6.0 Natural & Cultural Resources

Sumner County has a rich natural and cultural heritage that has changed dramatically since the 1960s with increasing suburbanization of the greater Nashville area. Residents expressed concern regarding the loss of Sumner County's rural atmosphere, sense of place, and agricultural roots during the visioning phase of the *2035 Comprehensive Plan* development. These concerns were also expressed among representatives on the Comprehensive Plan Working Group. In response to these concerns, a Natural & Cultural Resources Element was developed to assess the status of natural resources, primarily forest and water, in Sumner County, to begin identification of significant cultural resources, and to outline potential strategies for future implementation that protects, conserves, and mitigates impacts upon these resources. Ultimately, these strategies will strengthen the quality of life goals established in the Vision & Goals Element (3.0).

In this element, a discussion of sustainability is presented to develop a framework for including natural and cultural resources in the comprehensive plan. Also relevant to this element is inclusion of facts and photos from major flooding that took place while developing the comprehensive plan. A brief overview of assistance that was obtained while developing the element is outlined followed by the role of topography in Sumner County. A detailed analysis of forest and water resources including maps of key resources, potential risks, and possible opportunities is included and a brief section describing the role of cultural heritage in Sumner County follows. Finally, all of this information is pulled together to identify key areas for action strategies with three focus areas presented that include model strategies that could be implemented throughout the county as needed.

6.1 Key Concept – Sustainability

A traditional definition of sustainability is meeting the needs of the present without compromising the ability of future generations to meet their needs. Typically, sustainability addresses policies and strategies regarding development. A public policy perspective would define sustainability as the satisfaction of basic economic, social, and security needs now and in the future without undermining the natural resource base and environmental quality on which life depends. Sustainable development can foster policies that integrate environmental, economic, and social values in decision making (Figure 6-1). Sustainable development reflects not the trade-off between business and the environment but the synergy between them.

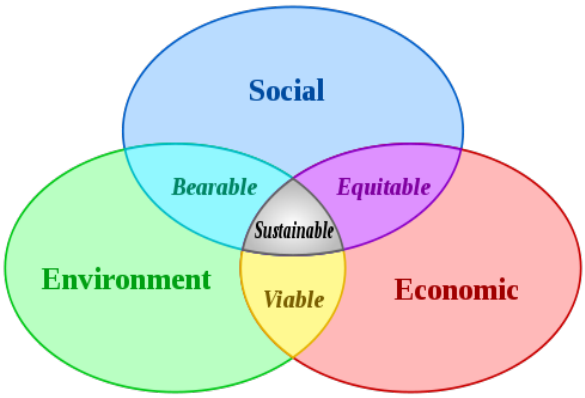


Figure 6-1: The Three Pillars of Sustainability
Source: Johann Dréo (2006)

Natural and cultural resources make up two of the pillars of sustainability. Each pillar overlaps with one another making a concept sustainable when it develops the right mix of all three.

The Natural & Cultural Resources Element focuses on these two areas because land and transportation development is intrinsically an economic by-product, where land owners try to maximize the use of one's land for profit by developing it. This perspective makes profit for some but may burden others with costs associated with a development. These costs might include increased traffic congestion, loss of open space, shipping of agricultural products, and other modern impacts. Benefits can include the generation of local jobs, amenities and services close by, increased wages, and other positive impacts. Solely approaching land and transportation development decisions for economic reasons without weighing the impacts upon the social and natural environments can have dire consequences. Achieving a balance is important.

Sustainability is a key concept involving climate change. Much political debate has surrounded climate change recently, but sound scientific research continues to show that temperatures are changing causing more dramatic shifts in climatology. The water-forest relationship is a key component in climate change. Whether one agrees that climate change is occurring or not, residents of Sumner County have identified the protection of natural resources as a primary objective in the *2035 Comprehensive Plan*. Strategies that address climate change by conserving, protecting, and mitigating water and forest resources are key strategies to maintaining Sumner County's sense of place, rural atmosphere, and cultural heritage.

Figure 6-2 depicts the water-forest-climate relationship. This interlaced, intricate relationship is necessary to include in a comprehensive plan because land use decisions can significantly impact this relationship.

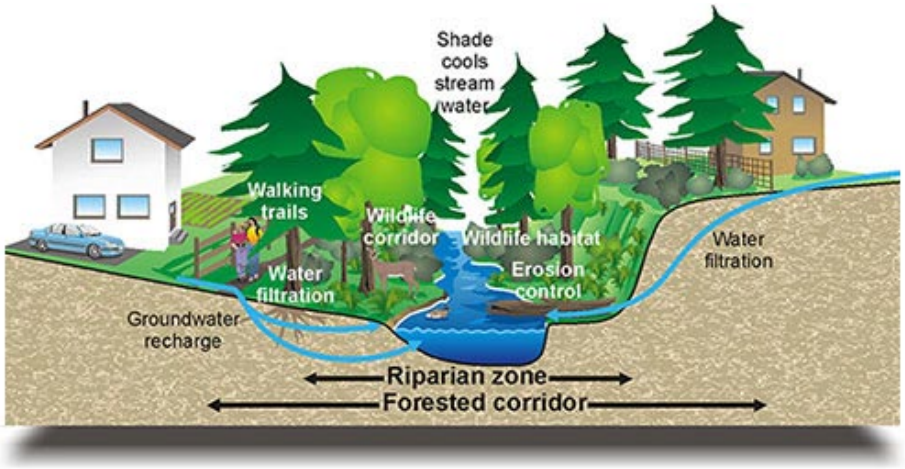


Figure 6-2: Water-Forest-Climate Relationship
Source: Model Forest Policy Program (2010)

Local governments play a key role in this relationship, particularly dealing with the conversion of land to more intense development uses. Residential and commercial development can significantly alter the natural relationship between water-forest-climate. The removal of trees impacts the amount of water that is stored in a forested area and the amount of carbon in the atmosphere. Both impacts alter the relationship by generating more stormwater runoff with less water storage. Buildings and parking lots

are impervious surfaces that do not allow rainwater to infiltrate into the soil, which causes more stormwater runoff. Increasing runoff over many years can cause stream pollution, flooding issues downstream, and other negative consequences. The climate is then impacted by the different amounts of water and carbon in the atmosphere, thereby changing weather patterns.

> **KEY CONCEPT: SUSTAINABILITY**
> Sustainability is meeting the needs of the present without compromising the ability of future generations to meet their needs.

6.2 Middle Tennessee Flood of 2010

Middle Tennessee recently experienced an extreme weather example. Over May 1-2, 2010, the Nashville International Airport recorded 13.57 inches of rain. This amount of rain shattered records that were set in the late 1970s by the remnants of Hurricane Frederic. On both days of that weekend, heavy rain started in early morning and worked through waves of intense rainfall that did not stop for ten or so hours. This event caused massive flooding beyond what would be expected in a 100-year flood event. A 100 year flood is an event that statistically has a 1% chance of occurring in any given year. A 500 year flood has a .2% chance of occurring, and a 1000 year flood has a .1% chance of occurring. Many experts have said that the event was at least a 500 year flood event although a final determination has not been concluded. Figures 6-3 and 6-4 show rainfall totals for Middle Tennessee for the two days and rainfall totals for the entire state during that timeframe. The following records were broken according to the National Weather Service (2010) during this epic event:

- **May 2010 will rank as the wettest May on record and the wettest month on record in Nashville history.**

- **New 24-hour rainfall record was set.**
  - 9.09 inches of rain fell on May 1 & 2, 2010.
  - Old record was 6.68 inches on September 13 & 14, 1979 during the remnants of Hurricane Frederic.

- **New two day rainfall record was set.**
  - 13.57 inches of rain fell on May 1 & 2, 2010.
  - Old record was 6.68 inches set on September 13 & 14, 1979.

- **New calendar day rainfall record was set.**
  - 7.25 inches of rain fell on May 2, 2010. This also established a new record for the most rainfall for any calendar day in Nashville's history.
  - Old record was 6.60 inches set on September 13, 1979.

- **New 12 hour rainfall record was set.**
  - 7.20 inches of rain fell on May 2, 2010.
  - Old record was 6.37 inches set on September 13, 1979.

- **New 6 hour rainfall record was set.**
  - 5.57 inches of rain fell.
  - Old record was 5.17 inches on September 13, 1979.

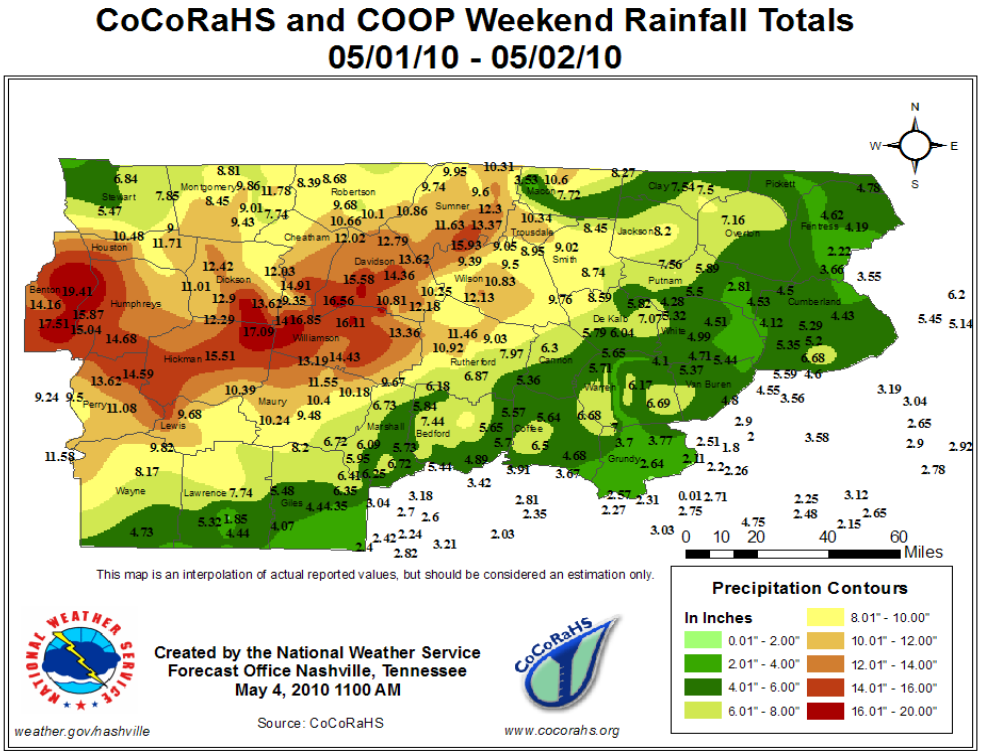


Figure 6-3: Estimated Rainfall Totals, May 1 & 2, 2010
Source: National Weather Service (2010)

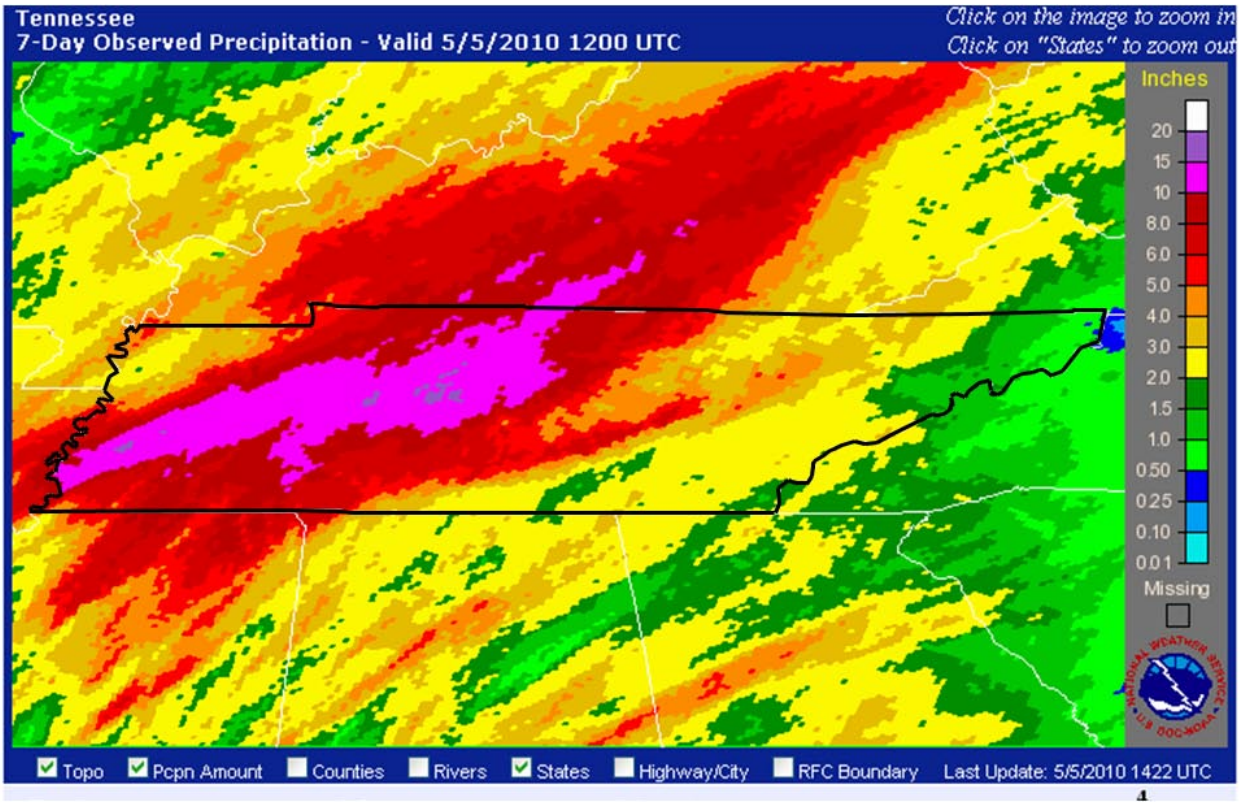


Figure 6-4: Statewide Estimated Rainfall Totals
Source: National Weather Service (2010)

Flash flooding was a major issue on the days of the event. Downstream flooding was a major problem for days after the event. Local dams maintained by the U.S. Army Corps of Engineers were holding back water at levels never seen since the construction of the lock and dam system on the Cumberland River in the 1960s. Water supply systems were threatened, and thousands of houses were destroyed across Middle Tennessee. Sumner County had significant flood damage along streams such as Bledsoe Creek, Mansker Creek, Station Camp Creek, and along Old Hickory Lake. Ground was so saturated and gave way along steep slopes like along US 31E/SR 6 on the Ridge towards Westmoreland.

