

# CONASAUGA

*Guiding Principles for Quality Growth and Preservation*

# WATERSHED

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## INTRODUCTION: WHAT IS A CHARRETTE?

### WHAT IS A CHARRETTE?

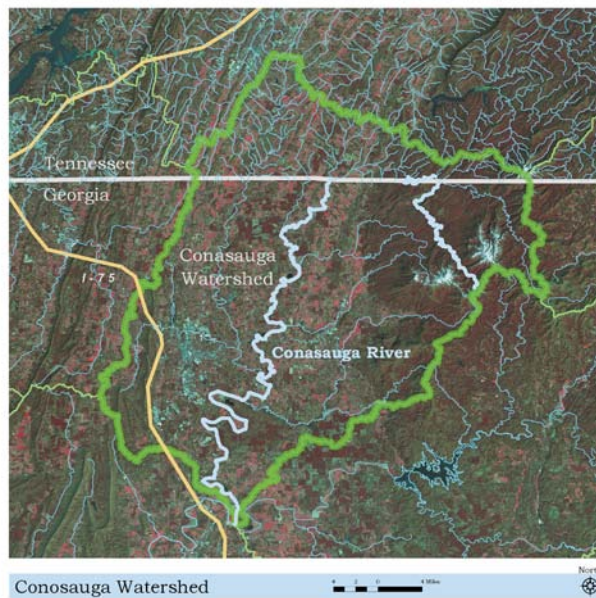
Charrette is a French word that means “little cart.” At the leading architecture school of the 19<sup>th</sup> century, the *Ecole des Beaux-Arts* in Paris, students were assigned tough design problems to solve under time pressure. They worked long hours on these projects and would continue sketching as fast as they could, even as the little carts (charrettes) carried their drawings away to be judged and graded.

Today, the word charrette has come to describe a rapid, intensive and creative work session, usually lasting a week or more, in which a design team focuses on a particular design problem and arrives at a collaborative solution. Charrettes are product-oriented. The public charrette is fast becoming a preferred way to face planning challenges confronting American cities.

—Victor Dover, Dover, Kohl & Partners, Congress for the New Urbanism

This project is a collaborative effort between the Conasauga River Alliance, the Limestone Valley Resource Conservation District, and the University of Georgia College of Environment & Design, Center for Community Design, Planning & Preservation. The project studied the Conasauga watershed and used sustainability as the investigative context. The result is a set of guiding principles for quality growth and preservation of the Conasauga watershed.

**The Conasauga Watershed Charrette was based in Dalton, Georgia and took place March 10 – 13, 2005.**



from a broad and diverse group of students, faculty, practitioners and the public.

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INTRODUCTION (CONT.)

**Conasauga River**

Flows through two states,  
& six counties.

Home to 92 species of fish,  
& part of a rich cultural heritage.

JOIN US!

Not only is the Conasauga rich in biodiversity, it is also rich in cultural heritage. It plays a vital role in the local economy for agriculture, industry, and housing. The Conasauga River Alliance seeks to maintain the river's treasures through education and use of river-friendly practices for today and tomorrow. Come, help us be stewards of our river by improving, conserving, and protecting the land and streams of the Conasauga.

**Conasauga River Alliance**  
706.625.7044 or www.conasaugariver.net

The University of Georgia College of Environment & Design is a fusion of the academic rigor of degree programs in Ecology, Landscape Architecture and Historic Preservation. These disciplines combine to create a joint mission of sustainable planning. As a country we have moved into an era when cities and municipalities can no longer plan to grow in ways that are not sustainable. Instead, we must develop, grow and change in ways that conserve resources, and in ways that will have longer and deeper impacts than just one generation. The future planning of the Conasauga watershed began with these issues of sustainability in mind.

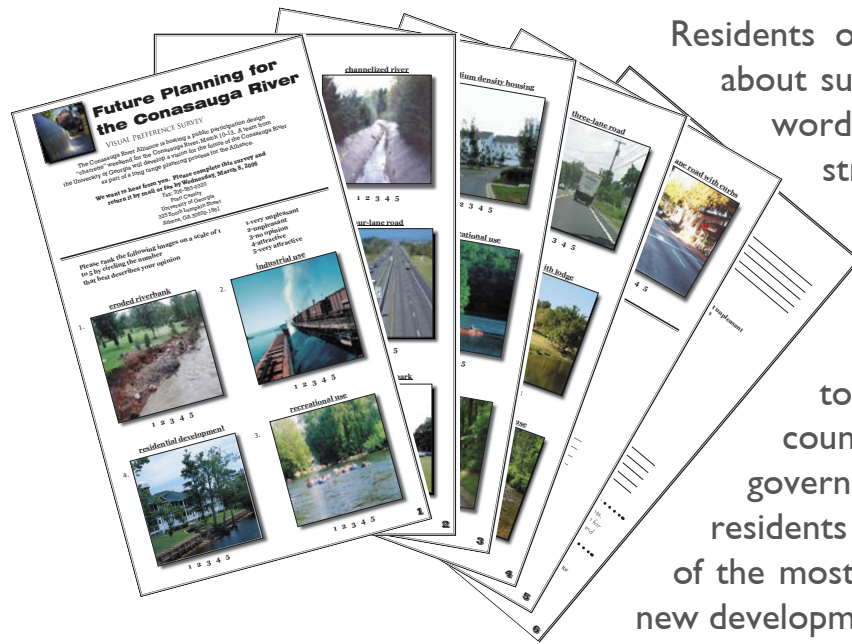
The Conasauga watershed, spanning from Dalton, Georgia to the Cherokee National forest in Tennessee, is an area that is alive and growing. It is an area with deep roots and nationally significant history. The local leadership of the region has recognized that water issues will be the most pressing challenge of this century. The Northeast Georgia and Southern Tennessee communities are also moving forward by implementing some of the latest technology in water treatment, utility services, and job creation. Some of the most exciting and innovative work happening anywhere in the southeast United States is occurring in the Conasauga watershed. **This charrette report provides tools for local and regional government planning to take conservation and resource protection to the next level through smart growth principles.**

*The Conasauga watershed charrette process began weeks before the charrette team arrived in Dalton, with a visual preference survey of over 600 watershed residents. Visual preference surveys are a means of understanding community priorities through response to photographic images. A total of 17% of the surveys were successfully returned by the time of the charrette. In survey research, this kind of return is phenomenal, and it means something significant about residents' investment in their community.*

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## CONASAUGA WATERSHED SURVEY RESULTS

### What You Told Us: Living Well in a Clean Environment



Residents of the Conasauga watershed are very concerned about sustainable planning. They may not use those exact words, but the responses from the survey indicated a strong desire to maintain and improve the quality of life in the watershed.

This area of North Georgia and Southern Tennessee is known for valuing family, connections to the land, and property rights. It is not an area of the country that has historically been accepting of additional governmental involvement or regulation. However, when residents were asked about changes in the watershed, one of the most persistent responses related to the way in which new development is occurring in the watershed. Responses from residents indicated a call for more regulation of new development, specifically in regards to “cookie cutter development.” Already, Whitfield County and the City of Dalton have taken significant steps toward enforcing development standards. Now that message is spreading to other North Georgia counties and into Polk and Bradley Counties in Tennessee. Education through marketing and promoting examples of quality growth (discussed later in this report) can create a more positive attitude toward new development in the region.



