

NORTHWEST GEORGIA



Growth Readiness Report
2007

Project Sponsors

The following agencies and organizations made this process possible through their expertise and support:



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Introduction	2
Workshop Summaries	4
Growth Readiness Recommendations	8
Residential Streets and Parking Lots (Habitat for Cars)	8
Lot Development (Habitat for People)	14
Conservation of Natural Areas (Habitat for Nature)	17
Implementation	13
Participants	<i>Back Cover</i>

The Issues

The mountain regions of north Georgia are blessed with natural resources and scenic vistas that are attracting growth and development on an unprecedented scale. As a result, many communities are facing significant pressures on land, air and water in their regions.

They are now faced with the challenge of maintaining economic growth, clean water and natural beauty all at the same time. While growth is good for these local economies, particularly in traditionally poor and isolated communities, they are in danger of losing the natural beauty and quality of life that is so important to them. Economically-viable, yet environmentally-friendly development practices can help maintain water quality, decrease the costs of infrastructure and construction, and preserve quality of life.

Purpose

In 2006 the Georgia Department of Community Affairs (DCA), Southeast Watershed Forum (SEWF) and Tennessee Valley Authority (TVA) conducted a series of Georgia Growth Readiness workshops for community opinion leaders and decision-makers in both northeast and northwest Georgia. **(Figure 1)**. The northeast Georgia project area included Fannin, Union, Towns and Rabun Counties and their cities. The northwest Georgia project area included Dade, Walker, Catoosa and Chattooga Counties and their cities. While these two regions are physically separated, they share many of the same community issues. Both contain scenic mountain areas and are experiencing rapid residential and commercial development. In northeast Georgia, much of the growth is driven by the influx of retirees and vacation homeowners. In northwest Georgia, the proximity of a major interstate and the city of Chattanooga is also encouraging growth. Many of these communities are largely unprepared for such growth and its impact on their resources, and tend to be independent-minded in regard to local land use planning and development control. Voluntary community-driven consensus building workshops are therefore well-suited for these areas.

These recommendations developed by the participants are intended as guidance for communities and developers and are not required by DCA or any other agency, unless otherwise noted. However, many of them are appropriate for inclusion in municipal stormwater management plans or other programs which may be required by state law. The Georgia Growth Readiness Program is based on the Tennessee Growth Readiness Program developed by TVA, SEWF, and the University of Tennessee's Water Resources Center, and builds on the nationally recognized guidance of the Center for Watershed Protection and the University of Connecticut's Nonpoint Education for Municipal Officials (NEMO) program. This approach has been used successfully in communities across Tennessee, Virginia, and other southeastern states, with more states planning additional programs.

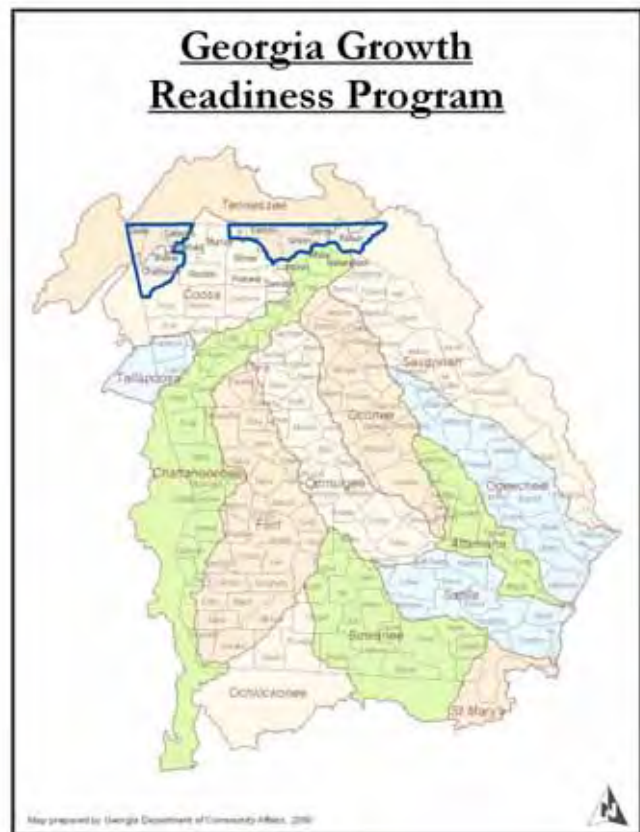


Figure 1. GGRP 2006 Project Areas

Strategy

This project was a pilot program to determine if the Growth Readiness process is a good fit for Georgia, and funding for it was provided in part by a Section 319(h) grant from the Georgia Environmental Protection Division for an Urban Nonpoint Source Capacity Building project. Additional workshop funding was provided by the Tennessee Valley Authority. Lunches were provided by the City of Chickamauga.

The goal of the Georgia project was to convene a broad cross section of community leaders representing planners, elected officials, developers, builders, citizens and others to elicit ideas and support for better site design ordinances. The recommendations of the participants will be provided to all local governments in the project area for consideration.

A Planning and Steering Committee was formed with selected representatives from the DCA regional offices and Office of Planning & Quality Growth, the Appalachian Regional Commission, the Walker and Union County Commissioners, Towns County Water Authority and Chamber of Commerce, The Nature Conservancy, the Hiwassee River Watershed Coalition, the University of Georgia, US Environmental Protection Agency and the Coosa Valley, North Georgia and Georgia Mountains Regional Development Centers.

DCA also developed an on-line survey tool to gather information about local land use and water quality/quantity issues and to help focus the workshop topics and agenda. Participants identified a number of key issues in northwest Georgia, including the need for education and cooperation of local government officials, landowners, and developers; comprehensive land use and water management planning; adoption and enforcement of environmental ordinances; stream buffer protection; providing drinking water and wastewater infrastructure; and protection of groundwater.

Separate back-to-back workshops were conducted in the two project areas. The course outline was the same for both series, but with population information, development patterns and existing ordinance reviews specific for each region.

This report covers the northwest Georgia workshops held in Chickamauga, with four counties, four cities, one environmental nonprofit organization, a developer, two development authorities and two Regional Development Centers participating in the workshop series.

During the workshops, leaders from communities learned about:

- the impact of growth on water quality and quantity
- economic, legal, regulatory, and quality of life reasons why water protection matters
- 22 model principles for Better Site Design and how these are incorporated into ordinances

Invitations to the workshops were sent out by email and regular mail to several hundred potential attendees, include all city and county elected officials, mayors, managers, council members and planners, development authorities, homebuilders associations, selected local developers and realtors, county extension agents, State Soil and Water Conservation Service offices, environmental organizations, the Forest Service, Regional Development Centers, Resource Conservation & Development offices, the Georgia Municipal Authority and Association County Commissioners of Georgia.