Two teens struggled to survive from flash flooding around Station Camp Creek.
Photo: Rick Murray
Source: *The Tennessee*, May 3, 2010

Flooding along Long Hollow Pike near Belvedere Drive in Gallatin.
Photo: Jennifer Easton
Source: Sumner County Publications (2010)

Residents of Cragfont Estates were rescued from rising flood waters.
Photo: Jennifer Easton
Source: Sumner County Publications (2010)

Young's Nursery was under water near Big Station Camp Blvd. and Nashville Pike.
Photo: Jennifer Easton
Source: Sumner County Publications (2010)

Flooding of Deshea Creek near Pruitt Lane.
Photo: Bob Olari

Deshea Creek carried debris across Pruitt Lane.
Photo: Bob Olari

Vic Jenkins car dealership on US 31E in Gallatin.
Photo: Bob Olari

US 31E near Downtown Gallatin.
Photo: Bob Olari

Mansker's Farm subdivision under water in Hendersonville.
Photo: Sheriff Bob Barker

SR 386/Vietnam Veterans Boulevard was shut down for several days because of flooding along Mansker Creek.
Photo: Sheriff Bob Barker

Aerial view of SR 386/Vietnam Veterans Boulevard at Davidson/Sumner County Line.
Photo: Sheriff Bob Barker

Old Hickory Dam with Old Hickory Lake in background and overflowing Cumberland River in foreground.
Photo: Sheriff Bob Barker

This epic flooding event has posed questions for residents and local officials about how Sumner County may develop in the future. There are opportunities through the *2035 Comprehensive Plan* to begin addressing some of the natural resources issues, so the built environment can adapt to drastic weather conditions or even mitigate these weather conditions.

A Natural Resources Protection Focus Group was formed in response to the priority that the Comprehensive Plan Working Group, Sumner County Regional Planning Commission, and residents have placed upon the natural and cultural heritages of Sumner County. During the development of the *2035 Comprehensive Plan*, the focus group discussed the impact the recent flooding event has had on Sumner County. The Focus Group felt that the following strategies should be considered as part of the comprehensive plan implementation because of the increased focus on flooding and climate change in Middle Tennessee:

- Reexamine Sumner County's cluster development zoning and development standards in natural resource rich areas such as the Ridge and along streams that do not take away property rights but only allow development after meeting criteria that mitigates impacts upon natural resources and/or involves sustainable development practices.
- Encourage more common sense approach to conservation buffers around streams to implement more safeguards against flooding.
- Develop a steep slopes policy regarding appropriate development.
- Encourage green infrastructure best practices such as pervious pavement, bioswales, underground detention, rain gardens, green roofs, etc. through incentives. Consider application for TDEC's green infrastructure grants.
- Analyze and better understand lakeshore erosion issues and concerns of residents.
- Assess Sumner County's role in regional watersheds and how the volume and rate of water impacts those downstream.
- Establish an urban tree canopy goal of 40 percent.
- Consider developing a Climate Action Plan for Sumner County.
- Maintain a photo library and documentation of accounts during the flood.

Some of these ideas are included as part of the Implementation Element (7.0) in the comprehensive plan. The recent flooding event had a significant impact on communities in Middle Tennessee, and it would be expected that residents and elected officials will be more mindful of development issues involving flooding in the immediate future because of this event.

6.3 Climate Solutions University

The Climate Solutions University (CSU) is a program conducted by the Model Forest Policy Program with its partners the Cumberland River Compact and The Climate Project. It builds upon community processes involving case studies in Idaho and Tennessee. A four step process engages the community, improves natural resource policy decisions and fosters sustainable livelihoods for resource dependent populations. CSU is replicating this process in six communities across the United States. Sumner County was selected as one of the six communities to participate in the program for 2010.

The purpose of CSU is to guide and empower local communities in resource rich areas to develop local climate action plans that include forest and water strategies. The four steps of the community process are:

1. Community decides to take leadership action;
2. Local conditions are assessed for resource vulnerabilities and action opportunities for forest, water, and land use planning and practices;
3. Strategies and recommendations are developed; and
4. Actions are implemented, monitored and evaluated for impacts and benefits.

The Natural & Cultural Resources Element builds upon the methods of the CSU program. This work was very timely in assisting Sumner County with strategies to include in the comprehensive plan for adoption. With the adoption of the *2035 Comprehensive Plan*, Sumner County will be ready to start step 4 and implement actions that are outlined in the Implementation Element (7.0).

6.4 Sumner County's Topography

The State of Tennessee, because of varying geographic differences, has been divided into three sections or physiographic provinces. These large surface divisions by title are the Appalachians, the Central Highlands, and the Mississippi Plain and Plateau and are generally referred to as East, Middle, and West Tennessee, respectively (Figure 6-5).

Sumner County lies within the Central Highlands Province, and is further divided into two major regions. A sharply defined ridge line, which is in fact the transition escarpment between the Central Basin and the Highland Rim, divides the county roughly in half. The two regions and the Ridge are the result of millions of years of erosion by running water acting upon a rocky bulge in the earth's surface historically called the Nashville Dome.

The Central Basin

This portion of the county varies in elevation from approximately 450 feet above sea level along the banks of the Cumberland River to areas of rolling hills of approximately 600 feet above sea level. While this area is mostly level to rolling with slopes under 12 percent, some isolated hills and knobs may exceed 12 percent.

The Highland Rim

This hilly upland region occurs throughout the northern half of Sumner County. It is characterized by rolling plains and open hills with roughly 80 percent of the area having slopes less than 12 percent. The elevation averages about 850-900 feet above sea level.

The Ridge

The Ridge as it is known locally is not really a separate province or region, but due to the significance of the landforms it deserves separate attention. The Ridge itself extends from the southwestern part of the county to the northeast in a gentle arc. It consists of hilltops, steep-walled valleys, and dissected ridges and is a result of the mature stage of dissection of the low limestone plateau by stream erosion.

At the base of the Ridge, elevations average about 600 feet above sea level while the hilltops will range from 850 to 950 and in some cases over 1,000 feet above sea level. Slopes in this area will vary from 20 to 30 percent to as much as 50 to 60 percent. This area presents severe limitation to any kind of development.

Characteristic landforms of this region are the ridges and valleys formed by centuries of erosion. Woven between the intricate drainage patterns are many narrow, steep-walled valleys with great varieties of wildflowers and vegetation, outstanding landforms, and abundant wildlife. These elements of the ecosystem, coupled with the man-made agricultural resources of the fertile valley floors make this region worthy for strong conservation and preservation policies.

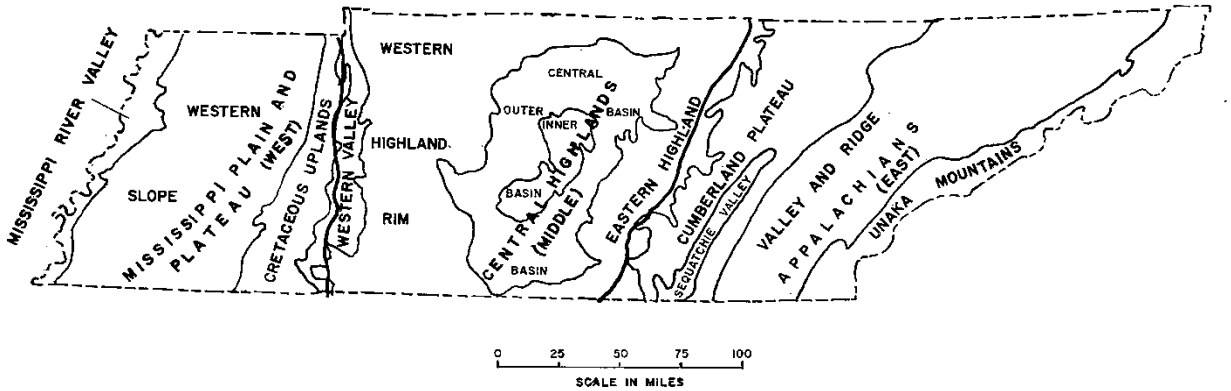


Figure 6-5: Physiographic Provinces and Regions in Tennessee
Source: Tennessee Department of Economic and Community Development (ECD) Local Planning Assistance Office (1977)

Slope is the degree of rise or fall, or an expression of steepness, over land surfaces. A slope of 20 percent indicates the land elevation will increase 20 feet for each 100 feet of horizontal distance traversed. In analyzing slopes in Sumner County, three categories are utilized. These categories are: less than 10 percent, flat to gently sloping; 10 to 20 percent, moderate slopes; greater than 20 percent, rough and extremely steep slopes. It should be noted that often those slopes which exceed 20 percent can even exceed 50 to 60 percent.[1]

Figure 6-6 depicts these categories over the Sumner County landscape. It can readily be seen that most of the slope problems occur within the area of the Ridge. Some steep slopes are encountered along some of the major streams, but most of the rest of the county is either flat or has moderate slopes. Slopes greater than 20 percent are areas appropriately suited for conservation strategies. These steep slopes have behaved as a natural barrier to growth in the south and west portions of Sumner County. As growth continues to occur, it can be expected that pressure will increase to develop in these steep sloped areas.

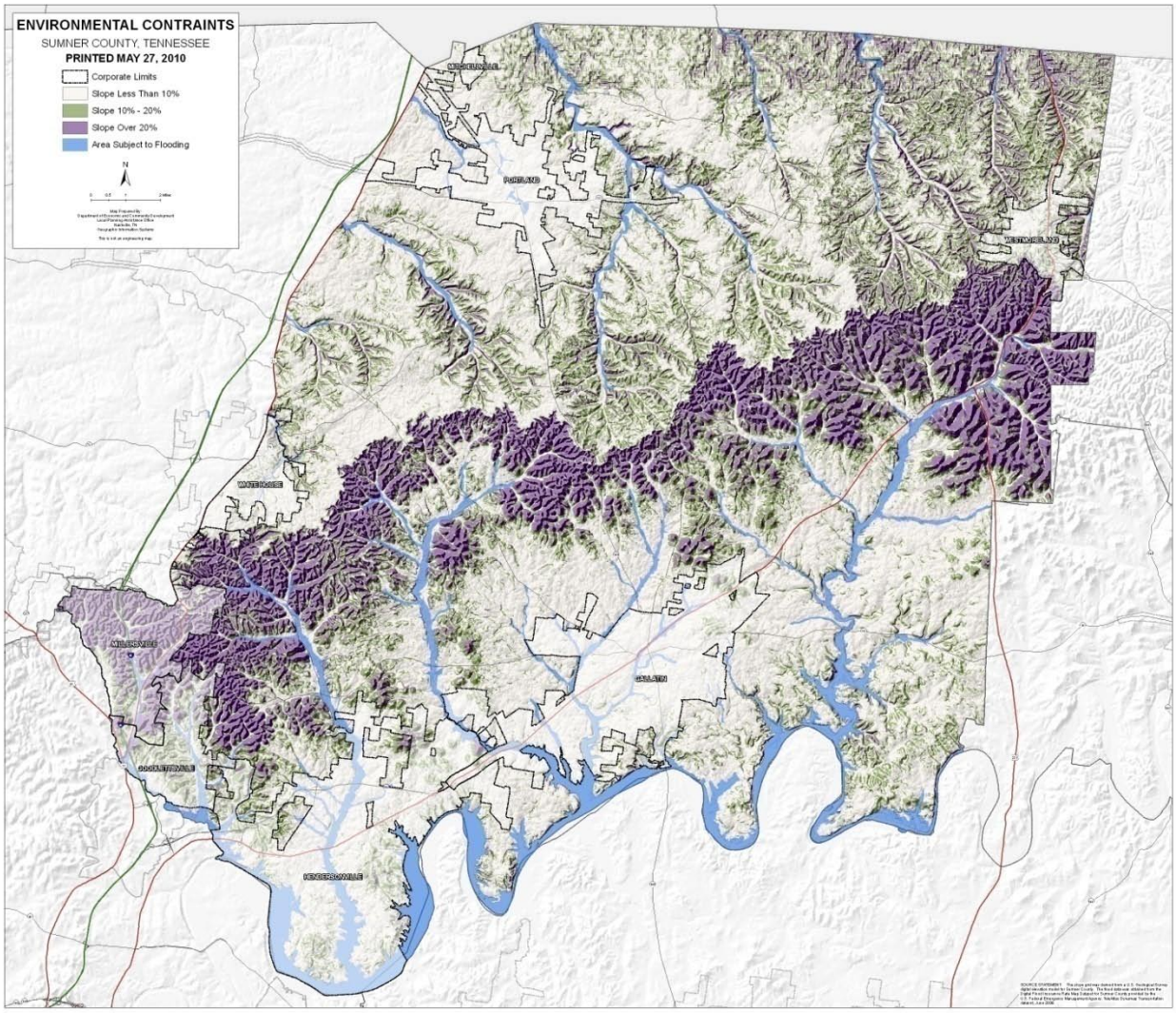


Figure 6-6: Steep Slopes in Sumner County
Source: Tennessee ECD Local Planning Assistance Office (2010)

6.4.1 Hazards of Excessive Slopes

The difficulties encountered in the development of steep slopes have been discussed in general terms; however, there are specific hazards that should be enumerated. These hazards involve dangers to public safety and to property that can now be documented from the 1970s and recently in 2010.