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CONASAUGA WATERSHED SURVEY RESULTS (CONT.)

**Living and Working in a Place that Has a Unique Identity.**



Survey respondents were sensitive to industry. The greater Dalton–Chattanooga area has an industrial–based economy that attracts many outsiders, and consequently has often been a model for job creation and large–scale development. The result is often a type of development that is not regional; it is something that looks like it could be located in Cincinnati, Oklahoma City, or any number of other places. It does not maintain characteristics indicative of North Georgia and Southern Tennessee. People in the watershed want to maintain a certain look and feel they identify as unique to this region.

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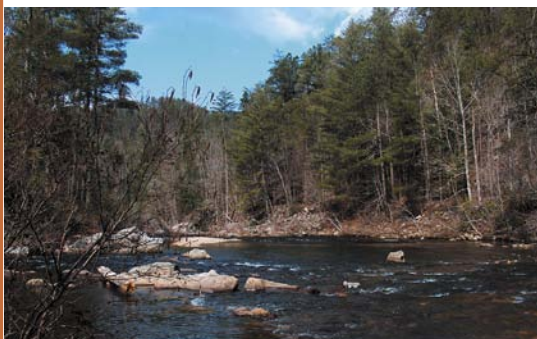
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**Access to the River for Recreation**

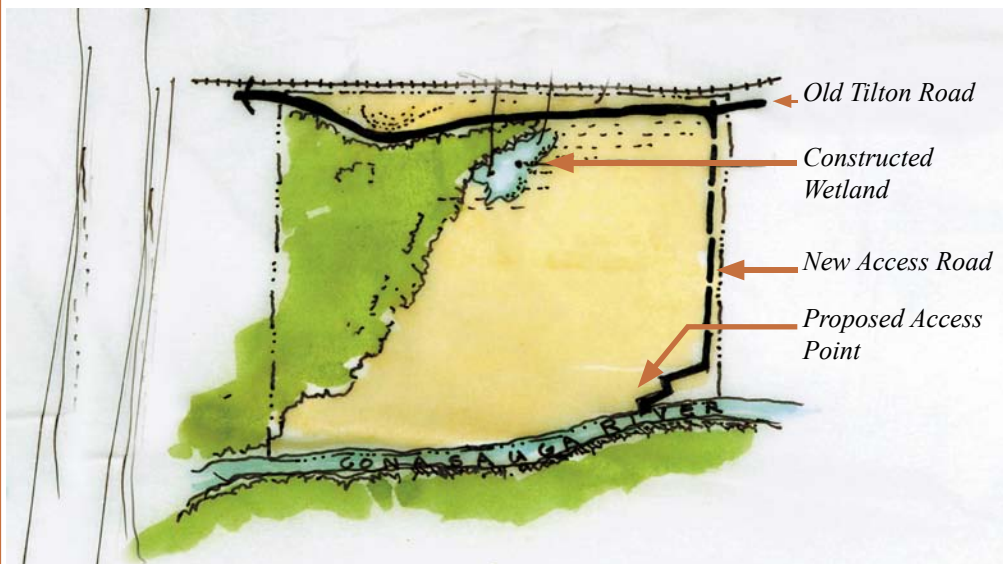
A repeating series of responses focused on recreation and human use of the river. The primary concern was access for recreation. Specifically, access for users who will respect the environment and maintain the health of the watershed was emphasized. Many respondents indicated that a monitoring and regulating agency was necessary to maintain quality recreational spaces and discourage violators. The community cannot depend on the skeleton staff, which currently regulates the public portions of the river or on personal commitment of a handful of property owners. **A funded and enforced monitoring system is needed.**



The survey also revealed that most people who had moved to the watershed in the last five years indicated that recreational use was their number one priority. Residents who have lived in the watershed for longer periods of time ranked recreational use of the Conasauga River as a slightly lower priority.



CONASAUGA RIVER MITIGATION BANK PROPOSED ACCESS POINT



This boat launching dock is large enough that several people can walk abreast, causing minimal damage to the riverbank while involved in recreational water activities.

Potential boat launching site: piece of land owned by the solid waste management authority on Tilton Rd. A constructed wetland mitigation project already exists on the site, adding a simple boat launching dock would be an excellent educational opportunity to highlight the wetland mitigation project and the nearby Conasauga River House, which is a locally important historic resource.

The boat launching dock could include a porous parking lot and gravel access lane illustrated in the figure.

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CONASAUGA WATERSHED SURVEY RESULTS (CONT.)

POINTS TO CONSIDER



As the importance of water quality and water management heightens in the next several years, the Conasauga River Alliance will grow. The organization's role in the community and in the planning process can be elevated. The growth of the organization is dependent upon funding, capacity and adequate staffing. The way

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in which the Conasauga River Alliance relates to its partners and to other organizations will need to be analyzed regularly.



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As economics, demographics, climate and the environment

continue to change, any organizational structure must be re-evaluated. Many organizations do this and do it in ways that result in a heightened awareness and increased value to larger constituencies.

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Other organizations refocus and narrow their mission and in some cases, downsize. Whatever the case is for the Conasauga River Alliance, vigilant re-evaluation, redefining of goals, and strategic planning is necessary.

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## OBSERVATIONS AND RECOMMENDATIONS



### What River? The Need for a Community Education Campaign

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There is a general lack of awareness about the Conasauga River and the watershed. The Conasauga River Alliance will address issues that go beyond the scope of individual property owners and the Alliance itself; therefore the organization will rely on the community for solutions. A **community awareness campaign** is the first major recommendation.

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### How do you raise community awareness?

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Field interviews indicated that the community was aware of the cultural resources that the Conasauga Watershed has to offer. Most people did not know about all of those resources, but they were frequently aware of some of them.

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When asked where the watershed boundaries were located—they had no idea.

When asked where particular creeks were located—they had no idea.

When asked which direction the water flowed in certain places—they had no idea.

3D

The two most recognized cultural resource sites in the watershed were Prater's Mill and Dug Gap Battle Park. Combining these cultural resource opportunities with the natural resources of the river will be the first step to create a more cohesive awareness campaign.

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## OBSERVATIONS AND RECOMMENDATIONS (CONT.)

### – Recognize connectivity:

The needs and health of many of the sites along the river are very interdependent. For example, people will not want to visit Prater's Mill if the water smells bad. Nobody will want to go to Dug Gap Battle Park if all that can be seen is smog and large amounts of parking.

1

### – Recognize success stories:

The industry and commerce in the Conasauga Watershed tells an important story about the history and growth of the area. There are also several significant environmental success stories. These successes need to be recognized and promoted. Give awards. Leverage the existing great examples of corporate responsibility to encourage other industries in the watershed to get involved. .

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### – Create clever and compatible signage:

3A



All sites within the watershed should be linked together and work to promote each other.