Participants were asked to attend all three workshops, or send a delegate if they could not. Each workshop built on the one before it, and was not intended to be a stand-alone workshop. However, the second and third workshops did provide a brief review of the preceding activities for those who missed a previous meeting. The workshops were organized as follows:

WORKSHOP SUMMARIES

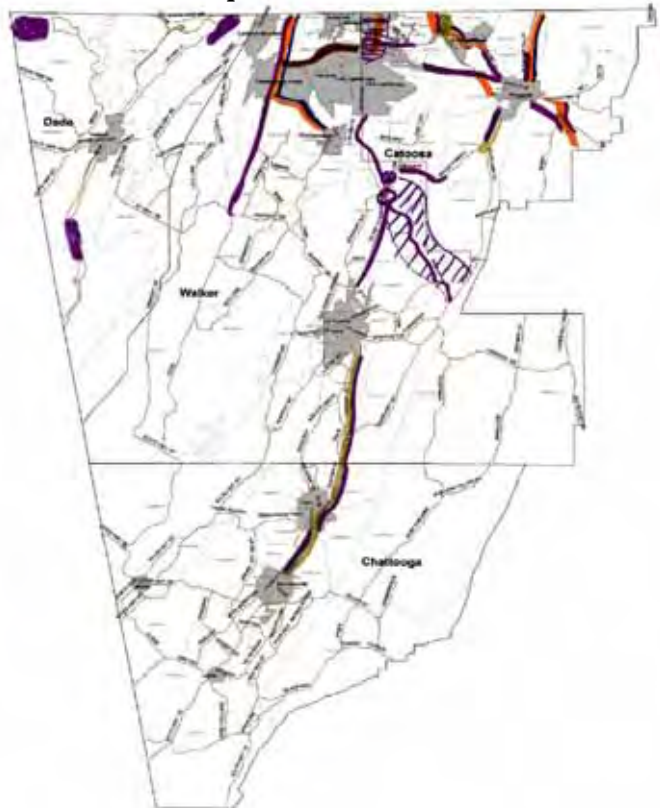
Workshop I Having Growth and Water Quality Too March 2006

Participants learned how urbanization affects water quality and quantity and can have an economic, legal and quality of life impact on a community. They learned the importance of the percentage of impervious surfaces to water quality and identified critical water issues in their communities. Working in small groups with maps and county population projections, they determined where they thought growth would occur in the future. This exercise was particularly useful in helping them to understand the need for cities and counties to modify their development codes simultaneously. Workshop facilitators combined their work into single maps before the second workshop. **(Figure 2)** The participants received the Center for Watershed Protection's Better Site Design Handbook and learned about the 22 Model Principles described there. They were also given the Codes and Ordinances Worksheet (COW), a tool to help communities evaluate their existing ordinances against the model principles, to use for their "homework assignment" of reviewing their development codes. One or more representatives from each jurisdiction present agreed to complete the COW for their community prior to the next workshop.

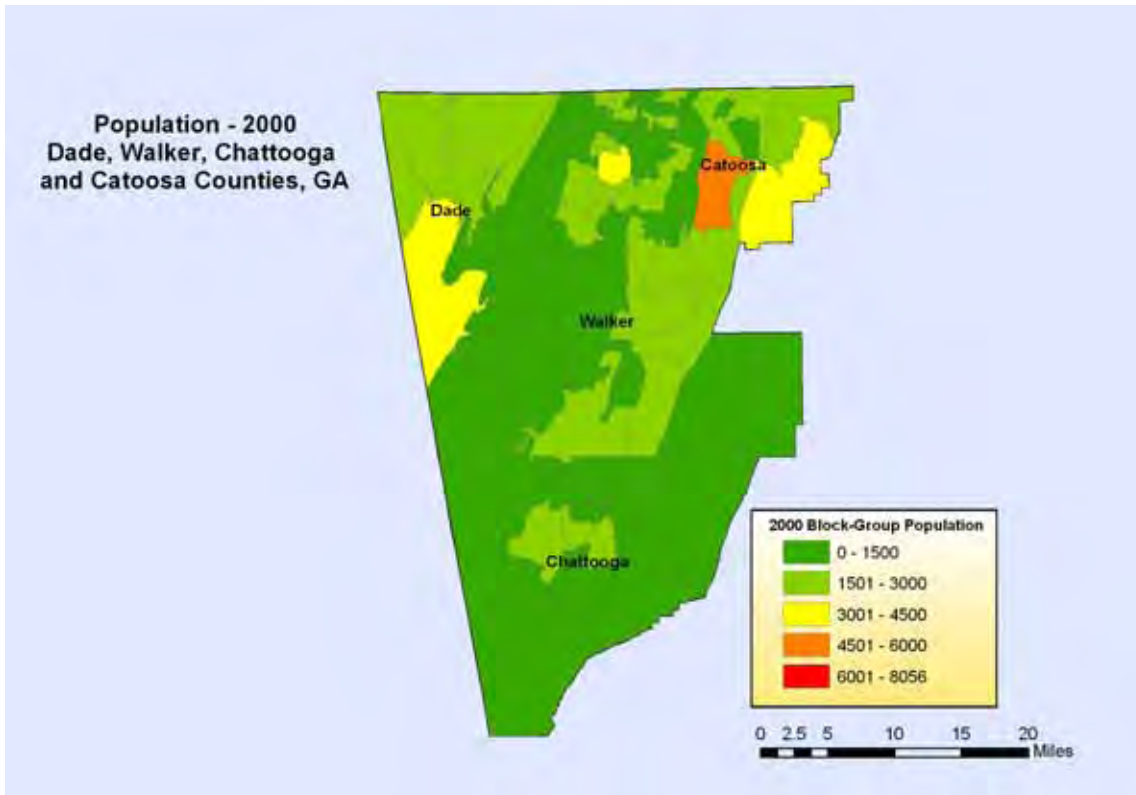


Workshop II Deciding What's Right For Our Community June 2006

Participants compared existing population and imperviousness maps with projected population and imperviousness maps formulated from the first workshop. (Table 1 and Figures 2 through 6). They discussed important community issues raised by the maps. They also learned about examples of low impact development in Georgia and other states, including the Georgia Coastal Green Growth Program and the Fieldstone Farms and Canyon Ridge subdivisions. Community representatives then discussed the results of the COW for their jurisdictions. Participants divided into three work groups based on the better site design categories (Streets and Parking, Lot Design, and Natural Areas) (Table 2) to identify opportunities to work together on recommendations for change. They agreed to continue meeting in their work groups to develop their recommendations before the third workshop.