The Ridge in Sumner County consists of similar geologic, soil, and topographic conditions of some steep areas of southern Davidson County and northern Williamson County. In March of 1975, these areas of Davidson and Williamson Counties experienced some significant landslides in conjunction with some very heavy rainfall. As a result of studies at the time by the Tennessee Division of Geology, some generalizations may be made about such conditions in Sumner County.[1] Additionally, with the recent epic flooding event in May 2010, landslides also occurred in areas of the Ridge in Sumner County. One notable area is along the Ridge just south of the City of Westmoreland. US 31E/US 231/SR 6 had sections of roadway that buckled and fell into the valley. The Tennessee Department of Transportation (TDOT) was making emergency repairs to the roadway at the time of this writing in late spring of 2010. There

were also numerous documented cases in the Middle Tennessee region where foundations were shifted and portions of houses collapse because of landslides during the epic rain event.

The landslides of 1975 took place when land development was permitted to intrude on steep slopes. Left undisturbed, the movement of the slopes would have not been noticed, but with the construction of roads and houses and the removal of natural cover, the slides were intensified and private property was affected.

The slides themselves occurred upon a substance known as colluviums. This is a general term applied to any loose, heterogeneous, and incoherent mass of soil and rock fragments deposited chiefly by gravity, usually at the base of a steep slope or cliff. The colluvial material was derived principally from the weathering and erosion of the geological formation known as the Fort Payne Formation. As the Highland Rim escarpment has retreated outward from the Central Basin, remnant hills and ridges remain. The same Fort Payne rocks capping the Highland Rim also cap these remnants. It is the siliceous debris supplied by these rocks that comprises the bulk of the colluviums both along the escarpment and around the outlying hills and ridges. The colluvium forms wedges and collars of weak, unconsolidated material with its upper limit normally at the break in the slope of the hillsides.

Slump is the principal type of movement that has occurred in the landslide area. This is an earth movement characterized by shearing and rotary movement of a generally independent mass of rock or earth along a curved slip surface and about an axis parallel to the slope from which it descends and by backward tilting of the mass with respect to that slope. The curved surface of the movement is concave upward.

6.4.2 Causes of Movement

The material involved in the slides within the area studied in 1975 moves naturally in the form of soil creep. To most people, the amount of movement is imperceptible, being only a few millimeters to centimeters annually. The distinct, abrupt movement involved in slumping was due principally to two factors. These were slope alterations by various means and excess water due to near record rainfall levels.

In almost every case of landslide occurrence, the slopes had been altered by construction in relation to residential development. This alteration was in one or a combination of three methods:

1. steepening of the entire slope;
2. notching above the toe of the wedge of colluviums; and/or
3. removal of the toe.

Steepening here refers to increasing the slope angle beyond the critical slope or angle of repose. This is defined as the local maximum slope inclination that the soil and rock materials underlying the slope can support without failure under existing elements, vegetation, and land use.

The slides described above occurred during March 11-13, 1975. Although some of the slides caused no damage to structures, many resulted in damage ranging from minor cracking of retaining walls and driveways to failure of dwelling foundations and major damage to walls and other structures.[1] Similar to 1975, the recent flooding event on May 1-2, 2010, caused similar damage throughout the Middle Tennessee region. Hazards of this nature will continue to happen as long as development continues to occur along steep slopes where conservation strategies are most appropriate.

These basic conservation strategies were detailed in a 1977 Land Use Plan for Sumner County:

1. Prohibit massive removal of natural vegetation.
2. Prohibit the steepening of slopes.
3. Limit development to very low densities.

Action strategies are outlined in the Implementation Element (7.0) addressing these issues.

6.5 Forest Assessment of Sumner County

A forest assessment of Sumner County was conducted for the CSU curriculum. The purpose of the forest assessment is to fully understand the history of forest resources in Sumner County, its current health and status, areas that are threatened, governance structure involving forests, and possible strategies that are apparent based upon review of this information. CSU faculty assisted Sumner County and the Natural Resources Protection Focus Group in pulling together this information and assessing forest resources. The Tennessee Department of Agriculture (TDA) Division of Forestry was especially helpful in gathering qualitative information for the forest assessment.

6.5.1 Original Forest Conditions

Most of Sumner County was forested originally. Species included oaks, chestnut, hickory, poplar (primarily in coves), sugar maple, beech, and many others. The age and size of most of the trees in this forest were greater than today. Size was greater because of the greater age and the soils were rich and not depleted by agriculture. It was not all “old growth”. Scattered patches of younger forest were situated where there were storms and/or a killing fire. Canopies in most areas were more varied and open than today, and vertical diversity (multiple canopy layers) was greater. The amount of standing and down dead wood was also greater than today. Mast yields were far greater due to the presence of chestnuts. The forb layer (ground level) was often thicker and more palatable to wildlife because of frequent fires. Fire also created more hollow trees.

Forest types included chestnut-oak-hickory on ridge and other dry sites, mixed mesophytic (cool, moist upland forest) in coves and small valleys, late successional beech-maple forest in areas that had long escaped disturbance, cedar-oak forest on dry rocky sites, and sycamore-elm-ash-cottonwood forest on wet ground near the Cumberland River. Extensive beech forest was reported on what is now good farmland in Ohio, Kentucky, and northern Tennessee.

Flat land, especially in northern Sumner County, was at times occupied by prairie, savannah, and brushy areas propagated by Indian-set fires. The extent of this open cover type was variable depending on climate, weather, and human population. These areas of natural prairie and savannah no longer exist today.

6.5.2 Current Stands & Health Status

Forest stands in Sumner County are predominantly even-aged in the overstory. Most land in Middle Tennessee was cleared and grazed for pasture in the 1800s and early 1900s. Starting with the Great Depression, poverty, overpopulation in farm areas, and depletion of soil drove large numbers of subsistence farmers off the land. Forest grew up on these lands, but rampant setting of fires continued for agricultural and other purposes giving a competitive advantage to oak. This is the reason oak is so common in the overstory now. These stands are still biologically “young”, with low quantities of dead snags and down trees. Now, understories are developing a lot of sugar maple, hickory, beech, black gum, and other shade-tolerant species, especially on moister sites. These will eventually dominate the

overstories as the oaks die, unless the stand is disturbed sufficiently to allow oak and yellow poplar to regenerate and grow to maturity.

Valuable hardwood timber is tall, straight, and free of defects (limbs, decay, and cracks) and is of commercially desirable species, especially oak, poplar, and walnut. These species grow only in direct sunlight and do not tolerate shade when they are out of the seedling stage. They grow at a faster rate than shade-tolerant species like maple and hickory. Maple is a valuable wood, but maple trees grow slowly and are usually limby, which ruins quality. Quality is important in hardwood timber production.

Timber volume and quality increased for several decades in the Middle Tennessee region following the Great Depression due largely to early use of fire then later the exclusion of fire. Fire strongly favors oak regeneration, but it later damages the maturing trees and opens them up to decay. Fire control and exclusion have slowly lowered the incidence of hollow logs over the last 60 years.

Now, with fire no longer a factor, oak regeneration has plummeted, and forests are dominated by more shade-tolerant species, especially in the understory. These trees will dominate the stand in Sumner County in the future.

So called “selective” logging has degraded timber quality over the last few decades. “Selective” logging in Mid-South hardwood forests has repeatedly removed the highest-grade, most profitable trees and left the “junk.” This system is the most profitable for the logger and the landowner in the short term, but it leaves little resources for the future. Also when forests are harvested this way, insufficient light reaches the ground to regenerate oak, poplar, and other desirable timber species. Some forests in Middle Tennessee are now composed of poorly-formed specimens of less-desired timber species, and some stands have no oak left at all.

Hardwood timber is usually harvested when trees reach at least 14 inches (often 16 inches) in diameter (This minimum used to be higher). An oak reaches this size on a typical site in about 60 to 80 years. The current rate of harvest statewide in Tennessee is about half of total growth. This means that the trees are bigger, but this wood volume accumulates on poorer grade timber because the best logs have been removed. The less desirable logs are left.

Timber volume for Sumner County is not accurately known, but as a general guideline, most 60-80 year old stands have volumes typically averaging 3,500 BF per acre. A good stand of oak and/or poplar can have 6,000-10,000 BF per acre, which is rare. Higher volumes are sometimes found in poplar stands, but this is rare, too.

Forest health in terms of timber growing is good with some exceptions. Native endemic insects are always a factor, but they seldom reach a point of concern. However, there are several major threats from invasive exotic pests:

- The emerald ash borer will soon exterminate ash in Tennessee. It is found in Kentucky and is moving rapidly south. There is no defense against it.
- The gypsy moth completely infested the northeast as far as southwest Virginia. The Federal/State “slow the spread” campaign slowed the advance considerably and currently quashes all new infestations brought into the state on vehicles, but eventually the pest will infest all of the state’s forests. Estimated time of arrival is in excess of 30 years in the future if

present efforts continue. Gypsy moth defoliates trees, especially oaks, and especially white oak. Repeated defoliation can kill trees, especially mature trees under stress already on dry ridges.

- Other pests include beech bark complex, butternut canker, hemlock wooly adelgid. New pests will be introduced such as the Asian long horn beetle, which has the potential to devastate local forests. It is currently found around New York and a few other cities in the Northeast.
- Tree of heaven (*Ailanthus altissima*) has been in Tennessee since the late 1800s and is slowly spreading from cities and home sites into the forest. It spreads vigorously by windblown seed and root sprouting. It can dominate disturbed areas indefinitely by outgrowing poplar. Sites are very difficult to reclaim.
- Bush (Amur) honeysuckle is a serious understory competitor on more moist sites. It is allelopathic (kills the seedling under it), casts dense shade, and takes over the best timber growing and wildflower sites.
- Cogon grass has almost reached Tennessee. It will be the most devastating pest yet.
- Studies have shown that acid rain does not affect forest growth significantly in the Middle Tennessee region.
- As hardwoods reach the end of their genetically programmed lives, their resistance to storms, insects, and disease decrease. This is a natural part of forest ecology and does not indicate some other health problem.

Fragmentation of forest ownership (smaller wooded lots) also affects timber resources. Timber volume is often insufficient on small tracts to make harvesting profitable to the logger.

Steep slopes and shallow soils make many slopes inoperable. This is apparent in Sumner County. Timber harvest using wheeled or tracked skidders is not advised on slopes exceeding 40 percent. Cable logging systems as used in the Northwest are too expensive to utilize in Middle Tennessee. Sulphura soils are prominent in this area and are characterized by steepness, shallowness, and a tendency to ravel if disturbed. An area of unincorporated Sumner County along Dobbins Pike bears the same name as the soil. They have low productivity and should be left alone.

Forest health should not be evaluated strictly on timber growing. Health must also consider forest wildlife. Forest game species, specifically deer and turkey, have staged a spectacular comeback and are now quite plentiful, but declining hard mast production in the future is a concern. Forests in Middle Tennessee are often sub-optimal for non-game wildlife. Canopies are generally too closed for most songbirds; understory layering is often lacking; and the quality of large snags and large organic debris on the forest floor are almost always sub-optimal. Leaving the forest “as is” will correct this as the forest becomes more ecologically mature. Intensive timber management can be antithetic to non-game species (such as box turtles, salamanders, white footed mouse, shrews, snakes, squirrels, insects, etc.). Innovative timber management integrated with wildlife needs can improve the situation, including crop trees release, small group selection harvesting, deadening of snag trees, and leaving tops after logging.

Biomass harvesting of trees offers both opportunities and concerns. If done appropriately, it can benefit the future timber supply, but there is concern that removal of woody materials will harm habitats for non-game wildlife.