3B

This can be done by connecting the river with cultural and natural resource maps.

3C

An example might include signs at Dug Gap Battle Park highlighting watershed issues.

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### – Reach out to new arrivals:

3F

Make the river a focal point for family activities in multiple languages.

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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

– Partner with hotels and the Convention and Visitor’s Bureau:



At the Dalton Ramada Inn, the charrette team counted 54 brochures available to visitors, only two of them related to the Dalton area. Neither of those two was related in any way to the Conasauga River. This is a great opportunity to educate visitors about the watershed. The Dalton Whitfield County Convention and Visitors Bureau website slogan is: “Discover the History and Natural Beauty in the Carpet Capital of the World.”

The promotional information about the area includes a paragraph about history, a paragraph about the carpet industry and then a paragraph about natural beauty. The most significant information about the natural beauty of Dalton–Whitfield County area is a description of the pleasant climate. The charrette team thinks that this is a missed opportunity to promote the Conasauga River and this ecologically rich and beautiful watershed.

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– Market Yourself:

The Conasauga Watershed is a truly impressive place. It is important to emphasize the overall ecological context of the Conasauga Watershed. It is not enough to say that there are over 90 species of freshwater fishes here, but one must say what it means to have over 90 species of freshwater, what it means to have mussels and snails that exist nowhere else in the world. By placing the figure in context, its significance becomes more accessible. Most people do not know if 90 species of fishes is a lot or a little. It is in fact, a lot. It is more than the total number of fish species found in all of Europe.

OBSERVATIONS AND RECOMMENDATIONS (CONT.)

– Tourism:



photo credit : Georgia Department of Economic Development

There are important opportunities for agricultural tourism in the watershed. This can be anything from you-pick fruit and vegetable areas to corn mazes in the fall. We encourage you to consider all of the implications of agricultural tourism carefully, among those is the type of automobile traffic agricultural tourism generates. If the parking lots for these areas are paved, all of the oils and other fluids from parked cars will run off of those parking lots. *Where will it go?* This is another example of the importance of implementing good stormwater management practices, so that new development of all kinds in this watershed is held to a standard that represents your values and your vision for this area.

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How do you fund a Community Awareness Campaign?

- Explore the possibility of corporate partnerships for educational programs within schools.
- Implement Special Purpose Local Interest Tax (SPLOST) program or Hotel Tax to increase funds for watershed protection. The revenue generated from these taxes result in millions of dollars annually and they can help pay for improvements to publicly managed resources (i.e. boat ramps, watershed awareness programs, educational programs, etc).

OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Article from Dalton Citizen Newspaper – 3/2006

## More awareness would aid Conasauga River

By DANIEL BELL

danielbell@daltoncitizen.com

The Conasauga River watershed could benefit from more publicity.

That was one of the preliminary findings of a team of students and faculty from the University of Georgia who spent the weekend in and around Dalton surveying residents and studying the river valley.

“We counted 54 brochures in our hotel lobby and only two were for places in Dalton,” said Duncan Elkins, one of the students who presented findings Monday afternoon at Dalton City Hall. He suggested the community tie the cultural resources of the area, such as the Chief Vann House in Murray County and the Old Varnell House, and the Conasauga River together, so that each helps promote the other.

The purpose of the weekend retreat, said UGA professor and team leader Pratt Cassity, was to give the

### JUST THE FACTS

**The Conasauga River Alliance, a non-profit organization with the goal of protecting the river, hosted the four-day event, which ended with Monday’s presentation. The team presented its findings to members of the alliance and the community and the overall theme was a need for increased awareness of the river and what it has to offer.**

community ideas for improving awareness of the river and the surrounding area. The team was comprised of more than 20 students and faculty — including Tunnel Hill resident Natosha Back, a landscape architecture student — who spent their spring break holiday working on the project.

Elkins also presented the idea of applying for National Heritage status, saying that the watershed meets

the requirements for the designation. To be considered, there must be a strong historical component to the area and a significant ecological presence.

The Trail of Tears and the diverse biology of the river certainly make the watershed worth considering, he said. The benefit would be inclusion on a national list of tourism locations, which would also make it easier for local organizations to apply for grants to improve the watershed.

There are 90 species of fish, 25 species of freshwater mussel, crayfish, frogs and more in the river, said Ben Liverman, another UGA student.

“It’s not only important to know that there are 90 species of fish, it is important to know why that is important,” said Liverman, who explained that the Conasauga River has more aquatic animal diversity than the continent of Europe.

Liverman pushed education, con-

servation and storm runoff prevention as ideas to help preserve the river. He said to attract more volunteers the community needs to make the volunteer experience positive. Liverman suggested building new entry points into the river so that more people can access it, and making sure they know where that access is.

“I am going to go ahead and use the ‘Z’ word. Zoning,” he said, stressing the importance of preventing over-development of the land around the river. “You don’t get this land back,” he said.

Frank Sagona, watershed director for the alliance, wanted to know what the next steps are, now that the weekend in Dalton is complete and the ideas presented.

“We have a lot more information than we presented here,” Cassity said.

➤ Please see **CONASAUGA, 5A**

## Conasauga: Promote

➤ Continued from page 1A

“We will continue compiling all the information and create drafts of brochures and other material for the alliance.”

The goal of the team is to have final drawings, plans and ideas ready for the alliance and the community by the first of May, since the semester is over mid-May at the university.

The alliance will be able to take the final results of the

teams’ work and “go after grants” to put the ideas into action, said Sagona.

The college of environment and design at UGA has participated in about 50 such studies and Cassity said “this one was different. We feel lucky we were given this.”

Cassity stressed that the community does not have to use the ideas.

“This is not the plan, but it gives the community a jump start,” he said.

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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Linking Smart Growth Principles with Stormwater Management:

SMART GROWTH PRINCIPLES

1. Create a range of housing opportunities and choices.
2. Create walkable neighborhoods.
3. Encourage community and stakeholder collaboration.
4. Foster distinctive, attractive places with a strong sense of place.
5. Make development decisions predictable, fair, and cost effective.
6. Mix land use.
7. Preserve open space, farmland, natural beauty, and critical environmental areas.
8. Provide a variety of transportation choices of smart growth.
9. Strengthen and direct development toward existing communities.
10. Take advantage of compact building design.

Source: "Using Smartgrowth Techniques as Stormwater Best Management Practices." United States Environmental Protection Agency

Growth is coming to the Conasauga Watershed:

From a water resource protection perspective, defining the balance of developed areas and open space requires a broader look at watershed management, rather than limits on a parcel-by-parcel basis.

The steps include:

- Step 1 –** Plan for the preservation of the remaining continuous tracts of open space.
- Step 2–** Plan for the preservation of critical ecological areas such as riparian corridors, stream buffers, flood plains, and wetlands. These parcels are of critical importance in developed areas to absorb and filter stormwater.
- Step 3–** Encourage smart growth practices such as higher density and more compact development for the land that is to be developed. Smart growth development disturbs less land and accommodates more people.