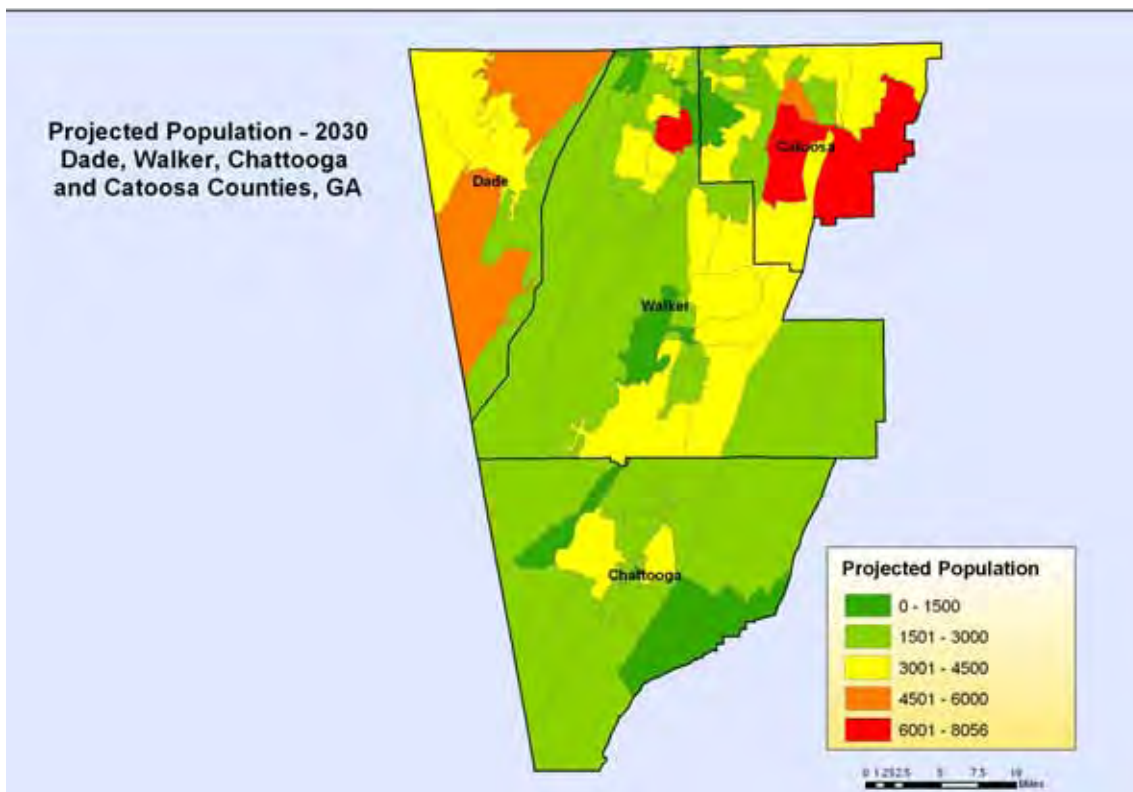


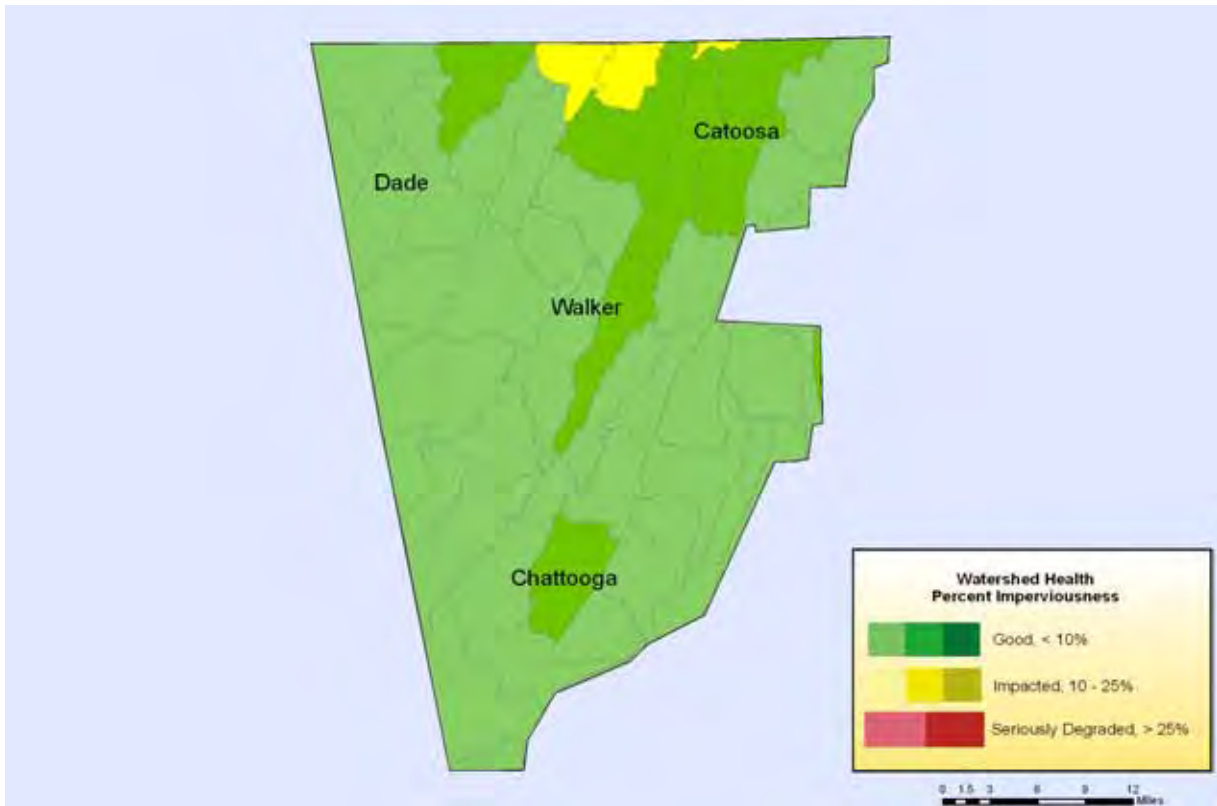
*(Above) Figure 2. Projected Growth Map
(Left) Steering Committee*