Forest fragmentation is a serious threat to non-game forest wildlife. Roads, clearing, and construction destroy habitats and hinder movement. Forest interior songbirds require hundreds or thousands of acres of contiguous habitat, and some species do not do well near human activity.

Forest within 100 feet of streams is very important for all wildlife, especially songbirds and amphibians.

There are some areas of mixed mesophytic forest, such as Taylor Hollow State Natural Area that supports unusual wildflowers such as Jacobs ladder, Dutchmans breeches, waterleaf, etc. These areas should get priority for any forest protection efforts. Typical sites include deep draws and moist but well drained slopes, especially on north slopes.

6.5.3 Land Ownership

Most land in Sumner County is under private ownership. Sumner County and the State of Tennessee own small amounts of land for historic preservation and recreational use. These lands do not include public use lands for activities such as education, government administration, etc. The Federal government through the U.S. Army Corps of Engineers owns land adjacent to Old Hickory Lake and maintains access points to the lake for public recreation. Some non-profit organizations such as the Land Trust of Tennessee and The Nature Conservancy also own land or have worked with private property owners to establish conservation easements or preserve lands of historic significance. These property owners are most likely to be involved in conservation efforts. Table 6-1 summarizes the properties owned by Sumner County, the State of Tennessee, and non-profit organizations primarily related to conservation efforts. Figure 6-7 depicts the location of the properties.

Table 6-1: Basic Forest Land Statistics

Ownership	Acres	Acres by Age Class/Condition					Notes/ Links/ Sources
		Old Growth	100+	50 - 100	20 – 50	0- 20	
All Land – Sumner County	347,520 acres = 338,560 acres (land) + 8,960 acres (water)	n/a	n/a	n/a	n/a	n/a	
All Forest Land	Unknown						
Private							
The Nature Conservancy	173 total acres in Taylor Hollow						TDEC Website
Bledsoe Lick Historical Association	81.31 total acres in Castalian Springs			14.7 acres			Sumner County Property Assessor
Land Trust Conservation Easements	598.42 total acres throughout Sumner County			138.84 acres			Sumner County Property Assessor
Small Forest Land Owners	**Unknown**						
Public							
Local – Sumner County	11.31 total acres in Castalian Springs			6 acres			Sumner County Property Assessor
State	164 acres - Bledsoe Creek State Park 133.05 acres – Castalian Springs Mound Site 54.74 acres – Wynnewood State Historic Site acres – Hawthorne Hill			30.7 acres (does not include State Park)			TDEC Website Sumner County Property Assessor
Federal (FS, BLM)	Corps of Engineers owns lands adjacent to Old Hickory Lake			?			

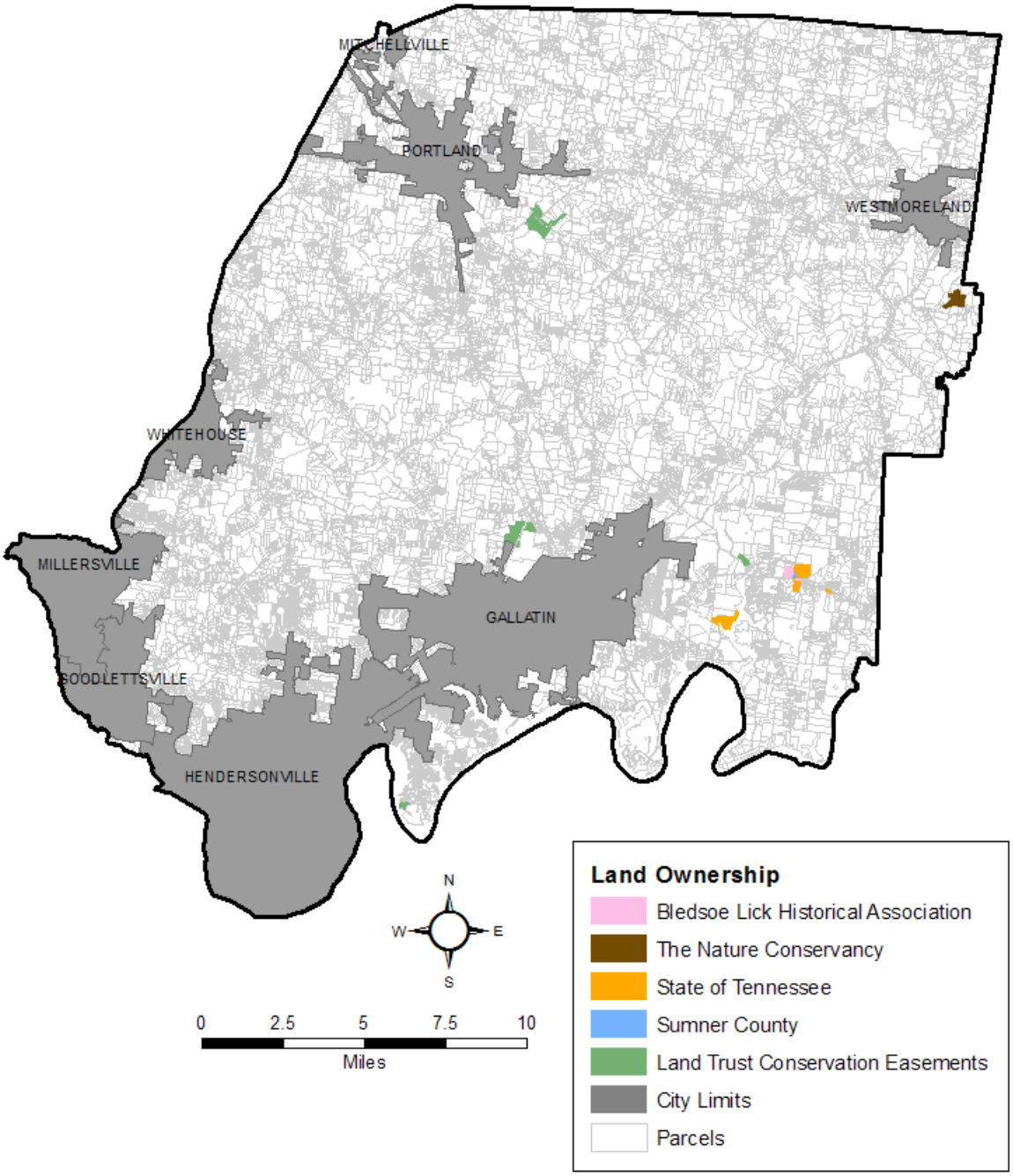


Figure 6-7: Key Resource Lands by Ownership in Sumner County
Data Sources: Sumner County Property Assessor, Land Trust of Tennessee, Bledsoe Lick Historical Association, and The Nature Conservancy

Identifying these same parcels in relation to the forest cover helps assess areas that will be conserved in the future. Figure 6-8 indicates forest canopy with lighter shades. One can easily see the Ridge that runs from southwest to northeast through Sumner County. Presently, the Ridge has acted as a natural development constraint to the suburban areas to the south and west; however, winding streets meander through this topography. Very little of this resource rich area is being conserved in Sumner County. The Ridge is also noted on the following topographic map indicating environmental constraints

by percent slope (Figure 6-9). The steepness of the terrain helps identify this physical feature in the county.

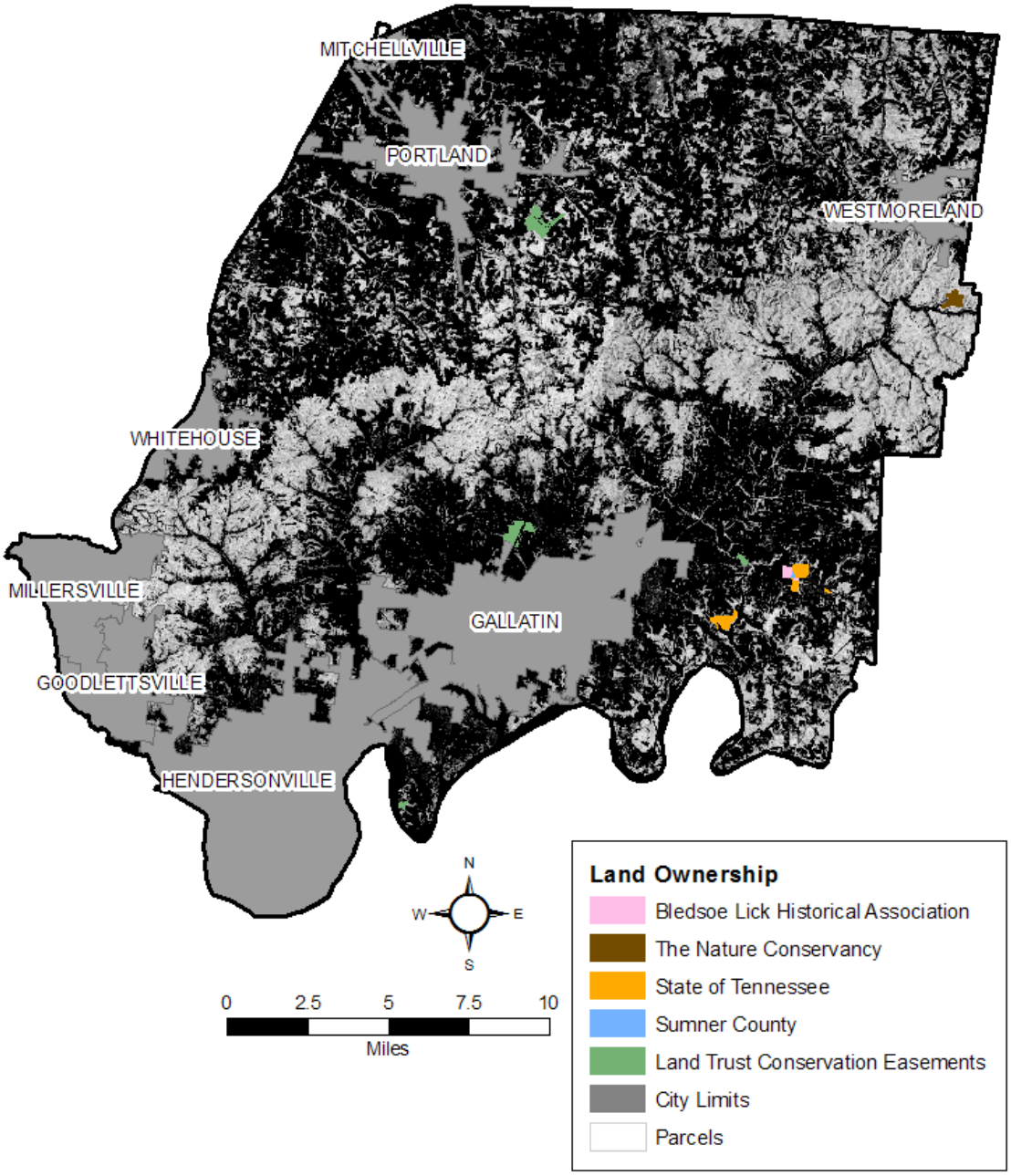


Figure 6-8: Forest Cover in Sumner County
Data Sources: Cumberland Region Tomorrow, Sumner County Property Assessor, Land Trust of Tennessee, Bledsoe Lick Historical Association, and The Nature Conservancy

