained with native vegetation and define allowable uses in the buffer.
- Only Orange County, Wake County, and Raleigh have stream buffer ordinances that specify enforcement and education mechanisms.

### Principle 19: Clearing and Grading

**Clearing and grading of forests and native vegetation at a site should be limited to the minimum amount needed to build lots, allow access, and provide fire protection. A fixed**

**portion of any community open space should be managed as protected green space in a consolidated manner.**

#### Results

- Franklin County, Hillsborough, Person County, and Raleigh do not have ordinances that require or encourage the preservation of natural vegetation at residential development sites.

### Principle 20: Tree Conservation

**Conserve trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native plants. Wherever practical, manage community open space, street rights-of-way, parking lot islands, and other landscaped areas to promote natural vegetation.**

#### Results

- Ordinances in Durham City, Durham County, and Orange County require some of the stand be preserved at a residential site if forest or specimen trees are present at residential development sites.
- It should be noted that Raleigh has recently adopted a tree protection ordinance for areas within reservoir watersheds.

### Principle 21: Land Conservation Incentives

**Incentives and flexibility in the form of density compensation, buffer averaging, property tax reduction, stormwater credits, and by-right open space development should be encouraged to promote conservation of stream buffers, forests, meadows, and other areas of environmental value. In addition, off-site mitigation consistent with locally adopted watershed plans should be encouraged.**

#### Results

- Ordinances in Durham City, Durham County, Hillsborough, and Person County do not allow developers flexibility in meeting regulatory or conservation restrictions.

### Principle 22: Stormwater Outfalls

**New stormwater outfalls should not discharge unmanaged stormwater into jurisdictional wetlands, sole-source aquifers, or sensitive areas.**

#### Results

- Only Durham City, Durham County, and Raleigh require that stormwater be treated before it is discharged.

- Hillsborough and Person County do not have floodplain management ordinances that restrict or prohibit development in the 100-year floodplain.

## **Conclusions**

This section summarizes and interprets the findings among the responses of the ten communities to the COW questionnaire. It begins with what we are doing well, explains where there is room for improvement, and ends with an analysis of where to go from here.

## **Principles we are meeting**

In several areas, community ordinances met or exceeded the model development principles. These examples are presented below:

### **Principle 1: Street Width**

Most community ordinances allow minimum street widths of between 18 and 22 feet. Considering the amount of existing roadways in the Upper Neuse Basin and continued growth that will increase the need for more roads, allowing narrower streets will have benefits for both developers and the watershed. Developers can save money by laying down less pavement for streets, while less pavement results in less impervious surface in the watershed.

### **Principle 11: Open Space Design**

Almost all community ordinances allow for open space or cluster development as well as for flexible site design for developers that use open space or cluster development. Open space and cluster development provide numerous benefits as mentioned in Principle 11. Developers who want to try open space design need to have, at the very least, some flexibility in the site design in order to encourage them to attempt these types of developments.

### **Principle 14: Driveways**

All community ordinances allow shared driveways in residential developments. Allowing shared driveways works both for the developer and for the watershed. A developer can save money by creating fewer parking spaces in a new development, while the reduction of driveways would result in overall lower impervious cover in the development.

### **Principle 15: Open Space Management**

In almost all communities ordinances specify allowable and unallowable uses for open space in residential areas. Proper management of open space is key to the sustainability of such open space – by not specifying particular uses for open space, a community runs the risk of allowing uses for open space that may damage the natural resource.

### **Principle 16: Rooftop Runoff**

All communities allow rooftop runoff to be discharged into yards. Yards with pervious surfaces can act like a buffer for mitigating the flow of rooftop runoff before it reaches larger stormwater drainage system such as stormwater sewers. Additionally, allowing front yard discharges gives

developers the option of installing expensive rooftop drainage systems or installing a simple rooftop gutter and drain pipe.

#### Principle 18: Buffer Maintenance

All communities have established local stream buffer ordinances. Because of the important functions buffers perform in protecting stream health, such ordinances are critical to the overall health of the watershed.

#### Principle 19: Clearing and Grading

Almost all communities have ordinances that require buffers be maintained with native vegetation. Proper buffer maintenance with native vegetation is critical for the buffer to be effective at mitigating non-point source pollution.

### Principles to Improve Upon

While communities in the Upper Neuse Basin are making progress towards protecting our watershed, there are still areas where our codes and ordinances are potentially hindering this progress. Certainly, many factors outside of watershed protection are considered when formulating ordinances. For example, the cost of implementing and enforcing an ordinance may be infeasible for local governments. However, some ordinances can be reasonably changed to allow watershed health protection. Below are key issues with existing ordinances that need to be addressed in order to make even greater strides towards protecting the Upper Neuse.

#### Principle 7: Parking Codes

Shared parking could be used as a strategy to reduce unused capacity in parking lots, which would reduce the size of parking lots and, therefore, impervious cover. Although many communities promote the use of shared parking, only Raleigh, Durham City and Durham County have model shared parking codes, and certain communities do not allow reduced parking ratios with shared parking. Allowing reduced parking ratios is key to effectively using shared parking as a way to reduce impervious cover. Such a strategy would require a change in the parking code as well as some initial research by staff to determine what types of sites are appropriate for shared parking.

#### Principle 8: Parking Lots

Several communities currently do not explicitly allow pervious materials to be used in overspill parking or residential driveways. Such requirements restrict developers to using impervious materials, thereby allowing impervious cover to increase in the watershed.

#### Principle 9: Structured Parking

Throughout all ordinances, there are no incentives to encourage structured parking instead of surface lots. While there may be some concerns over building parking decks, such as cost, structured parking can provide the same number of parking spaces as surface parking while covering far less land with impervious materials.

#### Principle 10: Parking Lot Runoff



Best Management Practices should be allowed wherever possible in order to treat parking lot runoff. Currently, Franklin County, Person County, and Wake County do not explicitly allow bio-retention islands or other BMPs in parking lot setbacks and landscaped areas. Allowing and even encouraging such BMPs in parking lot landscaping could greatly improve treatment of parking lot runoff.

#### Principle 11: Open Space Design

Making impervious cover reduction a goal of open space design is a key step toward actually reducing impervious cover and protecting watershed health. Communities that currently do not have this as a goal could easily incorporate it into existing open space design ordinances.

#### Principle 12: Setbacks and Frontages

Minimizing setback requirements can reduce overall street and driveway lengths required for a development. Almost all communities in the watershed do not allow minimum front setbacks of less than or equal to 20 feet and minimum side setbacks of less than or equal to 8 feet.

#### Principle 18: Buffer Maintenance

While all communities have buffer ordinances, few have ordinances that specify enforcement and education measures. Maintaining a quality buffer is critical for effective buffer function. Educating landowners how to properly manage their buffers and requiring enforcement measures such as inspections would certainly address the issue of maintenance. However, additional inspections would require more expenditure by local governments.

#### Principle 22: Stormwater Outfalls

Currently, few communities require stormwater to be treated before it is discharged. Certainly, treating stormwater would increase costs to local communities. However, requiring developers to incorporate low-cost BMPs into projects would be one way such costs to local governments could be reduced.

For questions, information and assistance regarding this Issue Brief or the Upper Neuse Watershed Management Plan, please contact:

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