(Above) Figure 3. 2000 Population U.S. Census

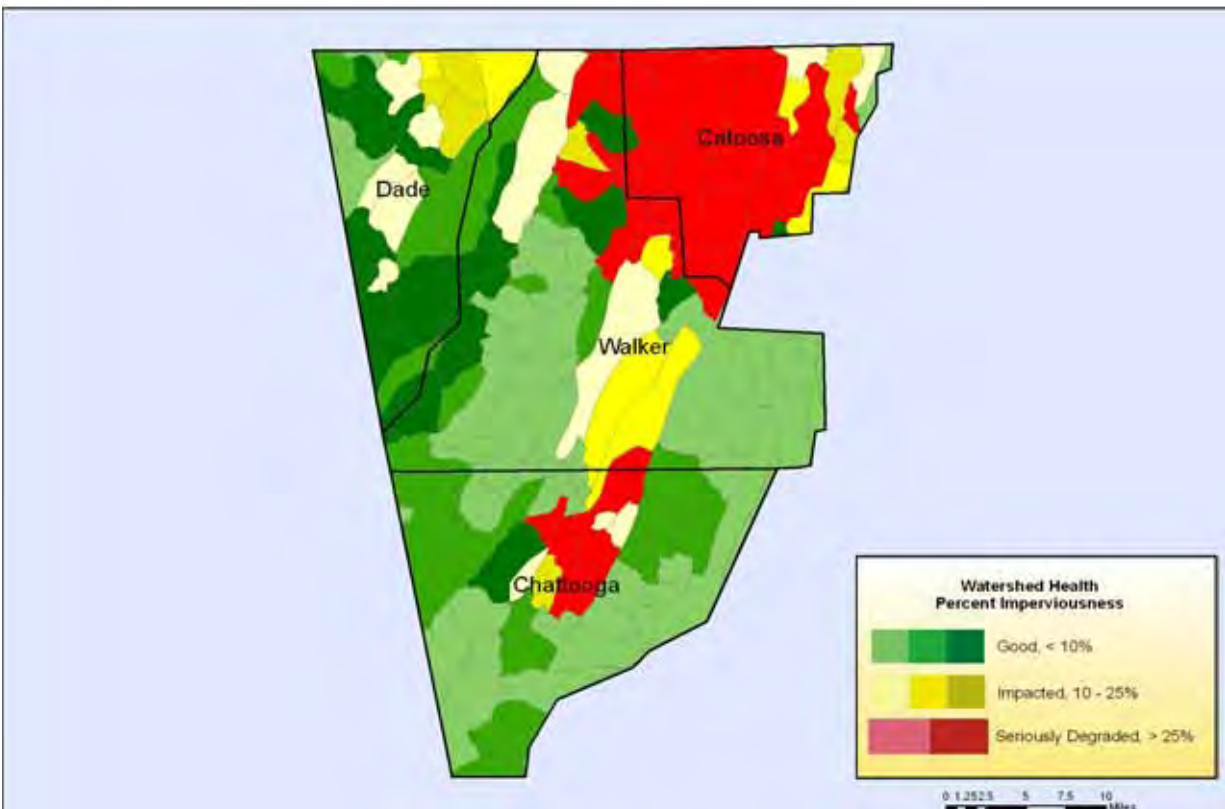
(Below) Figure 4. Projected 2030 Population Map Developed at Workshop





(Above) Figure 5. Current Percent Impervious Surface—2000

(Below) Figure 6. Projected Percent Impervious Service—2030



**Workshop III
July 25, 2006
Building Consensus For Change
September 2006**

The three work groups met independently between the second and third workshops to put together their better site design recommendations, which they presented to the whole group at this workshop. They considered opportunities to work together to change their respective codes and ordinances to promote watershed-friendly development. The group identified a wide range of principles of common interest.

The entire group then participated in a consensus-building process to endorse the recommendations and to suggest specific changes and/or raise questions to be answered prior to finalizing the recommendations. The group discussed how to implement these development policies and practices in their area and suggested steps to involve other stakeholders in their respective jurisdictions. Workshop organizers later incorporated the changes made to the recommendations for distribution to workgroup members for final comments.

Next Steps

The workshop organizers have agreed to provide additional resource materials requested by the participants and help promote the implementation of the recommendations across the region. The participants suggested that the workshop organizers develop materials to educate decision-makers and stakeholders about the issues and recommendations. They would like this to include a project report and PowerPoint presentation for city and county planning boards, commissioners, and other decisions makers. More information about how the ordinance modification process works at the local government level would also be useful. Organizers have obtained additional funding to pursue these goals and help educate decision makers.

County	1990	2000	2030 projection
Catoosa	42,464	53,282	77,719
Chattooga	22,242	25,470	30,891
Dade	13,340	15,154	19,408
Walker	58,340	61,053	67,928

*(Above) Table 1. Population Projections
(US Bureau of Census and DCA Data View)*

(Below) Table 2. Workgroups for Better Site Design Recommendations

Streets & Parking	
Joe Krewer	GA DCA
Jason Hall	City of Ringgold
Greg Carpenter	Chickamauga Planning
Kathy Ward	Walker County
Chris Rader	Fort Oglethorpe
Jill Joss	Coosa Valley RDC
Kelia Kimbell	Walker County
Lot Design	
Stacey Bouma	US EPA
Julie Meadows	Coosa Valley RDC
Johnnie Arnold	LaFayette
James Cole	Walker County Planning
Connie Alexander	US EPA
James Powell	Walker County Zoning
Mike Stewart	Fort Oglethorpe
Kelia Kimbell	Walker County Planning
Natural Areas	
Linda Harris	TVA
John Culpepper	Chickamauga
Rod Robertson	LaFayette
John Mousourakis	Landowner
Ben Brandon	Dade County
Kathy Johnson	SE Industrial Development Authority

The following recommendations were developed by three workgroups and refined by the whole group. The numbered principles are the Center for Watershed Protection's 22 Model Principles. They provided the framework for the recommendations. Consensus was reached on these recommendations by the full group at the third workshop.

Residential Streets and Parking Lots (Habitat for Cars)

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.

Recommendations:

- 20 ft wide for local streets and small collectors (up to 500 ADT)
- 22 feet for larger streets and collectors (up to 1000 ADT)
- Increase road width by 8 feet for each side where permanent on-street parking is provided.
- Shallow, open drainage swales may be used in lieu of curbs and gutters.
- Increase width by 4 feet to accommodate bike lanes where necessary.
- Follow State DOT requirements for major streets where necessary.
- Restrict on-street parking in older areas of town and for new homes on small lots; offer areas where overflow parking can go.
- Narrower streets improve walkability due to slower traffic and easier pedestrian crossing.
- Enforcement of on-street parking restrictions is very important.
- Specify widths of new subdivision entrances. Specify the width of vegetation, correlated to the number of homes and size of road receiving traffic.

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.

Recommendations:

- Encourage and allow traditional neighborhood and open space development designs and also relax lot setbacks in ordinances. The actual requirements should follow the group's recommendations for Principle 11 related to open space development and Principle 12 related to front and side yard setbacks.
- Actual distances will vary according to the type of development, but in general, relax minimum lot frontage widths and front yard setbacks, keeping in mind that on-street parking may dictate a wider frontage width, while parking in driveways may require deeper front setbacks. Also relax side yard setbacks to encourage narrower lots.
- Street design should complement natural site characteristics and foster connectivity as much as possible.
- Reduce length of cul-de-sac streets so they do not affect walkability of neighborhoods.

Residential Streets and Parking Lots (Habitat for Cars) *Continued*

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.