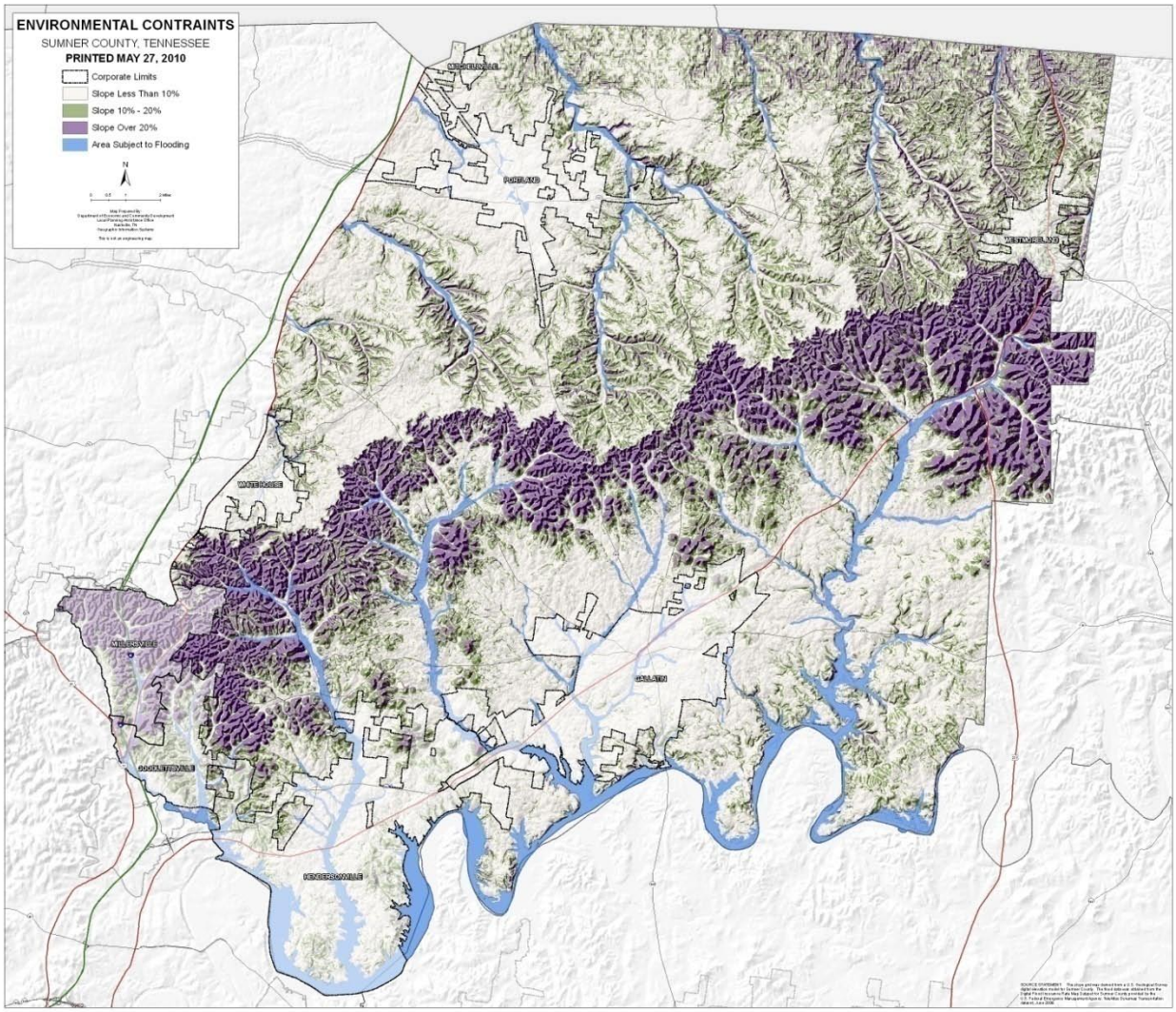


Figure 6-9: Steep Slopes in Sumner County
Source: Tennessee ECD Local Planning Assistance Office (2010)

Steep slopes extend from the City of Millersville northeastward toward the southern extent of the City of Westmoreland. The steepest slopes are noted in the area around Bransford where US 231 and US 31E/SR 6 meet. These slopes continue north where Old Gallatin Road and US 31E/US 231/SR 6 travel to the City of Westmoreland. Rolling hills are prevalent in the northeastern portion of Sumner County. These slopes closely align with some of the most forested areas of the county. A more detailed discussion about the hazards of excessive slopes is contained in the Topography Section (6.4) of this element.

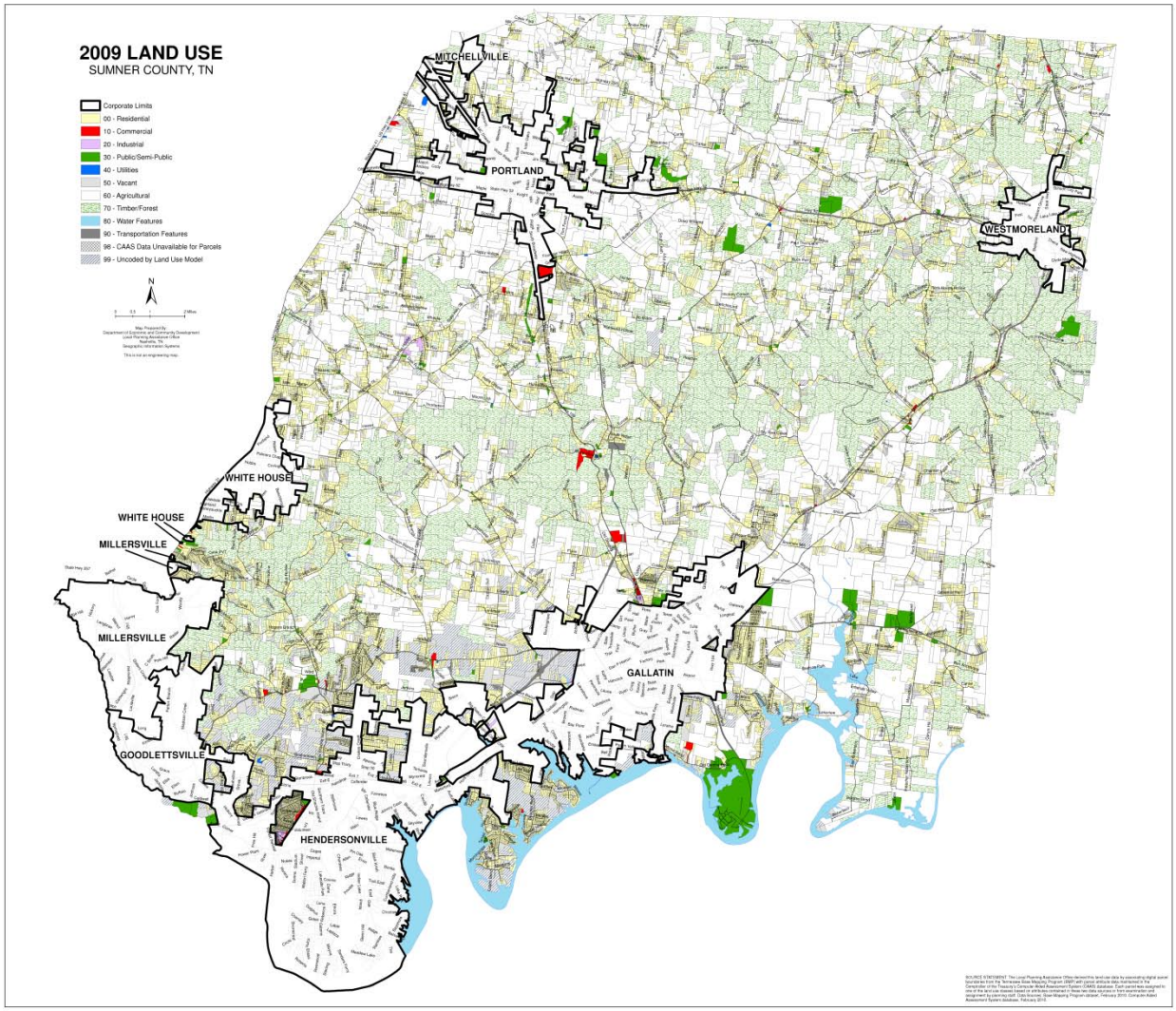


Figure 6-10: Sumner County Existing Land Use, 2009
Source: Tennessee ECD Local Planning Assistance Office (2010)

Examining the existing land use of Sumner County also captures the location of forest cover extending from Millersville to the northeast. The dotted green parcels in Figure 6-10 show mostly forested parcels. This information is generated from the Computer Assisted Appraisal System (CAAS) utilized by county property assessors in Tennessee. This information also depicts some of the forest cover in the northeastern portion of Sumner County.

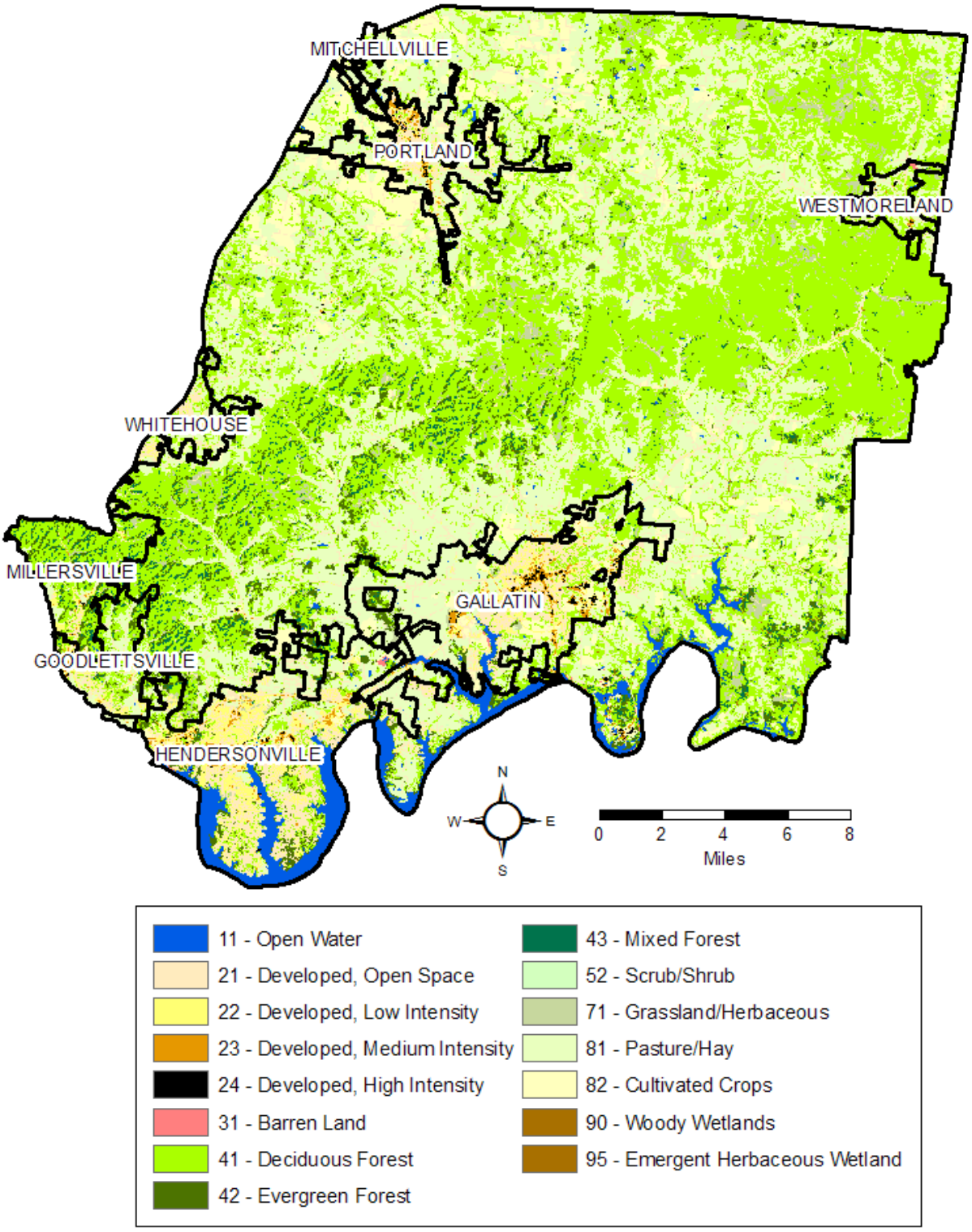


Figure 6-11: National Land Cover Data for Sumner County, 2001
Data Source: U.S. Environmental Protection Agency (EPA) Multi-Resolution Land Characteristics Consortium (2001)

Figure 6-11 illustrates data from the National Land Cover database in 2001. The green shades show forested areas, and blue represents open water easily highlighting Old Hickory Lake and the Cumberland River in Sumner County. According to this data, most development was restricted to the incorporated cities in 2001. Again, a significant portion of unincorporated Sumner County is still forested indicated by the green shades and closely aligns with the Ridge. Table 6-2 explains these land cover categories in more detail.

Table 6-2: 2001 National Land Cover Data Class Definitions

Code & Title	Description
11. Open Water	All areas of open water, generally with less than 25% cover of vegetation or soil.
21. Developed, Open Space	Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22. Developed, Low Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.
23. Developed, Medium Intensity	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.
24. Developed, High Intensity	Developed, High Intensity - Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.
31. Barren Land (Rock/Sand/Clay)	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
41. Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
42. Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
43. Mixed Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
52. Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
71. Grassland/Herbaceous	Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
81. Pasture/Hay	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
82. Cultivated Crops	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
90. Woody Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95. Emergent Herbaceous Wetlands	Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