Even though lower density development may have lower amounts of impervious surface on an individual site, lower density developments tend to be accompanied by more offsite impervious infrastructure. Much of the "pervious" surface in low-density development acts as impervious surface for managing stormwater. Development practices often involve the removal of topsoil, resulting in severe erosion during construction and soil compaction by heavy equipment. Research shows that runoff from highly compacted lawns is almost equivalent to runoff from paved surfaces.

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## OBSERVATIONS AND RECOMMENDATIONS (CONT.)

### Linking Smart Growth Principles with Stormwater Management:

### Regional Visioning and Scenario Planning



Illustration 1  
Kane County/Gilberts Present Day



Illustration 2  
Kane County/Gilberts Build Out Under  
Conventional Planning and  
Development



Illustration 3  
Kane County/Gilberts Build Out Under  
Smart Growth Planning and  
Development

Plans by Dodson Associates, Ltd.; Illustrations by Jack Werner

This series of illustrations was developed for the Chicago Regional Environmental Planning Project to show development alternatives at the western edge of the Chicago suburbs in Kane County. This agricultural area is characterized by poorly drained soils and the presence of the Fox River, which was once viewed as a natural boundary for growth. Illustration 1 shows the emergence of some housing in the background.

Kane County expects growth to emerge with the further expansion of housing, roadways and their use. Office and research are the prime industries that are expected to expand into the area first. Housing and retail are expected to follow. Illustration 2 shows that current planning trends would dictate separated land uses, large set-backs, and individual parking lots. The stormwater runoff from the large parcels and parking lots would eventually impact the streambed illustrated in the foreground.

Illustration 3 shows an alternative future using smart growth practices. The industrial uses are placed in the background closer to existing infrastructure and development. Housing developments are connected to services and retail. Illustration 3 envisions a county plan where certain areas are preserved for agriculture and drainage while accommodating growth in village centers. For more information, see the Environmental Law and Policy's "Visions" report at <[www.elpc.org/trans/visions/visions.htm](http://www.elpc.org/trans/visions/visions.htm)>.

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Source: "Using Smartgrowth Techniques as Stormwater Best Management Practices." United States Environmental Protection Agency

## OBSERVATIONS AND RECOMMENDATIONS (CONT.)

### Linking Smart Growth Principles with Stormwater Management:

#### How Does Density Relate to Runoff? The Site Level

These three scenarios show how different housing densities on one acre can affect not only total runoff, but also runoff per house. Although the higher-density scenarios generate more stormwater per acre, they generate less total stormwater runoff and less stormwater runoff per house. Since most watershed growth is expected to be in the range of several thousand houses, not four or eight, the estimation of runoff based on per unit of housing is important. In addition, this illustration looks only at the lot and impervious cover related to the house footprint and driveway.

<b>Scenario A</b> 1 house/acre						
						
						
	Impervious cover = 20 percent		Total runoff (18,700 ft <sup>3</sup> /yr x 8 acres) = 149,600 ft <sup>3</sup> /yr		Runoff/house = 18,700 ft <sup>3</sup> /yr	
<b>Scenario B</b> 4 houses/acre	 		 			
	 		 			
	Impervious cover = 38 percent		Total runoff (24,800 ft <sup>3</sup> /yr x 2 acres) = 49,600 ft <sup>3</sup> /yr		Runoff/house = 6,200 ft <sup>3</sup> /yr	
<b>Scenario C</b> 8 houses/acre	   					
	   					
	Impervious cover = 65 percent		Total runoff = 39,600 ft <sup>3</sup> /yr		Runoff/house = 4,950 ft <sup>3</sup> /yr	

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Source: "Using Smartgrowth Techniques as Stormwater Best Management Practices." United States Environmental Protection Agency



## OBSERVATIONS AND RECOMMENDATIONS (CONT.)

### Linking Smart Growth Principles with Stormwater Management:

#### Paved Area per Dwelling Unit – a Comparison

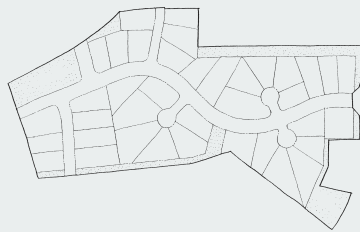


Image: Tom Low, Duany Plater-Zyberk

Conventional Residential Subdivision

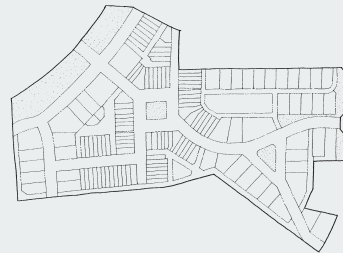


Image: Tom Low, Duany Plater-Zyberk

Mixed Use, Traditional Neighborhood Design

Vermillion is a traditional neighborhood outside Huntersville, North Carolina. The town enacted a TND ordinance to coordinate the approval process for TNDs. The two maps were drawn to compare the TND design and a more conventional, residential-only design.

In the new urbanist street plan, the greater part of the paved areas is taken up by narrow 18 foot roadway widths, whereas the conventional plan relies on wider 30 feet streets. Although the roadway area is higher in the TND plan, the street component per dwelling unit is far less, as indicated in the following tables.

#### Conventional Design

- 38 single family homes

Street Width (feet)	Street Length (feet)	Street Imperviousness (ft <sup>2</sup> )
18	275	4,950
24	350	8,400
30	2111	63,330
		76,680

76,680/38 dwellings = 2,018 square feet street imperviousness/dwelling unit

#### Traditional Neighborhood Design

- 40 single family homes
- 16 studio apartments
- 16 live/work dwellings
- 74 townhouses
- Total 146 residential dwelling units
- One office building (4,400 square feet)
- Two medium sized office buildings (30,000 square feet total)
- Three smaller commercial buildings (15,000 square feet total)
- One restaurant (5,000 square feet)
- One church (10,000 square feet)

Street Width (feet)	Street Length (feet)	Street Imperviousness (ft <sup>2</sup> )
18	3,270	58,860
24	750	18,000
30	525	15,750
		92,610

92,610/146 dwellings = 634 square feet street imperviousness/dwelling unit

The analysis did not look at sidewalk lengths, or the street imperviousness related to commercial buildings.<sup>16</sup>

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Source: "Using Smartgrowth Techniques as Stormwater Best Management Practices." United States Environmental Protection Agency

OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

Streambank Protection and Stabilization Techniques

- Bundles
- Live Staking
- Live Siltation
- Brush Matting
- Brush/hedge Layering
- Vegetated Cribbing
- Grass Rolls

There is a degree of confusion in the watershed about what it means to be a landowner on a naturally flowing river. Very few rivers in the U.S. are naturally flowing, that is, unregulated by dams. The trade off is an environmentally healthier, but less predictable river. Streambank protection and stabilization efforts should be pursued in a way that maintains and improves the health of the river and streams.

Property owners often ask why riprap is not an effective means of streambank stabilization. While riprap stops immediate erosion at a site, it does not slow the water velocity and therefore causes more significant erosion directly downstream. The only effective means of long-term streambank restoration involves revegetation of the streambank with plant materials that aid in slowing the water velocity. Native vegetation is the logical choice for these efforts as it is adapted to local conditions and requires less maintenance. Several protection and revegetation techniques are outlined below.