Recommendations:

- Road Right-of-Way (ROW) widths should be variable to accommodate different approaches to reducing pavement width. Recommend limiting ROW to 60 ft. or less, including utilities. With proper engineering and road construction, entire ROW width may not need to be cleared, only what is needed.
- While smaller ROW widths minimize the number of trees cut, it also creates a much less friendly environment to long-term road health. Roads need sunlight to be maintained to their optimal level, especially in the mountains. The minimum clearing width within the ROW should be at least 30 ft. to take this into account.
- If storm water drainage will be piped under the road surface, provisions should be made at the outlet end of the pipe to treat the water with some adequate retention. While out-sloping roads and avoiding ditches when possible is preferable, wider ROW width should be allowed when wide grass ditches (swales) are utilized. Utilities could use these same areas. Installing utilities under pavement is generally not advised unless expense is not an issue and all utilities can be installed in conduit. This allows for replacement without digging up pavement.

Principle 4. **Culs-De-Sac**

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

Recommendations:

- Flexibility should be allowed for both culs-de-sac with and without landscaped islands. If landscaped islands are not used, the cul-de-sac should have a radius of 40 ft. The 40 ft diameter cul-de-sac should allow stormwater flow away from the cul-de-sac's center and should be evenly distributed to the surrounding landscaped yards (bioretention areas). Biofilters should be used as the primary means of retention within the landscaped yards; however, other means may be used where appropriate, with prior approval from the local governing body. In combination, the landscaped yards shall be designed to accommodate a 10 year rain event.
- Culs-de-sac with landscaped islands should have a radius of 20 ft between the outer edge of the cul-de-sac and the outer edge of the landscaped island. The cul-de-sac shall be designed so that all stormwater generated from the cul-de-sac flows evenly across the paved surface and is directed into the landscaped island. The landscaped island shall be designed to accommodate stormwater flows for a minimum of a 10 year rain event.

Residential Streets and Parking Lots (Habitat for Cars) *Continued*

***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.

Recommendations:

Vegetated open channels should be encouraged along residential streets where soils, slope and housing density permit. Select those areas where grass channels and dry swales may be engineered so as to not interfere with existing infrastructure or rights-of-way. They ought to be designed to handle a 10-year flood and the first flush of a 2-year storm event, directed into a bioretention area, stormwater retention area or other appropriate BMP.

***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.

Recommendations:

The group adopted the parking ratios recommendations developed during the Duck River Watershed (TN) Growth Readiness project (Table 3, page 7). The requirements will apply, unless approved pervious paving is used, in which case the amount of paving may be increased.

Impervious surfaces like asphalt, cement and roofing prevent infiltration of rainfall into the soil, disrupting the water cycle and affecting both the quantity and quality of our water resources.



(Above) Curbless cul-de-sac built around a natural feature.

- NEMO (Nonpoint Education for Municipal Officials)

(Opposite) Table 3: Parking ratio recommendations

GROWTH READINESS RECOMMENDATIONS

Land Use	Minimum Parking Spaces
Medical Uses	
Assisted Care Living	1 space per 3 beds
Hospice	1 space per bedroom
Hospital	2 spaces per bed
Medical Appliance Sales	1 space per 200 sq. ft.
Medical Office	1 space per 200 sq. ft. UZO district: First 2,000 sq. ft.: exempt; 1 space per 400 sq. ft. for floor space in excess of 2,000 sq. ft.
Medical or Scientific Lab	1 space per 300 sq. ft. UZO district: 1 space per 500 sq. ft.
Nonresidential Drug Treatment Facility	1 space per 150 sq. ft.
Nursing Home	1 space per 3 beds UZO district: 1 space per 5 beds
Outpatient Clinic	1 space per 200 sq. ft.
Rehabilitation Services	1 space per 3 beds
Residence for the Handicapped	1 space per 3 beds UZO district: 1 space per 5 beds
Veterinarian	1 space per 200 sq. ft. UZO district: 1 space per 300 sq. ft.
School Day Care	Same as day care center
Monastery or Convent	1 space per bedroom UZO district: 1 space per 2 beds
Orphanage	1 space per employee UZO district: 1 space per 1,000 sq. ft.
Religious Institution	1 space per 4 seats in the sanctuary or equivalent work ship space
Educational Uses	
Business School	1 space per sq. ft.
College or University	Established by the traffic engineer (Section 17.20.0230F)
Community Education	1 space per staff member, plus 10 visitor spaces (elementary and middle schools); plus 1 space per each 2 students (high school)
Dormitory	1 space per each 2 rooming units
Fraternity/Sorority House	Same as multifamily; plus 1 space per 300 sq. ft. of meeting area
Personal Instruction	1 space per 200 sq. ft.
Vocational School	1 space per 200 sq. ft.
Office Uses	
Financial Institution	1 space per 200 sq. ft. UZO district: first 2,000 sq. ft.: exempt; 1 space per 500 sq. ft. for floor space in excess of 2,000 sq. ft.
General Office	1 space per 300 sq. ft. UZO district: first 2,000 sq. ft.: exempt; 1 space per 500 sq. ft. for floor space in excess of 2,000 sq. ft.
Sales/Leasing Office	1 space per 200 sq. ft.
Residential Housing	
Single Family	2 minimum-4 maximum
Convenience	250 minimum-200 maximum
Shopping Center	3 spaces per 1,000 GFA of asphalt Or 3 spaces per 1,000 GFA reinforced soil or pavement grids Or 1 space per 250 sq. ft. for less than 400,000 sq. ft. Or 1 space per 225 sq. ft. for 400,000 to 600,000 sq. ft. Or 1 space per 200 sq. ft. greater than 600,000 sq. ft.
Industrial	1 space per 1,000 sq. ft. (should not have a maximum)

Residential Streets and Parking Lots (Habitat for Cars) *Continued*

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.

Recommendations:

- Incentives for the use of pervious paving should be developed. The group requested additional information on this item
- Shared Parking: Development regulations should encourage consideration of shared parking during project design and review, and allow variances to standard parking requirements. Actual calculation of the number of appropriate shared spaces may require a site-specific assessment, using methodology provided in the Urban Land Institute's "Shared Parking" (2005) document and other sources, which could be referenced in the ordinance language.
- Mass Transit Reductions: At the present time, mass transit is not present or providing a significant enough impact on parking situations in these counties to make reduction in the number of parking spaces important. Recommend that this item be reserved for a later ordinance revision process
- The following related requirements of the Walker County "Chickamauga Battlefield Corridor Overlay District" ordinance should be considered.
 1. Shared access roads: new commercial developments with frontage on state highways and county streets shall use shared access points to and from the highway. Normally, no more than two accesses are to be used per parcel or development (one ingress, one egress, for example), regardless of the number of properties served.
 2. Rear Parking: Parking lots are to be provided to the side or rear of non-residential buildings that are visible from public rights-of-way, with rear parking being preferred. Locate parking in front only if no other possibility exists and if parking is visually screened by landscaping and ground contours as described in Section 3.12.1.
 3. Linked Parking: Parking lots on adjacent premises should be connected with access drives so that customers may drive from business to business.