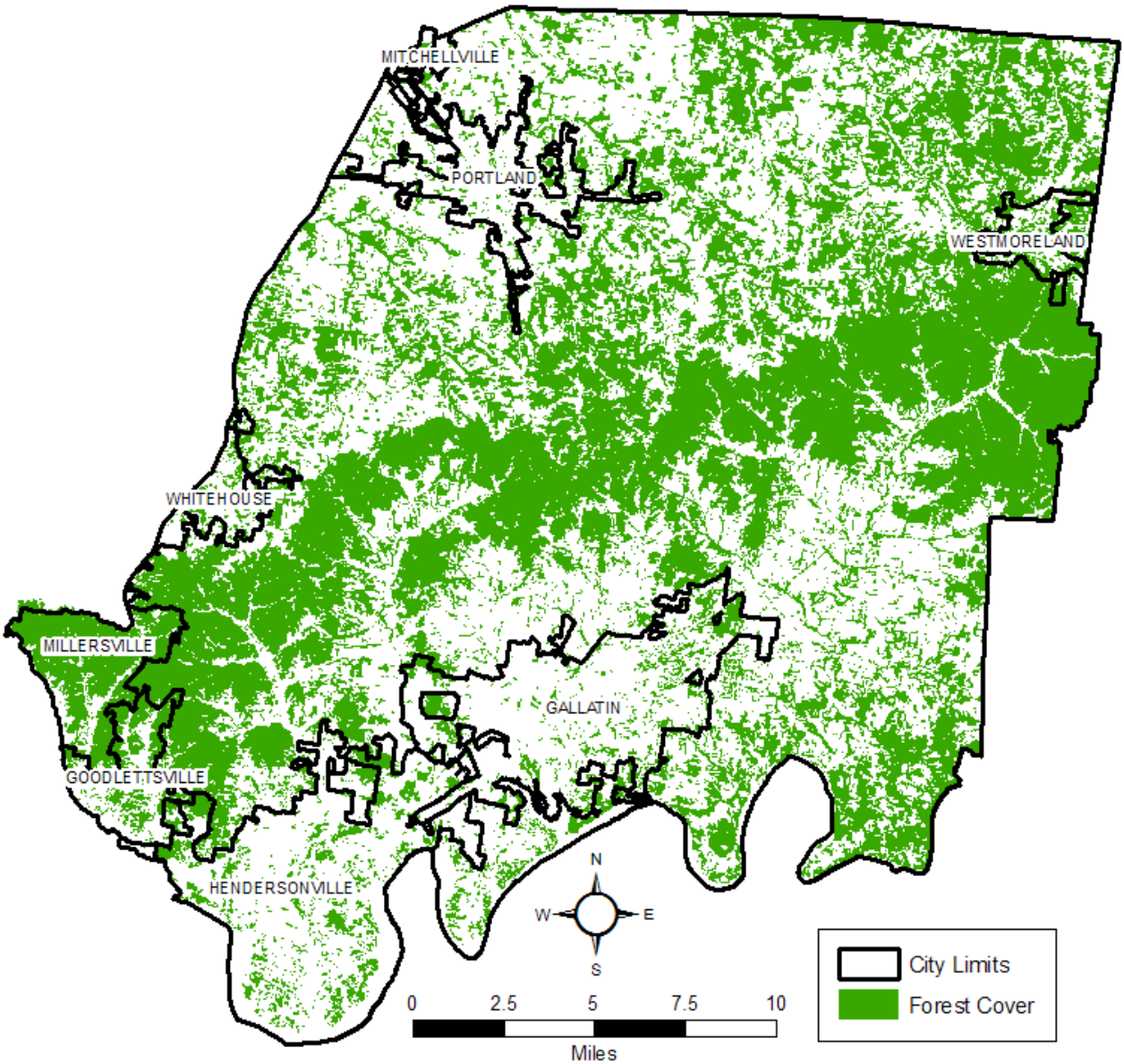


Figure 6-12: All Forest Types in Sumner County Based Upon 2001 National Land Cover Data
Data Source: TDA Division of Forestry Resources Management Unit

To further highlight the forested types in the National Land Cover Data in Sumner County, Figure 6-12 depicts only those areas considered as forest cover in 2001. Again, the largest area of continuous forest cover extends from the City of Millersville northeast to just south of the City of Westmoreland. Also patches of forest cover are found in northern Sumner County and in southeastern Sumner County along the Cumberland River. These areas are mostly flat to rolling hills and not as steep terrain as within the Ridge. Refer to Figure 6-9 depicting the slopes in Sumner County and the overlap of forested areas.

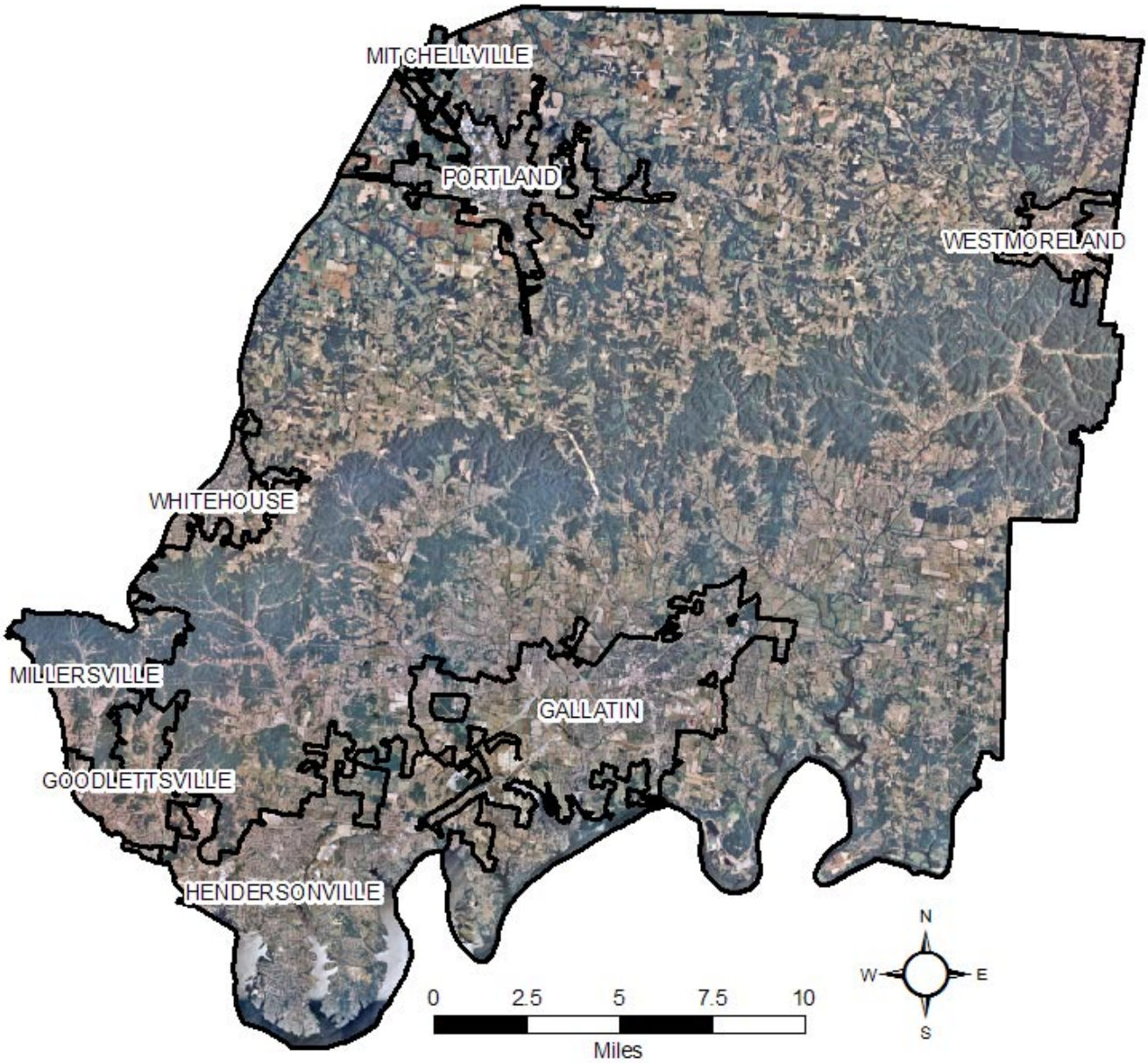


Figure 6-13: National Agricultural Imagery Program Data for Sumner County
Data Source: United States Department of Agriculture's Farm Service Agency (2007)

The National Agricultural Imagery Program (NAIP) administered by the U.S. Department of Agriculture's Farm Service Agency (FSA) captures aerial imagery during the agricultural growing seasons in the United States (Figure 6-13). The NAIP imagery captures the landscape while "leaf on" in Tennessee's summer months yielding a highly detailed photo of agricultural areas. This contrasts with typical aerial imagery conducted while "leaf off" that captures changes in the built environment such as new residential locations, streets, and other infrastructure. Forested areas in Sumner County are easily identified with the NAIP imagery indicating the Ridge extending from southwest to northeast through the county.

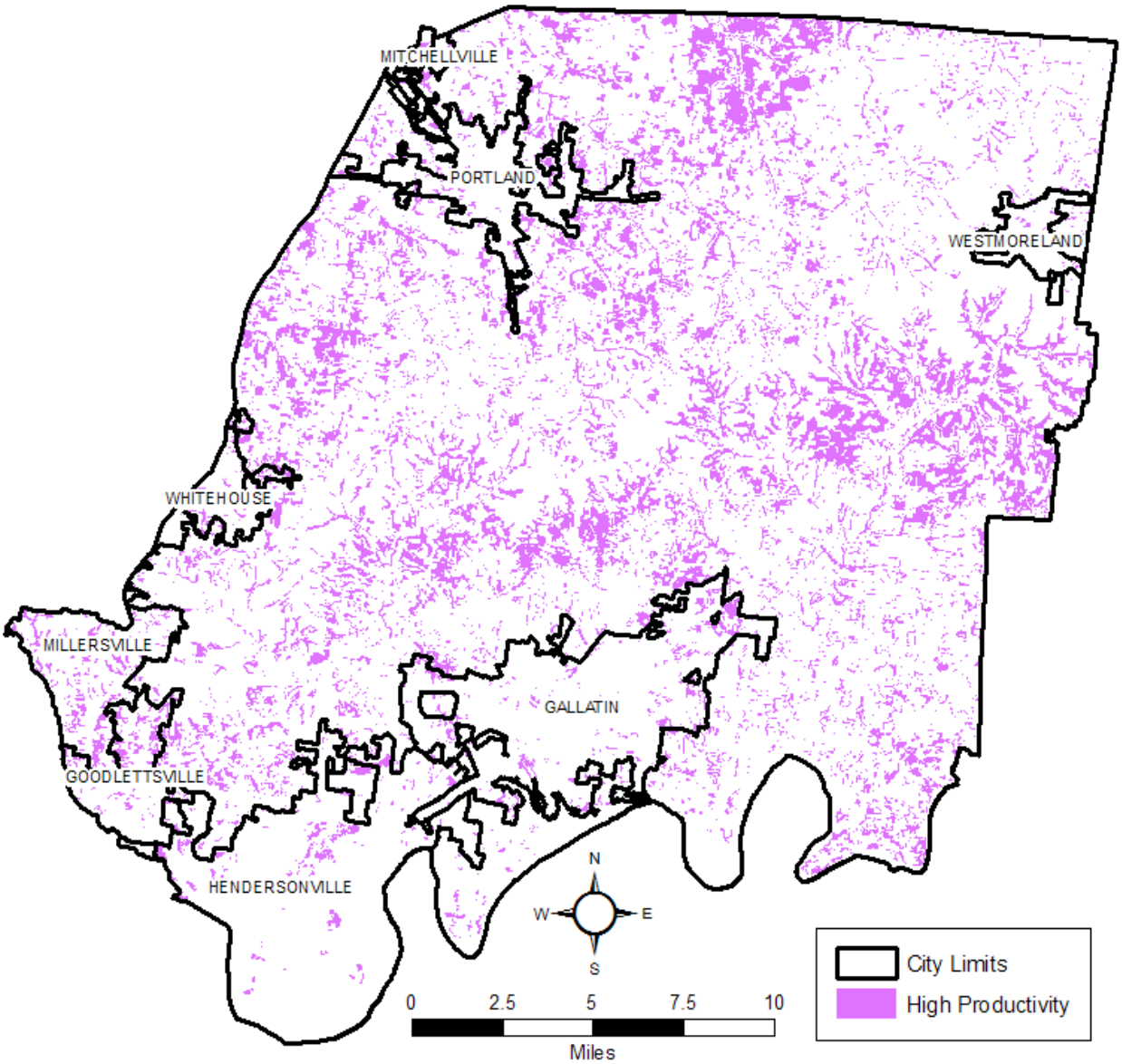


Figure 6-14: Forest Cover with Site Index >75 in Sumner County
Data Source: TDA Division of Forestry Resources Management Unit

Figure 6-14 narrows down the areas identified in the National Land Cover Data, National Agricultural Imagery Program, forest cover aerials, and existing land use by highlighting those areas of forest cover that are considered high productivity forests by the Division of Forestry's Resources Management Unit. These are areas with a site index of 75 or greater and are considered sites growing a well stocked, even aged forest. The largest concentrations of high productivity forests are near the Bransford community and in north-central Sumner County near Nubia. There are scattered patches throughout the Ridge. Most of these forests are not within the city limits except for a scattering throughout Millersville and northern Goodlettsville. Other scattered patches are on the extremes of many city limits in the county. One might expect some of these areas to disappear over time with continued growth spreading out from the municipalities.