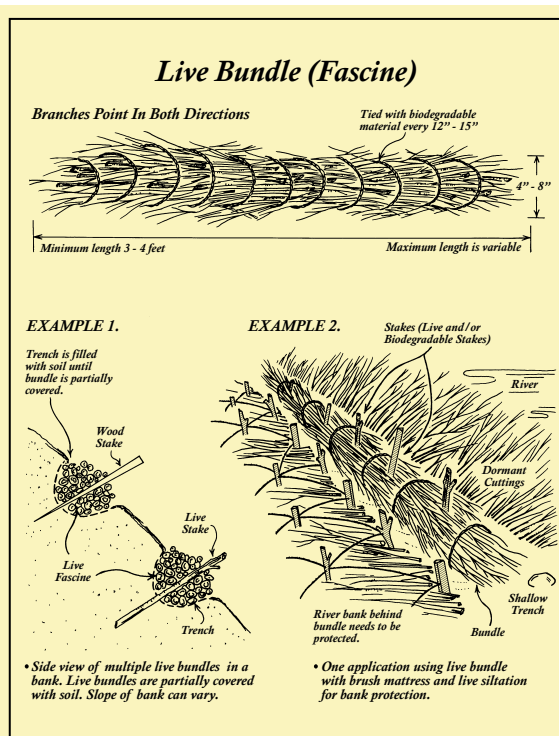
*Property owners should consult a Streambank Revegetation Specialist before installation of any revegetation or protection techniques.*

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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

BUNDLES



The bundle technique involves using dormant branches bound together to create a log-like structure that will root, grow and provide plant cover rapidly. The bundle is used to revegetate and stabilize slopes, break-up slope length, and/or provide a transition from one revegetation technique to another (e.g., a brush mat to a live siltation). Bundles create small terraces that encourage native plant seed collection and growth.

ADVANTAGES:

- Provides good density of vegetation and root matter in lower velocity areas.
- Breaks up slope length.
- Can be cost effective.
- Easy to construct and install.
- Provides terraced area for soil and seeds to settle.
- Provides good quality fish and wildlife habitat.

DISADVANTAGES:

- May require a large quantity of willow.
- May require additional toe-of-slope and bank stabilization using techniques listed.

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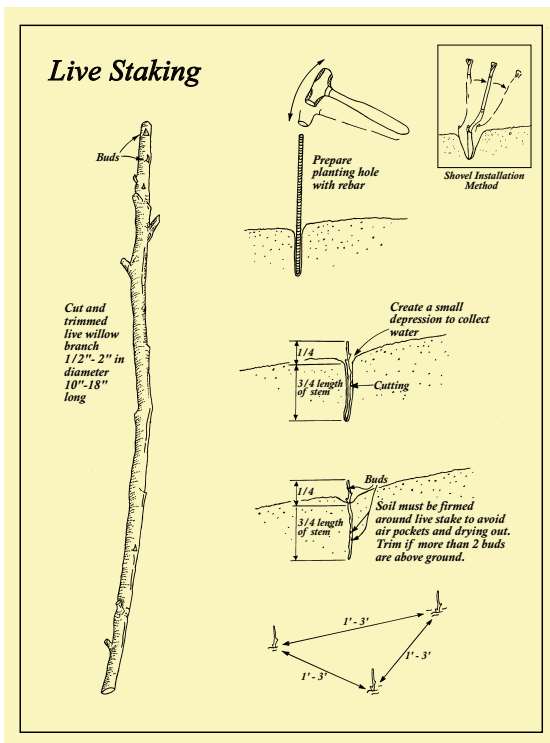
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

LIVE STAKING



Live staking involves the installation of a dormant plant cutting directly into the ground. This technique is often utilized where single stem plantings will provide adequate plant cover, slope stability and fish habitat. Live staking should be combined with other revegetation techniques. These may include anchoring bundles, brush mats and erosion control fabric.

ADVANTAGES:

- Inexpensive.
- Not labor intensive.
- Low tech.
- May plant in high densities.

DISADVANTAGES:

- Low survival compared with other revegetation techniques.
- Should be used in conjunction with other revegetation techniques.
- Ease of planting is dependant on soil type and site condition.
- Should only be used at sites with moist soils or sites where soil has been watered extensively.

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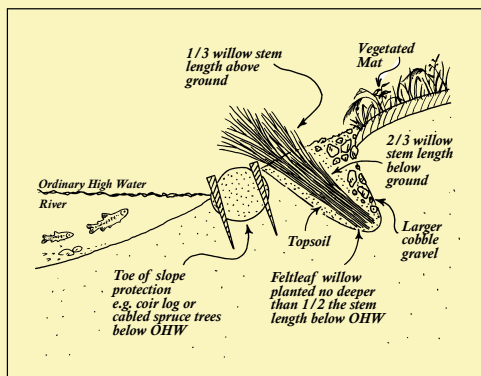
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

LIVE SILTATION

*Live Siltation*



Live siltation is a revegetation technique to secure the toe of a slope, trap sediment, and create fish rearing habitat. This technique may be installed behind other toe-of-slope protection. The practice can be constructed as a living brushy system at the water's edge. This technique is particularly valuable for providing immediate cover and fish habitat while other revegetation plantings are in the process of becoming established.

ADVANTAGES:

- Provides particularly good fish habitat.
- Provides bank stability in low velocity areas.

DISADVANTAGES:

- Requires shallow water and slope.
- Requires relatively low velocity.
- Critical to know ordinary high water level.

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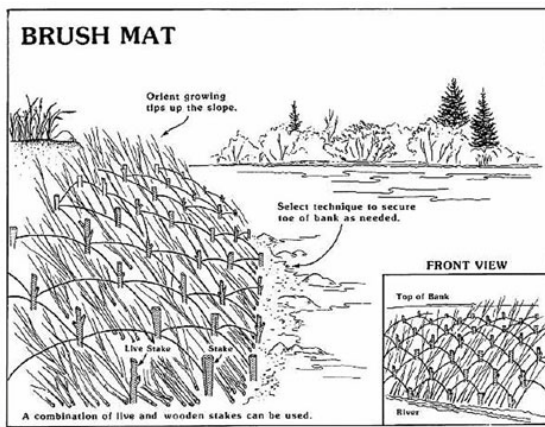
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

BRUSH MATTING



A brush mat provides a protective vegetative covering to a slope immediately upon installation. A brush mat can be constructed with dormant branches that will root and grow (see Recommended Plant List). This technique is often combined with other revegetation and/or protection techniques that are used to secure the toe of the slope.

ADVANTAGES:

- Provides good plant coverage and erosion control.
- Promotes good soil stability.
- Does not involve geotextile or metal left in streambank.