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.

Recommendations:

- The typical parking lot needs to be constructed without curbs. When curbing is used, cuts that divert water to "greenway islands" or areas where runoff can be absorbed should be provided. The recommendation of the minimum width and depth of parking stalls should be the norm.
- The use of "compact car" spaces, as well as "regular car" spaces is debatable. Big cars or SUV's squeezing into one or two "compact car" spaces defeats the purpose.
- The use of pervious materials must be properly designed and appropriate for local soils and other conditions. Additional information on suitable pervious materials is needed.
- The use of pervious surfaces for spillover areas allows stormwater runoff to be reduced.



Porous Pavement, Chickamauga

Principle 9. Structured Parking

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

Recommendations:

- Study parking trends in downtown areas (number of cars/space/day, turnover rate, demand for parking at special events)
- Consider allowing parking structure development in lots not typically suited for development (sloped lots) in downtown areas particularly behind the square or central business district.
- Consider the possibility of allowing first-level parking for lake-side condominium development. Incentive could be to allow for additional height to structures.
- Additional information on garage design guidelines is needed.

Principle 10. Parking Lot Runoff

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

Recommendations:

- Encourage bioretention in landscaped streets and cul-de-sacs and center islands.
- Native vegetation should be used and the area should be on a scale that will ensure the survival of any vegetation planted there.
- Ordinances should specify that no residential, commercial, or industrial site with a land disturbance area over five acres will be able to release untreated stormwater runoff directly into a natural channel or drainage system. Other model ordinances, such as the Metropolitan North Georgia Water Planning District ordinance, should be researched to determine if the number of acres should be reduced for this requirement.
- The use of “green roofs” to control stormwater runoff should be encouraged and allowed. Additional information is needed for this technology.
- Additional recommendations for stormwater BMPs may be found in the Georgia Stormwater Management Manual.

Because of impervious surfaces, a city block creates nine times more runoff than a woodland area of the same size.

*- EPA, Office of Wetlands,
Oceans & Watersheds*



Workshop Small Group Discussion

Lot Development (Habitat for People)

Principle 11. Open Space Development

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.

Recommendations:

- Address open space and cluster development in planned unit development regulations.
- Calculate the allowable density for cluster development to equal to the total amount of units that would normally be allowed for the gross land area of the development.
- Common open space shall be included as an integral part of the overall development design and shall constitute a minimum percentage (16%) of the gross land area of the development. The following are not considered open space for minimum percentage calculations: wetlands, right-of-ways, stormwater detention/retention areas, required stream buffers, swimming pools or other impervious surfaces, backyards.
- Require mechanism to ensure open spaces are not developed in the future.

Owners of small companies ranked recreation, parks, and open space as the highest priority in choosing a new location for their business.

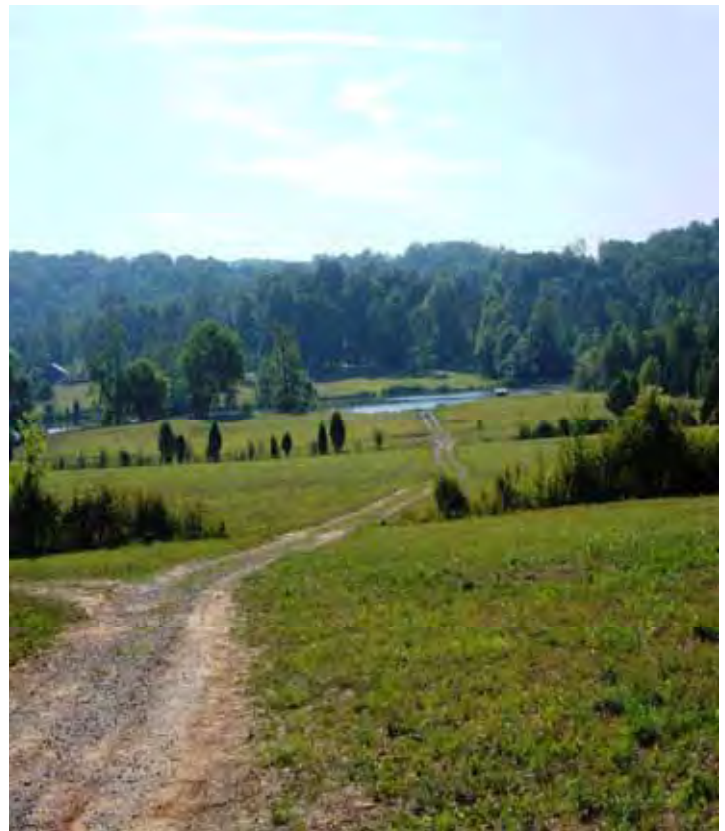
*- Journal of Parks
and Recreation
Administration, 1997*

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.

Recommendations:

- Relax setback requirements if the development has a mandatory percentage of open space; incorporate into planned unit development regulations.
- Ensure minimum side and rear setbacks allow for safe distance between houses for fire protection. Need information on state and/or federal requirements.



Fieldstone Farms, open space / vista

Principle 13. Sidewalks

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

Recommendations:

For residential side streets, promote limiting sidewalks to one side of the street to reduce impervious surfaces and construction costs. Incorporate into planned unit development regulations [For large roads and parkways, have sidewalks on both sides for safety reasons.]

Principle 14. Driveways

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

Recommendations:

- Promote use of pervious materials. Could give incentive if use pervious pavement or materials.
- Need to consider minimum slope length.



Walking Path, Fieldstone Farms

Lot Development (Habitat for People) *Continued*

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.

Recommendations:

- Define allowable and unallowable uses for open space in residential developments. The following would not be considered open spaces: swimming pools, other pervious surfaces, wetlands, backyards, retention ponds, and right-of-ways.
- Open space can be managed by a third party using land trusts or conservation easements.
- Could use as an incentive if a minimum percentage of open space is managed in a natural condition.

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 storm water conveyance system.

Recommendations:

- Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff to the roadway and the storm water conveyance system.
- Rooftop runoff should not be directed towards a neighbor's house.
- Additional information is needed on the recommended minimum distance from a stream or other waterbody



Coke Oven Park Wetland

Conservation of Natural Areas (Habitat for Nature)

**Principle 17.
Buffer Systems**

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

Recommendations:

- This section addresses buffers, but State minimum buffer requirements of 25 feet (50 feet on trout streams) and allowable uses must be followed at all times. Various buffer widths are also required by the State’s Environmental Planning Criteria for Water Supply Watersheds and Protected River Corridors.
- Create a variable width, naturally vegetated buffer system along all perennial streams that also encompasses critical environment features such as the 100-year floodplain, steep slopes and freshwater wetlands.
- A three-zone 100-foot buffer system is required from both banks along all perennial streams – a streamside zone, a middle zone and an outer zone (Figure 7.)
 - ◊ The streamside zone shall be a minimum of 25 feet plus wetlands and critical habitats. It shall consist of undisturbed mature forest

and must be reforested if necessary. Allowable use is very restricted and includes only flood control, utility right-of-ways and footpaths.