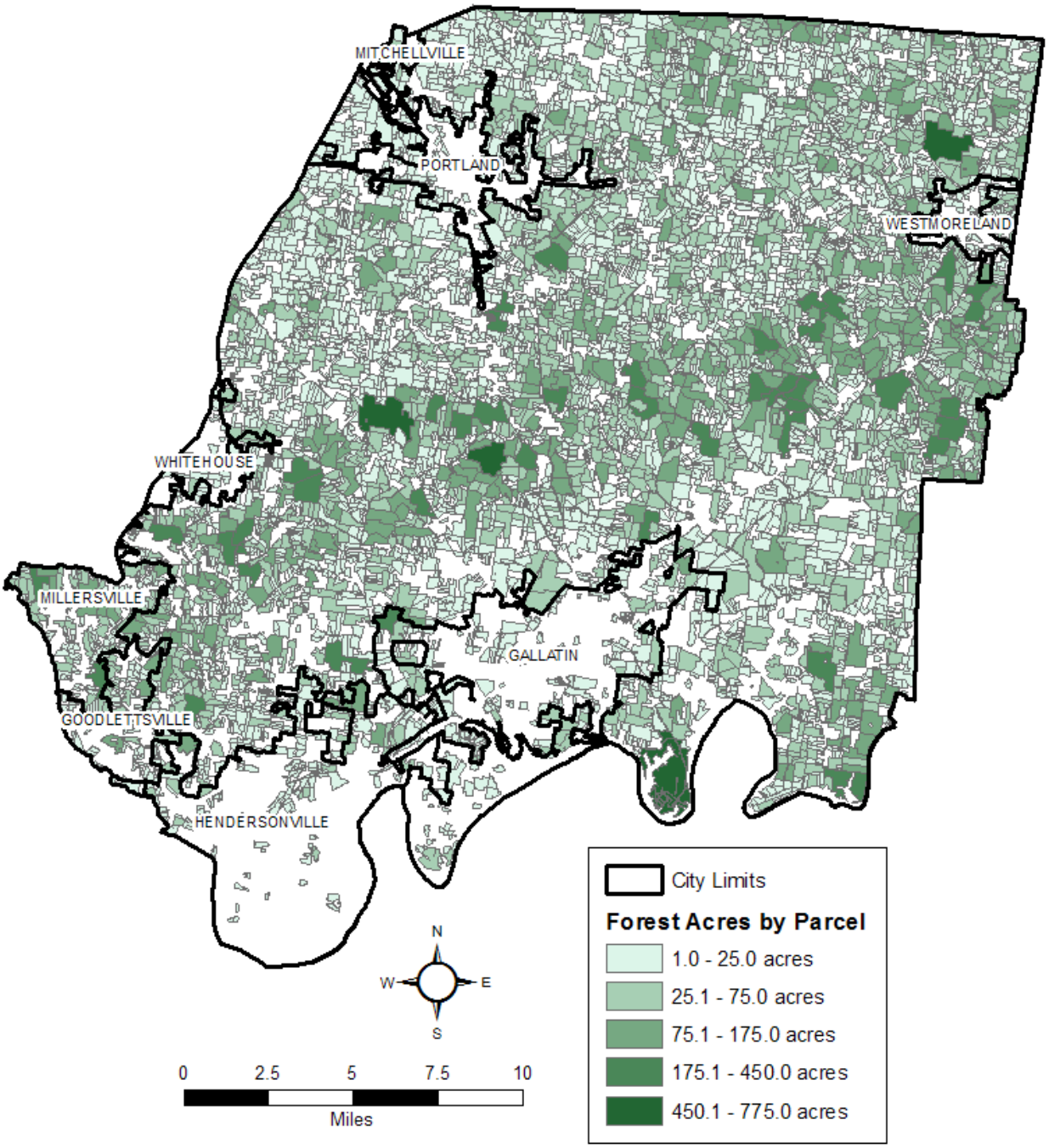


Figure 6-15: Forested Acres by Parcel in Sumner County
Data Source: TDA Division of Forestry Resources Management Unit

Figure 6-15 highlights parcels over 10 acres and the amount of forested acres contained on these parcels. Several large-sized parcels contain a significant number of forested acres. These are just north of Cottontown and near Turners Station. Interestingly, some of these parcels where identified for their size and amount of natural resources by citizens at public meetings. Again, the significant concentration of parcels with large quantities of forested acres is located through the Ridge. Most of the large parcels are not located within the municipalities and very few of these parcels contain significant amounts of

forested acres except near the Ridge where slopes may factor into development decisions. A map as shown in Figure 6-15 will be helpful to work with property owners on conservation strategies in the future in Sumner County. These property owners may be interested in conservation easements or working with a land trust on possible future options.

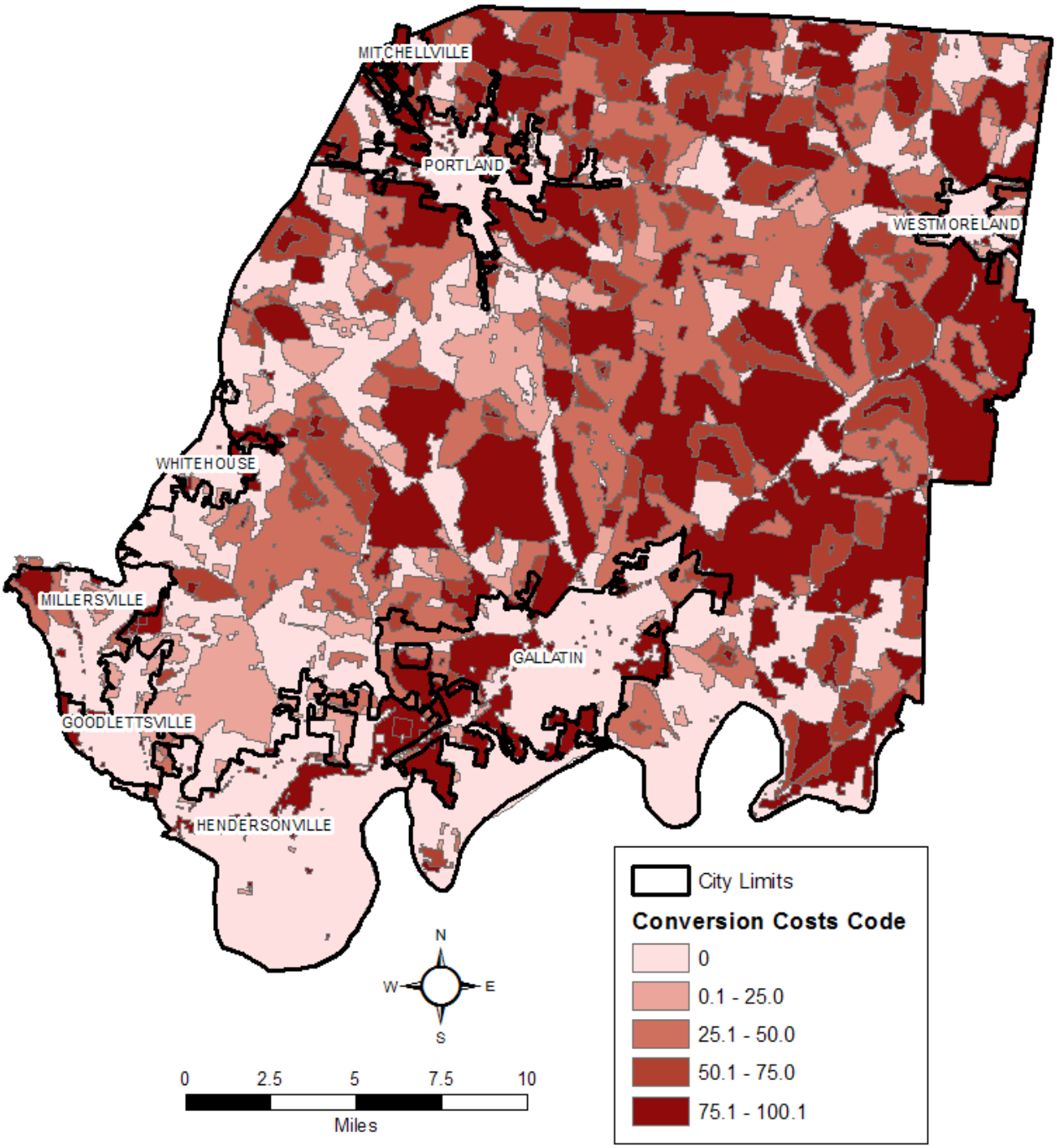


Figure 6-16: Conversion Costs Potential for Sumner County
Data Source: Tennessee DOA Division of Forestry Resources Management Unit based upon "Forests on the edge: A GIS-based Approach to Projecting Housing Development on Private Forests" by Susan Stein, et al. (2006)

One might also consider the cost of converting forested land over to residential uses or other land uses. Figure 6-16 is based upon a paper by Susan Stein, et al., "Forests on the Edge: A GIS-based Approach to Projecting Housing Development on Private Forests" from the USDA Forest Service Proceedings RMRS-P-42CD, 2006. The predicted change in housing density for each 30 meter pixel in non-urban areas between the years 2000 and 2030 was divided into 15 classes ranging from almost no housing unit per 1,000 acres to high urban levels at over 10,000 per 1,000 acres. The move from one class to another over the 30 year period was then assigned a weight ranging from 10 to 100 with 100 carrying the highest cost to the environment of changing from a less developed to a more developed use. According to the Division of Forestry, the method was somewhat arbitrary, and the values probably cannot be used to compute averages for large areas such as watersheds or counties; however, it gives an indication of what one environmentalist thinks the cost of development would be to the forest cover and ecosystem in Sumner County on a large parcel-scale. The highest weight of conversion costs is located in some areas of the Ridge between Bethpage and Bransford and in north-central Sumner County. These were areas highlighted as high productivity forests in Figure 6-14. Of particular concern are areas on the outer extents of city limits, especially between Hendersonville and Gallatin and around Portland. One would assume that these areas are most likely to be converted over to residential land uses in the future thereby exhibiting the potential for higher conversion costs.

6.5.4 Forest Hydrology

Forests play a key role in water quality including suspended sediment, nutrients, oxygen, content, and siltation. Forest soils are very stable and highly permeable due to tree root mats, biological activity, high organic matter content, and lack of compacting agents. Forest soils also regulate and attenuate the flow of stormwater and provide higher summer base flows in the Middle Tennessee region. They make a watershed less flashy and less prone to flooding. Water absorbed by forest soils enters cracks in the bedrock, slowly moves down slope, and emerges near streams and from springs. Trees and brush shade keep forest streams cool and oxygenated. Large organic debris (logs) is very important for stream structure, slowing flow, sediment storage, plunge pools, gravel sorting, and habitats.

Logging does not affect water quality substantially as long as state best management practices (BMPs) are followed and stream buffers implemented. Logging roads and skid trails are the main source of sediment. Careful preplanning of skid routes is important. Steep skid trails where the root mat is broken can erode causing sedimentation and permanent loss of site productivity.

Forest hydrology impacts road and house location. Houses at the base of steep slopes can be subject to rotational slumps of deep colluviums in heavy rainfall events. Roads above steep slopes can contribute to landslides on steep terrain, especially at the head of draws, by collecting water and channeling it into an already unstable slope. This is especially important in subdivisions. The issue of hazards involving excessive slopes was discussed further in the Topography Section (6.4) of this element.

Impaired and high quality streams are discussed in more detail as part of the Water Assessment. Figure 6-17 is a map of forested areas and the location of impaired and high quality streams in relation to the forest cover and high productivity forests. Within the City of Millersville are issues involving impaired streams and high productivity forests. Also, north of Westmoreland is an impaired stream and forest cover. These impaired streams can impact the amount of forest cover and health of forests in these areas.

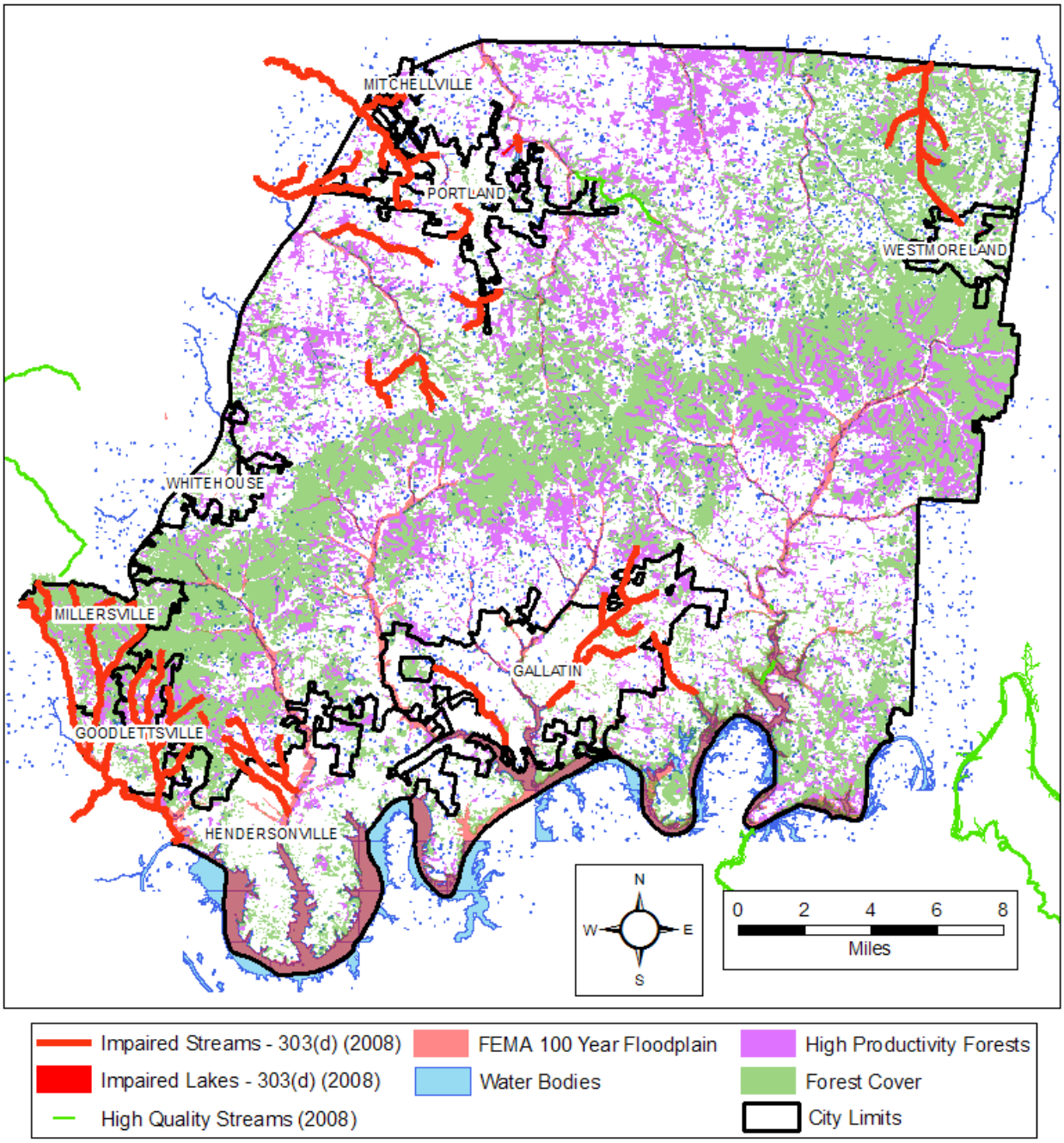


Figure 6-17: High Quality, Impaired Streams, & Forested Areas in Sumner County
Data Source: Tennessee Department of Environment & Conservation (TDEC) Interactive Mapping, Tennessee DOA Division of Forestry Resources Management Unit, and Federal Emergency Management Agency (FEMA)