DISADVANTAGES:

- Labor intensive and may be technically challenging

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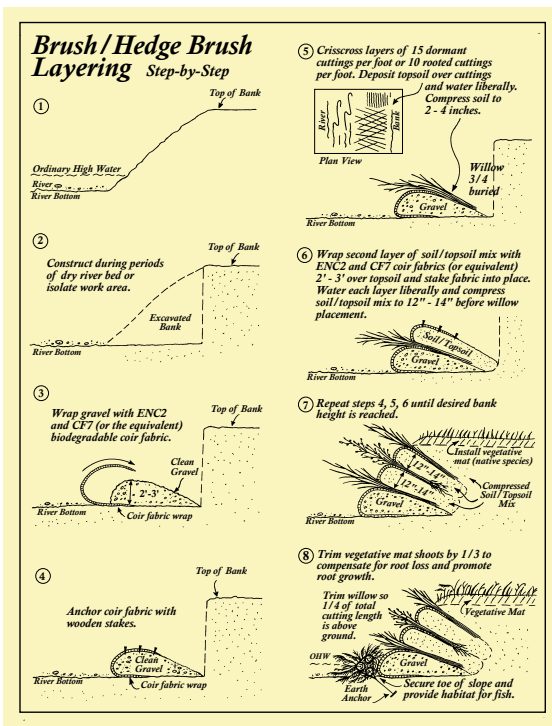
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

BRUSH/HEDGE LAYERING



Brush or hedge layering is a revegetation technique, which combines layers of dormant or rooted cuttings with soil to revegetate and stabilize both streambanks and slopes. A mixture of species may allow the revegetation project to blend with existing vegetation. Branches should be placed on an angle following the contour of the slope. Steep slopes and streambanks are better stabilized with the addition of a biodegradable revegetation fabric to hold the soil in place between the plant layers.

ADVANTAGES:

- May be used in higher velocity areas, dependant on toe-of-slope protection.
- High success rate.
- No permanent geotextile fabrics or metal left in bank.
- Reestablishes healthy riparian zone functions.
- Provides good quality fish habitat.

DISADVANTAGES:

- Relatively expensive.
- More technically challenging.
- May require heavy machinery.
- Requires isolated work area to prevent water body siltation.
- Very stable, dependent on toe-of-slope stabilization.

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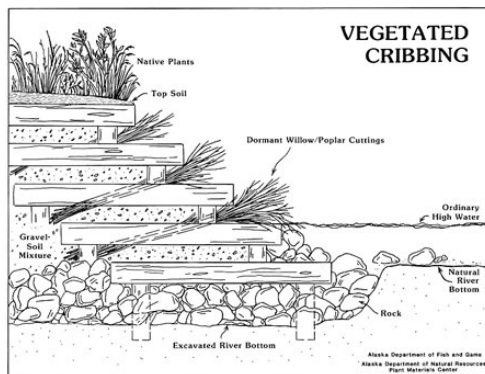
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

VEGETATED CRIBBING



*Vegetated cribbing under construction*



*Vegetated cribbing post construction*

Vegetated cribbing is a technique reserved for use at sites where other revegetation techniques may not provide sufficient protection from erosion.

This technique combines layers of reinforced soil lifts and plant material similar to brush layering with the addition of a protective cribbing. Untreated timbers are notched and keyed into each other to create a crib-like structure. Cross-timbers are periodically installed to increase stability.

Layers of cribbing can be added to reach desired height of bank. The layers can be built vertically or stepped back into the slope with deep or shallow steps. Exposed soil should be seeded to prevent additional erosion.

ADVANTAGES:

- Stable.
- Prevents soil erosion of bank.
- May be used in higher velocity areas.
- Provides good quality fish habitat.

DISADVANTAGES:

- Very expensive.
- Technically challenging.
- Requires large machinery.

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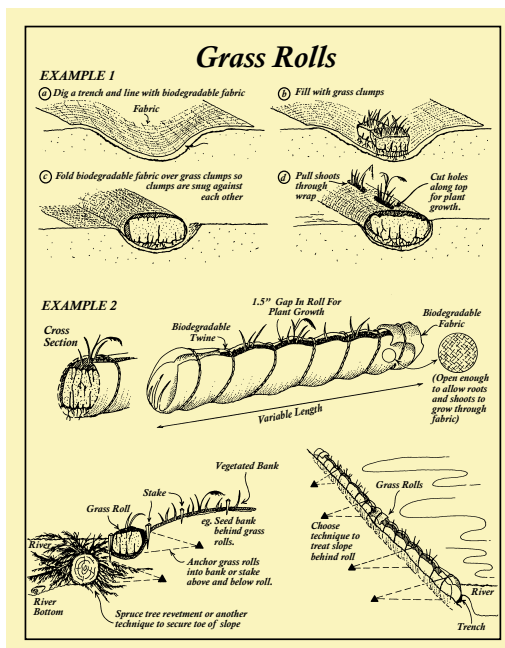
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OBSERVATIONS AND RECOMMENDATIONS (CONT.)

Stabilization Techniques

GRASS ROLLS



Grass rolls are often used to revegetate lakeshores and streambanks where grasses and grass-like plants have been the primary vegetation type and where seeding is impractical due to fluctuating water levels. Clumps of grass sod are placed tightly together, side by side with shoots pointing up, in a sausage-like structure and held together with biodegradable fabric and twine. The roll is then anchored in place. This technique reintroduces herbaceous vegetation to a site while simultaneously providing some structural stability. Ultimately, the sod will form a dense root system along the streambank and provide structural protection to the site. When the grasses go into dormancy at the end of each growing season, their leaves hang over the streambank and provide rearing habitat for fish.

ADVANTAGES:

- Inexpensive.
- Uses simple material requiring little mechanized work.
- Little training required.
- Reestablishes natural conditions.
- High success rate.
- Best used around lakes and low velocity areas.
- Provides erosion control.

DISADVANTAGES:

- Not recommended for high velocity environments.
- Requires protection from trampling.

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## RECOMMENDED PLANTS FOR STREAMBANK RESTORATION NORTH GEORGIA AND SOUTHERN TENNESSEE

### Trees:

Red Maple <i>Acer rubrum</i>	Sweetgum Tree <i>Liquidambar styraciflua</i>
River Birch <i>Betula nigra</i>	Blackgum Tree <i>Nyssa sylvatica</i>
American Hornbeam <i>Carpinus caroliniana</i>	Hophornbeam <i>Ostrya virginiana</i>
Pawpaw <i>Asimina triloba</i>	Sycamore Tree <i>Plantanus occidentalis</i>
Flowering Dogwood <i>Cornus florida</i>	Eastern Cottonwood Tree <i>Populus deltoids</i>
Persimmon <i>Diospyros virginia</i>	White Oak <i>Quercus alba</i>
Green Ash <i>Fraxinus pennsylvanica</i>	Swamp Chestnut Oak <i>Quercus michauxii</i>
American Holly <i>Ilex opaca</i>	Water Oak <i>Quercus nigra</i>
Black Walnut <i>Juglans nigra</i>	Cherrybark Oak <i>Quercus pagoda</i>
Eastern Red Cedar <i>Juniperus virginiana</i>	Willow Oak <i>Quercus phellos</i>
Common Spicebush <i>Lindera benzoin</i>	Black Willow <i>Salix nigra</i>
Tulip Poplar <i>Liriodendron tulipefera</i>	Eastern Hemlock <i>Tsuga canadensis</i>

### Shrubs:

Buttonbush <i>Cephalantus occidentalis</i>	1
Silky dogwood <i>Cornus amomum</i>	2
Smooth Alder <i>Alnus serrulata</i>	3
False Indigo <i>Amorpha fruticosa</i>	3A
Red Chokeberry <i>Aronia arbutifolia</i>	3B
Swamp Dogwood <i>Cornus stricta</i>	3C
Winterberry Bush <i>Ilex verticilata</i>	3D
Swamp Haw <i>Viburnum nudum</i>	3E
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## AGRICULTURAL BEST MANAGEMENT PRACTICES FOR PROTECTING WATER QUALITY

Reducing inputs of nutrients found in pesticides and fertilizers is an important element of pollution prevention for watershed protection.