- ◊ The middle zone shall be a minimum of 50 additional feet, depending on slope and the 100-year floodplain. It shall consist of managed forest with some clearing allowed by permit. Allowable use is restricted to some recreational uses, some stormwater BMPs, bike paths and tree removal by permit.
 - ◊ The outer zone shall be a minimum of 25 additional feet as a setback from structures. Forest is encouraged in this zone, but turfgrass is permitted. Allowable use is restricted to lawn, garden, compost, yard wastes, and most stormwater BMPs.
- The minimum buffer must be extended outward to include all adjacent 100-year floodplains, adjacent non-tidal wetlands or non-tidal wetlands within 25 feet, and slopes greater than 15% within 100 feet.
 - Local buffer requirements may be reduced by variance permit provided stormwater BMPs are used.
 - A strict review and permitting process is required for all public and private sector development within the minimum 100-foot buffer requirement along all perennial streams.

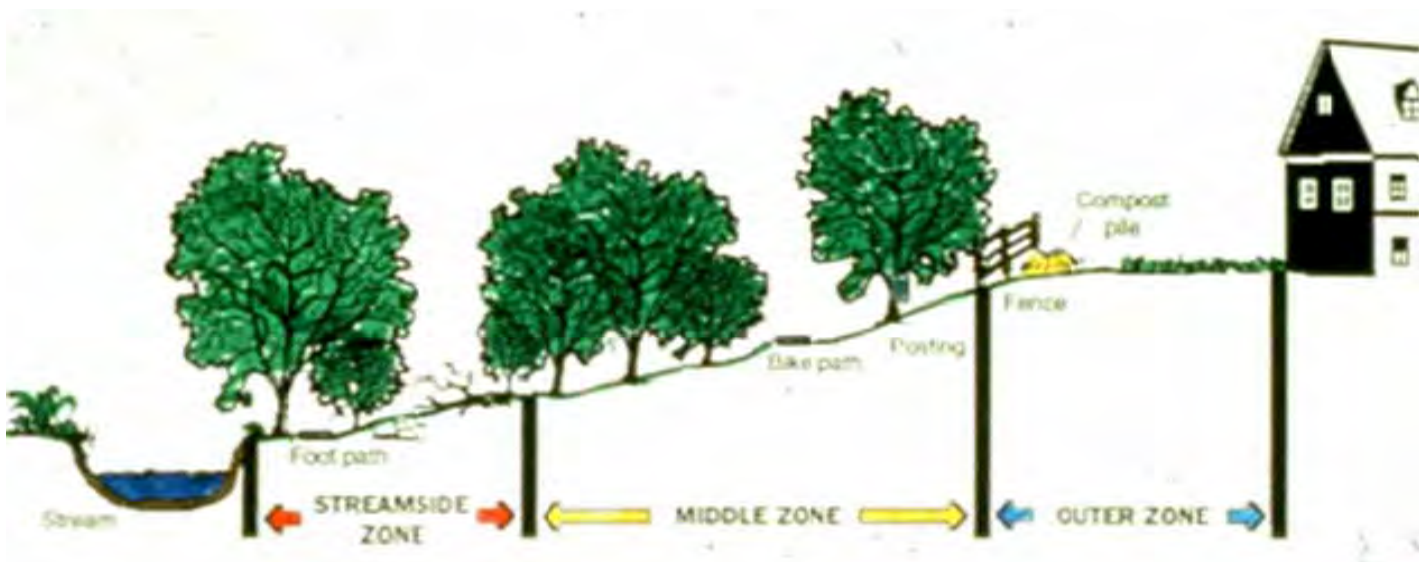


Figure 7. Three Zone Buffer System, Center for Watershed Protection

Conservation of Natural Areas (Habitat for Nature) *Continued*

Principle 18.

Buffer Maintenance

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

Recommendations:

- The riparian stream buffer should be reserved or restored with native vegetation. Appropriate plant selection will help minimize maintenance.
- Maintain the buffer system through the plan review delineation, construction, and post-development stages.
- Forest riparian buffers should be maintained and reforestation should be encouraged where no wooded buffer exists. Riparian forest should be part of restoration.
- The riparian stream buffer ordinance outlines the local government and the organization or landowner responsible for long-term management and maintenance of the buffer.
- The riparian stream buffer ordinance outlines allowable uses. Examples of allowable uses might be:
 - ◊ Utility right of way
 - ◊ Footpaths
 - ◊ Management of flood control and storm water
 - ◊ Stream restoration projects
 - ◊ Water quality monitoring.
- Individual trees may be removed that are in danger of falling, causing damage to dwellings or other structures or causing blockage of the stream.
- Timber cutting may be done if necessary to preserve the forest from extensive pest infestation, disease infestation or threat from fire.
- Development within a riparian buffer zone should be limited only to those structures and facilities necessary. When there is development within the riparian corridor, specific mitigation measures are required.
- The ordinance should specify enforcement and educational mechanisms.

Enforcement of ordinances might include:

- ◊ Written notices to violators
- ◊ For violations continuing after the fixed time for abatement and correction have expired, the violator will be cited.
- ◊ Violators of ordinance may be liable and may be assessed for cost or expenses, monetary penalty and /or imprisonment.

Education might include:

- ◊ Signage along the buffers
- ◊ Public service announcements and newspaper articles on the buffer program
- ◊ Government sponsored buffer walks
- ◊ Written disclosures regarding the buffer that convey with the deeds of buffer owner and all landowners adjacent to the buffer
- ◊ Outline of buffer uses and maintenance requirements in community association covenant



Buffer Restoration Project

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 a protected green space in a consolidated manner.