Utilizing agricultural best management practices will significantly reduce streambank erosion, nutrient loading and chemical pollution of the Conasauga Watershed.

Proper storage, mixing and handling of pesticides and fertilizers is also essential in minimizing risk to the surface water and drinking water.

SOURCE: Agriculture and Agri-food: Farm Rehabilitation Administration  
[http://www.agr.gc.ca/pfra/water/quality\\_e.htm](http://www.agr.gc.ca/pfra/water/quality_e.htm)

- **MINIMIZE** application nutrients or pesticides, avoiding over-application as excess chemicals may run off the land and contaminate the water (including drinking water);
- **MANAGE** all farm waste including animal wastes, hazardous chemicals such as pesticides, fuel, and cleaning agents to prevent accidental contamination of water.
- **INCORPORATE** wetlands in the watershed to act as natural purifiers by reducing phosphorus movement as plants consume nutrients and trap sediment; practicing reduced-till farming;
- **AVOID** agricultural uses that extend directly to the water edge and allow natural vegetation or planted vegetation to regenerate.
- **CONSTRUCT** vegetated buffer strips (50–100 feet wide grassed zones between the water edge and cultivated or grazing land).
- **RESTORE** eroded streambanks through streambank stabilization techniques described.
- **PROVIDE** watering containers in pastures for cattle, thereby reducing a major cause of streambank erosion.
- **CONSTRUCT** cattle crossings to reduce streambank disturbance.
- **ALTER** livestock distribution by rotating salt and mineral locations, and using temporary fencing.
- **MANAGE** the riparian area as a separate and unique pasture.
- **REDUCE** erosion through techniques such as crop rotations, shelterbelts, grassed runways, diversions, and sediment basins;
- **ERECT** fences to prevent livestock access to the water source and delivering the water to the animals, through equipment such as livestock nose pumps;
- **MANAGE** pasture land to prevent over-grazing;

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## AGRICULTURAL BEST MANAGEMENT PRACTICES FOR PROTECTING WATER QUALITY



### SITE-LEVEL STORMWATER CONTROL:

Effective control of rainwater where it falls lessens the impact of stormwater runoff.

- Possibilities: Vegetated Buffer strips, reduction in impervious surface, rainwater storage.



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## AGRICULTURAL BEST MANAGEMENT PRACTICES FOR PROTECTING WATER QUALITY



### SITE-LEVEL STORMWATER CONTROL



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AGRICULTURAL BEST MANAGEMENT PRACTICES FOR PROTECTING WATER QUALITY



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## NATIONAL HERITAGE AREA DESIGNATION

### Q. WHAT IS A NATIONAL HERITAGE AREA?

**A.** A “National Heritage Area” is a place designated by the United States Congress where natural, cultural, historic and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography. These patterns make National Heritage Areas representative of the national experience through the physical features that remain and the traditions that have evolved in the areas. Continued use of the National Heritage Areas by people whose traditions helped to shape the landscapes enhances their significance.

National Heritage Areas are a strategy that encourages residents, government agencies, non-profit groups and private partners to collaboratively plan and implement programs and projects that recognize, preserve and celebrate many of America’s defining landscapes. The heritage areas seek short and long-term solutions to their conservation and development challenges by fostering relationships among regional stakeholders and encouraging them to work collaboratively to achieve shared goals.

Linking the existing cultural and natural resources of the watershed in a unified campaign would result in increased financial leverage, idea sharing, reduction of duplicated efforts and increased community awareness of the value of the river and the watershed. We termed it the “Blue Thread” which knits the watershed together.

There is precedence for this type of binding of cultural and natural resources in ways that enhance a community’s marketability and protection prowess.

**NATIONAL HERITAGE AREAS** are a way to gain national recognition for local success stories. Success stories where local groups have formed partnerships to work together and create a management plan to protect the resources they find are valuable.

There are 27 National Heritage Areas in the United States (see map at the end of section 3E), two of them in Georgia: the Augusta Canal and Arabia Mountain, southeast of Atlanta, including parts of DeKalb, Rockdale and Henry Counties.

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NATIONAL HERITAGE AREA DESIGNATION (CONT.)

**Q.** How do communities benefit from designation as a “heritage area”?

**A.** Some benefits of designation are intangible. Heritage conservation efforts are grounded in a community’s pride in its history and traditions, and in residents’ interest and involvement in retaining and interpreting the landscape for future generations. Preserving the integrity of the cultural landscape and local stories means that future generations will be able to understand their relationship to the land. Heritage areas provide educational and inspirational opportunities which encourage residents and visitors to stay in a place, but they also offer a collaborative approach to conservation that does not compromise traditional local control over and use of the landscape.

In addition to enhancing local pride and retaining residents, designation comes with limited technical and financial assistance from the National Park Service. NPS primarily provides planning and interpretation assistance and expertise, but also connects regions with other Federal agencies. Federal financial assistance provides valuable “seed” money that covers basic expenses such as staffing, and leverages other money from state, local and private sources. The region also benefits from national recognition due to its association with the National Park Service through the use of the NPS arrowhead symbol as a branding strategy.

*Source: [www.cr.nps.gov/heritageareas/FAQ](http://www.cr.nps.gov/heritageareas/FAQ)*

Elements that combine to make the Conasauga Watershed an excellent candidate for National Heritage Area designation include

1) the watershed’s incredible biodiversity of freshwater organisms.

2) the nationally important story of the trail of tears, which originated within the watershed.

3) the global prominence and history of the carpet industry in Dalton.

National Heritage Areas do not involve a significant federal involvement. In fact one stipulation of such areas is that federal money cannot be used to buy private land and no new federal regulations can be implemented. Everything has to be locally initiated.

Being a national heritage area makes communities eligible for one million dollars a year in matching funds to locally conceived and initiated projects. Perhaps most important is the pride and ownership the local community gets from knowing that its resources are nationally recognized.

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NATIONAL HERITAGE AREA DESIGNATION (CONT.)

27 NATIONAL HERITAGE AREAS IN THE UNITED STATES



Source: [www.cr.nps.gov/heritageareas](http://www.cr.nps.gov/heritageareas)

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## CASE STUDY: CANE RIVER LOUISIANA



*Creole, Indian, and plantation cultures  
and their association to the land.*

Cane River National Heritage Area in northwestern Louisiana is a largely rural, agricultural landscape known for its historic plantations, its distinctive Creole architecture, and its multi-cultural legacy. Historically this region lay at the intersection of French and Spanish realms in the New World. Today it is home to a unique blend of cultures, including French, Spanish, African, American Indian, and Creole. The central corridor of the heritage area begins just south of Natchitoches, the oldest permanent settlement in the Louisiana Purchase, and extends along both sides of Cane River Lake for approximately 35 miles. The heritage area includes Cane River Creole National Historical Park, seven National Historic Landmarks, three State Historic Sites, and many other historic plantations, homes, and churches. The majority of the 116,000-acre heritage area is privately owned, but there are also many sites, which are open to the public.

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SOURCE: <http://www.cr.nps.gov/heritageareas/AREAS/CANERV.HTM>

## CASE STUDY: AUGUSTA CANAL, AUGUSTA, GEORGIA



*Highlights Industrial Heritage and its connection to the city. Promotes Recreational and Educational opportunities along the canal.*

This area was awarded National Heritage Area designation for the Augusta Canal's industrial and cultural heritage, and the outstanding natural resources of the area. The area includes the nation's only industrial power canal still in use for its original purpose as well as a suite of recreational and educational opportunities.

This nine-mile corridor follows the best preserved canal of its kind remaining in the southern United States. The canal transformed Augusta into an important regional industrial area on the eve of the Civil War, and was instrumental in the post-Civil War relocation of much of the nation's textile industry to the south.

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SOURCE: <http://www.cr.nps.gov/heritageareas/AREAS/AUGUSTA.HTM>

## SITES OF CULTURAL AND NATURAL SIGNIFICANCE IN THE CONASAUGA WATERSHED

# CONASAUGA WATERSHED

*Sites of Cultural and Natural Significance*

Some sites are not accessible to the public:



PRIVATELY OWNED



PUBLICLY OWNED

- 1 Delilah's Grave Site at McNair's Stand
- 2 Chief Vann House Historic Site
- 3 Old Federal Road
- 4 Moravia Mission at Springplace
- 5 Jack's River Snorkel Site
- 6 CCC WPA Heritage Site
- 7 Holly Creek Trout Access
- 8 New Echota Cherokee Capital
- 9 Easley Ford Historic Bridge
- 10 Varnell Blue Hole
- 11 Varnell Springs
- 12 Historic Varnell Home
- 13 Carlton Petty Family Farm
- 14 Conasauga River House
- 15 Nature Park/Archery Range
- 16 Cohutta Springs
- 17 Praters Mill
- 18 Red Clay State Park
- 19 Fort Mtn. State Park
- 20 Cohutta Wilderness



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## OUTSTANDING NATIONAL RESOURCE WATER DESIGNATION OVERVIEW

Outstanding National Resource Water (ONRW) is a designation under the federal Clean Water Act. Under the Clean Water Act, states are required to classify all surface waters into one of three categories based on their water quality. ONRWs (also known as “Tier 3” waters) are the highest quality waters, and are those surface waters of such exceptional ecological and/or recreational significance that their water quality must be maintained and protected. Once a water is designated as an ONRW, the Clean Water Act requires that the ONRW’s water quality “shall be maintained and protected.” This provision effectively prohibits any activities that will result in degradation of water quality, with limited exceptions for activities that result in temporary and short-term changes in water quality.

The Clean Water Act also requires every state to have its own antidegradation regulations that create water quality designations and classifications for all surface waters. Georgia’s regulation imposes additional requirements on ONRWs. First, this regulation prohibits new point sources or increases on existing point sources located within the ONRW.

Second, this regulation states that existing point sources in the ONRW must be treated and controlled in accordance with applicable laws and regulations. Third, new or increased point sources on tributaries of the ONRW must comply with applicable laws and regulations, meet their use criteria, and must maintain and protect the water quality of the ONRW.

The Georgia Department of Natural Resources (“DNR”) also maintains a policy document relating to ONRWs. This document imposes additional limitations on wastewater treatment facilities, stormwater permits and stream buffer variances in areas adjacent to ONRW waterbodies. The DNR document also describes the application procedure for designating a waterbody as an ONRW. A nomination package must include certain materials and must be submitted by June 30th of a given year. The DNR document then sets a timeline for various events related to public notice and agency consideration.

There are currently no waters designated as ONRW in Georgia. Therefore, several organizations (Georgia River Network,

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OUTSTANDING NATIONAL RESOURCE WATER DESIGNATION (CONT.)

Georgia PIRG, Turner Environmental Law Clinic, Southern Environmental Law Center, Upper Chattahoochee Riverkeeper, Georgia Wildlife Federation and National Wildlife Federation) have pulled together in order to consider petitioning DNR to designate at least one water in the state as ONRW. Our first step was to identify the portion of a river that was appropriate for ONRW designation. Due to its biological diversity, the variety of recreational opportunities it offers, and high water quality, we believe that the Conasauga River fits the Clean Water Act’s definition of an ONRW as a waterbody of “exceptional ecological and/or recreational significance.” We believe that designating the headwaters of the Conasauga will be the least complicated and most politically viable stretch of the river to designate. Designating a body of water as an ONRW will prohibit some activities – such as construction of wastewater treatment facilities, creating new point sources, and the granting of stream buffer variances. However, because the majority of the land adjacent to the Conasauga’s headwaters are owned and managed by the federal government, the impact on private property uses will be minimal.

We believe it will be necessary to have the support of the adjacent land owners, as well

as the local government, before attempting to nominate the Conasauga (or any other river). Our hope is that the Conasauga River Alliance will act as an advocate for the ONRW designation and a liaison with local government and landowners. We believe it would be invaluable to have a local partner to assist in identifying and meeting with the relevant landowners, businesses, and government leaders in an effort to obtain their support for the designation. This effort will require time more than any other resource, but the designation will not require additional resources once it is in place.

We are unaware of whether any federal funds or other types of grants are available based on an ONRW designation. However, as no other Georgia waters have this designation, it is likely to increase business in the area related to recreation and tourism. This protection against degradation of the Conasauga River is also likely to increase property values in the area.

ONRW status would give strict protection to the headwaters of the Conasauga, which is undoubtedly one of the state’s most treasured waters. If designated, the Conasauga will be Georgia’s first ONRW.

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## CONCLUSIONS

Local government and state boundaries often foster competition more than cooperation. Economic conditions, organizational systems, population growth and budget restrictions all influence this heavily. These competing interests will drive wedges between the communities and some of the goals outlined in this report. The political situation will make or break the watershed.

This watershed is a step ahead of many of the other watersheds in the states. You've already realized that those relationships are important. Some of the things that we've seen here and some of the cooperation between organizations and organizations and industry are quite impressive. We want to congratulate you for recognizing that watershed cooperation must occur for success to be realized.

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# CONASAUGA *Guiding Principles for Quality Growth and Preservation* WATERSHED



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The University of Georgia

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