Recommendations:

- Clearing and grading of forests and native vegetation at a site should be limited to the minimum amount needed to build structures and the septic system, allow access, and provide fire protection. An example might be limiting disturbed area around structures to a reasonable distance outward from the building pad.
- Reserve (secondary) septic field areas cannot be cleared of trees at time of development.
- Clearing of construction roads should coincide with planned permanent roadways whenever possible.
- Specific clearing and grading rules governing protection of buffers, jurisdictional wetlands, steep slopes, and floodplains should be created and enforced to minimize cumulative impacts of sediment to water resources and to retain the natural hydrology of the development site.
- A grading ordinance should prescribe maximum and minimum slopes for house lots, and if a variance is allowed, a greater percentage of trees and native vegetation must be preserved or planted. Example: 2:1 slope - 20% of land must have trees/native vegetation preserved or planted, 3:1 slope - 25 or 30% of land must have trees/native vegetation preserved or planted.
- Adopt the Georgia Mountain Protection Act ordinances to protect steep slopes from clear cutting and destruction of native plant and specimen trees, and severe erosion of soil.
- Develop and enforce ordinances for new subdivisions and properties below 2,200 ft in elevation to protect from destructive clearing and development practices and non essential removal of specimen trees.
- Develop steep slope ordinance to restrict clearing and grading along the brow of hills and ridges.
- A post-development Forest Conservation Threshold related to zoning categories should be considered, such as Single Residential - 25% of woodland/forest must be preserved; Multiple Dwellings - 20 %; Commercial/Industrial - 15%. Any clearing of forest areas below the threshold should require reforestation, possibly at a ratio of two acres for every one cleared, either at the site or at another site in the same watershed.
- A site inspection should be required to confirm clearing/grading requirements are met prior to initiation of construction.
- Encourage preservation of large contiguous tracts of forest greater than 3 acres, including primary conservation acres such as steep slopes/jurisdictional wetlands, and secondary conservation areas such as forest habitat/natural areas along streams and lakes, through incentives for forest protection, assessed fees based on woodland loss.

Conservation of Natural Areas (Habitat for Nature) *Continued*

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.

Recommendations:

- Appoint a committee of professional horticulturalists and local citizens to provide recommendations to the cities, county and private citizens on design, maintenance and upgrading of natural areas and xeriscaping. Consider having a monetary incentive for homeowners practicing xeriscaping. Xeriscape landscapes are defined as "quality landscaping that conserves water and protects the environment." Xeriscape-type landscaping is a package of seven common-sense steps for making a landscape more water-efficient:
 1. Planning and Design
 2. Soil Analysis
 3. Appropriate Plant Selection
 4. Practical Turf Areas
 5. Efficient Irrigation
 6. Use of Mulches
 7. Appropriate Maintenance
- For access the Georgia Xeriscape Guide, go to pubs.caes.uga.edu/caespubs/pubcd/B1073.htm
- Develop ordinances for lawn & garden maintenance and specimen tree and protected plant preservation in cities.
- Implement planting of trees and shrubs along street right of ways to reduce impervious surface cover.
- Develop and enforce rules for clear cutting on new lots and subdivisions.
- Develop and implement rules and laws for Cluster Development to conserve land, protect forested areas and reduce human imprint.
- Appoint a committee to investigate, report on, and facilitate funding sources for both public and private programs to protect specimen trees, new forestation projects, stream buffers, and land and water conservation efforts.

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.

Recommendations:

- Incentives and flexibility should be encouraged to promote conservation of stream buffers, forests, meadows, and other areas of environmental value. Jurisdictions should consider the following types of incentives to determine which best meet the needs of their community: density compensation, buffer averaging, property tax reduction, storm water credits, and by-right open space development.
- Density Compensation -encourage developers to build approximately the same number of homes in a more compact design that will create savings in infrastructure costs in exchange for 25%-50% protected open space, including floodplains, jurisdictional wetlands, woodlands, stream buffers and native meadows.
- Buffer Averaging - allow developers to narrow the buffer width at some points (but no less than state minimum for regular and trout streams) and widen it at others, as long as the average width meets the minimum criteria. Appropriate use of this practice should be limited to specific situations, such as accommodating existing structures and recovering lost lots. Requests for variances should be scrutinized to eliminate potential impacts to streams through use of this practice.
- Property Tax Credit - reduce, defer, or exempt property taxes on conserved land in exchange for Conservation Easements or protection of high value resources in the community. If this incentive is adopted, the program should provide a penalty if property is later taken out of conservation use in order to be developed.

(Principle 21 Continued)

- Stormwater Credits - require use of site level techniques that reduce stormwater management costs for developers by reducing runoff volumes and minimizing construction of more costly stormwater management structures. Techniques include natural area conservation and retention of pre-development water quality and hydrologic characteristics such as forest retention areas, wetlands, floodplains, and steep slopes. Other considerations can be directing runoff to well-established filter strips and wooded buffers adjacent to streams and use of environmentally sensitive site design techniques applied to low density development, such as large lot residential.
- By-right Open Space Development - encourage open space development by allowing developers to submit plans, follow plan review and appeal procedures that are no more arduous than that needed for approval of conventional subdivisions.
- Density Bonuses and Density Penalties - encourage conservation of natural areas by establishing a maximum and minimum density level allowing developers to build at the higher density only if a set percentage on natural areas and open space is preserved, while development is restricted to the lower density when the natural areas and open space techniques are not used.
- Encourage innovative on-site sewage disposal options, such as common drain fields and community systems, to allow by-right higher densities in conservation subdivisions.

***Property values
of homes with trees
in the landscape are
5 - 20% higher than
equivalent properties
without trees.***

- Trees Atlanta

Principle 22.***Storm Water Outfalls***

New storm water outfalls should not discharge unmanaged storm water into jurisdictional wetlands, sole source aquifers, or other water bodies.

Recommendations:

- New storm water outfalls should not discharge unmanaged storm water into jurisdictional wetlands, sole-source aquifers, or sensitive lakes and streams.
- Develop a floodplain management ordinance that restricts or prohibits development within the 100 year floodplain.
- Stormwater must be treated before it is discharged.
- General Application Structural Controls are to be used whenever feasible to effectively treat the water quality volume and remove total suspended solids (TSS) load (up to 80%). These must be designed, constructed and maintained in accordance with recommended specifications. These include:
 1. Stormwater ponds - constructed stormwater retention basins with permanent pool of water that detains and treats runoff from each rain event.
 2. Stormwater Wetlands—constructed wetland systems consisting of combinations of shallow marsh areas, open water and semi-wet areas above permanent water surface.
 3. Bio-retention Areas - shallow stormwater basins or landscaped areas with engineered soils and vegetation to capture and treat stormwater runoff.
 4. Enhanced Swales-vegetated open channels that are designed to capture and treat runoff in dry or wet cells formed by check dams or other means.
 5. Infiltration Trench - excavated trench filled with stone aggregate to capture and infiltrate stormwater runoff into the surrounding soils.
 6. Sand filters - multi-chamber structures that treat stormwater runoff through filtration using the sand bed as the primary filter media.
- Limited Application Structural Controls, such as filter strips, grass channels, gravity oil-grit separators, underground sand filters and porous surfaces may be used as one component of a stormwater treatment train, or applied only for special site or design conditions, as alone they do not achieve appropriate TSS removal targets.
- Detention Structural Controls are not intended to treat stormwater runoff. Use them only for water quantity control such as channel protection, over-bank flood protection or extreme flood protection in a stormwater treatment train.

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