6.5.5 Other Elements of Forest Health

Fire is often not considered sufficiently in planning development on forested land, especially on steep slopes. Fire incidence in Sumner County is low, but as seen in Southern California, arson often comes with increased populations. Houses surrounded by trees are never safe. This is especially true of houses on top of steep hills. Fire starting at the base of a hill can engulf a house in 20 minutes as seen repeatedly in East Tennessee. The Division of Forestry's FireWise program is designed to show homeowners how to make their woodland homes safe from forest fires. A cleared yard and simple construction devices can make a difference.

Large contiguous concentrations of forest, as found in the eastern part of Sumner County and in the hills ascending out of the Nashville Basin, are prime habitat for forest interior songbirds, are important to watersheds and water quality, and pose the greatest risk from wildfire to houses. These areas warrant special consideration.

Mature red oaks are dying at an increasing rate. They do not live as long as white oak and they are more sensitive to drought. They were heavily impacted by the freeze and drought of 2007. This mortality will decrease the red oak component of forests in Middle Tennessee. It is not the product of an insect or disease epidemic, and does not pose a risk of a pine beetle style epidemic.

6.5.6 Status, Trends, & Risks of Forest Land Conversions to Monoculture or Other Uses

There is little likelihood of monoculture forestry developing in Sumner County. There is currently little or no market for pine, the most common monoculture forest crop. The climate and sites are also not highly suited. Pine production is retreating to the Deep South and Brazil. Monoculture cropping of fescue hay is of greater wildlife concern.

6.5.7 Timber Harvests Over Time

Timber harvest consumes at most only half of the wood that grows in the forest each year. Few reliable statistics exist for Sumner County, but observation indicates a relatively low rate of timber harvest. There is one primary wood-using mill in Sumner County in Portland, B&S Specialty Hardwoods.

Future demand for timber is not likely to match that of the peak demand prior to 2008. Demand will continue to be high for veneer logs, which are the highest quality log product. These are rare but could be cultured on good sites in the future. Demand for low-grade material is likely to be steady to strong, especially if rail becomes more popular. There is a ready market nearby (Guthrie, Kentucky, and Lafayette) for low-grade material. Lumber and flooring demand (#1 and 2 sawlogs) are likely to be tepid in coming years.

Landowners near developing metropolitan areas tend to be wealthier than past owners, less interested in timber harvest, and more interested in aesthetics and wildlife. This changing in demographics will tend to diminish the timber supply. On the other hand, owners will have occasions when they need income. If they have been holding their timber for some time, some of the higher quality trees could have grown into a higher grade worth more money. Growing a few high quality trees appeals to many wealthier landowners because they are less inclined to practice conventional logging or forest management.

Another future factor to consider is finding forest management techniques that deal effectively with invasive plants like tree of heaven. These techniques might include retaining shade, such as small group harvest or true single tree selection management of maple of suitable (cool, moist, rich) sites, and intensive herbicide use. Goats can be introduced to control bush honeysuckle prior to harvest and reforestation. There will likely be further innovations.

Integrating forest bird management by using crop tree release will increase timber production by a third where it is practiced.

Public education and assistance are very important in maintaining a good timber resource. A tool now emerging to motivate landowners to practice better management is Certified Wood, which is paying a premium price and catching on quickly. To qualify, landowners must have and implement a multiple use forest management plan.

In urban areas, waste wood from tree removal can be ground and sold as biofuel instead of taking up landfill space.

Again, biomass harvesting is likely in the future. It is an economic and forest management opportunity for low grade stands that need renewing, but it should be used with care, moderation, and balanced with other goals. Even removal of forest thinnings will degrade non-game habitat. Frequent biomass harvest could conceivably not allow the growth of older higher quality timber on some parcels of land. Another forest market will be carbon sequestration. Landowners are paid to grow trees, but the highest rates go to young pine stands. Older hardwood forest will be "rented" at a much lower rate, if at all.

6.5.8 Forest Local Governance

Table 6-3 summarizes local and state policies that might impact development activities in forested areas of Sumner County.

Table 6-3: Forest Governance in Unincorporated Sumner County

Governance level	What does it do?	Who is responsible?	Monitoring?	Reference citations and sources
Forest Practices				
Road rules	BMPs encouraged by Division of Forestry – forest roads and skid trails required	TDA Division of Forestry Property Owner TDOT Sumner County Hwy Dept.	TDA Division of Forestry monitors implementation	TDA's Best Management Practices in Tennessee
Riparian rules	Land disturbance permitting Buffering along streams SWPPP required	Sumner County C&D TDEC Developer/Property owner	Regular stormwater inspections by Sumner County C&D	Sumner County Stormwater & Illicit Discharge Resolutions
Logging rules	BMPs encouraged by Division of Forestry Agriculture and silviculture (forestry) activities are exempt from general permitting	TDA Division of Forestry Property Owner	TDA Division of Forestry monitors implementation	TDA's Best Management Practices in Tennessee
Watershed rules	ARAP required on all stream bank disturbance Notice of violation on habitat disturbances	Property Owner TDEC	TDEC monitors stream gauges for pollutants & TMDL, consumption TDA Division of Forestry monitors implementation	TDA's Best Management Practices in Tennessee
Conversions				
Subdivision regulation	Subdivision of land with adequate services Construction & drainage plans required	Sumner County C&D	No financial resources to monitor on site implementation except for stormwater inspections	Sumner County Subdivision Regulations
Conservation easements or other non-regulatory	Ensures that land is conserved in the future	Property Owner Land Trust of Tennessee	Land Trust of Tennessee maintains property owner database	Land Trust of Tennessee

6.5.9 Forest Vulnerabilities & Trends

The primary threats to forest resources in unincorporated Sumner County are:

1. conversion of forested lands to residential and other uses that is difficult to quantify over time,
2. construction activities that impact streams and wetlands while hampering forest health and riparian buffers,
3. lack of monitoring involving forest activities and uses,
4. although perceived as limited, logging for agricultural purposes, and
5. most forest land is on private property with little public access for recreational purposes.

Figure 6-18 shows the overlap between forest resources, forest hydrology including impaired streams and high quality streams, and the threat of development. Development or the conversion of forested lands to residential and other uses is probably the greatest threat to forest resources in Sumner County. Tennessee's Public Chapter 1101 required all counties to adopt urban growth boundaries and planned growth areas. Those areas are noted on the map and are most likely to experience growth in the future. The urban growth boundary areas are the only portions of unincorporated Sumner County that municipalities can annex unless the annexation is done by referendum. The forest resources most threatened by development based on population and development trends would be the Tyree Springs area south of White House and north of Hendersonville. This area is not within the urban growth boundaries of any city but is within the planned growth area of Sumner County and would be under the county's planning jurisdiction for the immediate future unless revisions are made to these boundaries and agreed upon by Sumner County and its municipalities. Growth along the Long Hollow Pike (SR 174) corridor and near the Shackle Island community exploded in the 1990s because of the extension of sewer service by the White House Utility District. This area's growth is anticipated to continue as more subdivisions complete phases and commercial activities locate near the community's center. One would anticipate growth pressure just north of here within the Tyree Springs area, too, despite terrain posing more of a development constraint. This general area is noted in Figure 6-18 with a red, dashed circle.

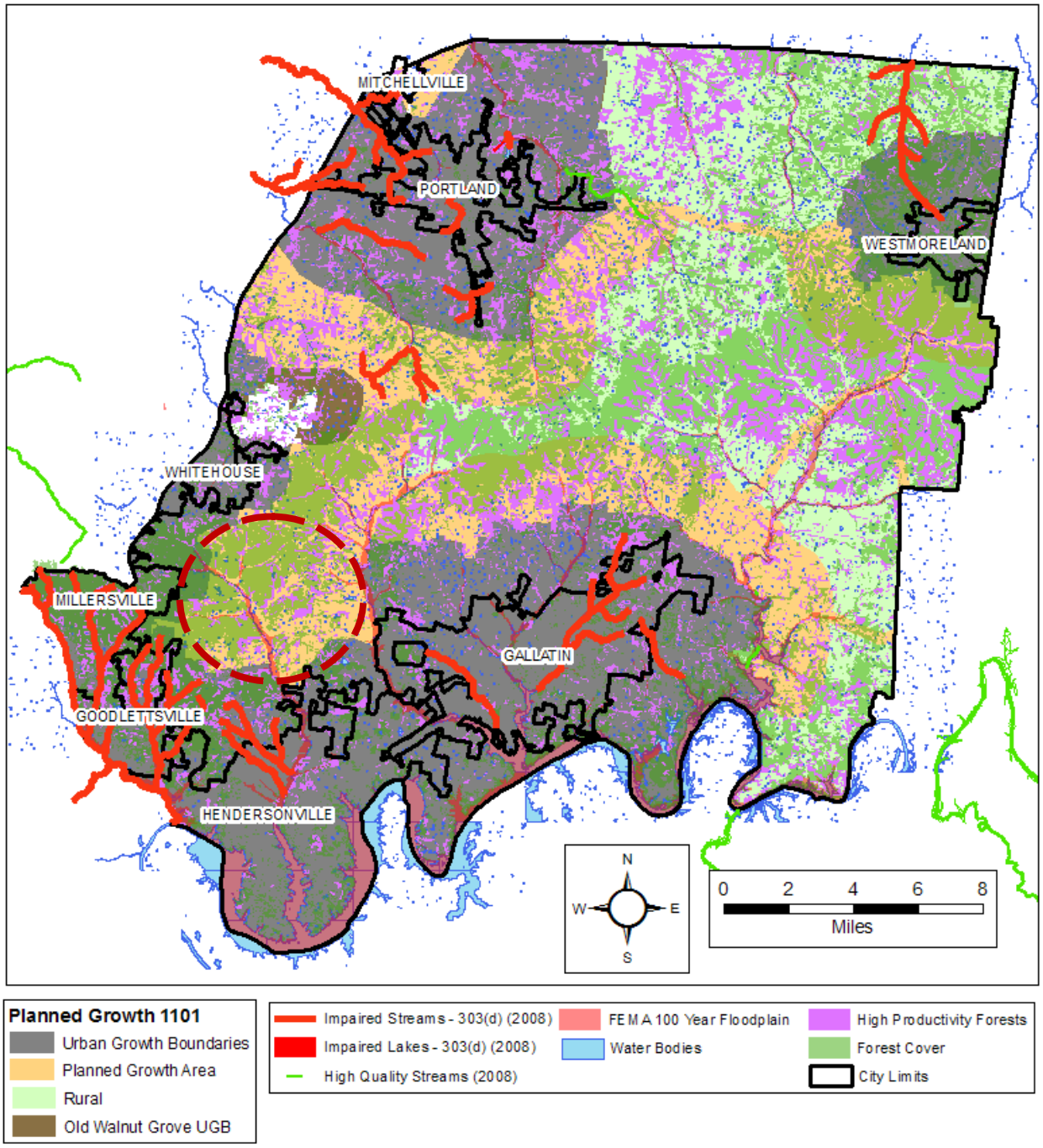


Figure 6-18: Growth Threats to High Quality, Impaired Streams, & Forested Areas in Sumner County
Data Source: TDEC, Tennessee DOA Division of Forestry Resources Management Unit, and FEMA

6.5.10 Forest Opportunities

Table 6-4 summarizes possible opportunities to enhance and protect forest resources in Sumner County.

Table 6-4: Forest Opportunities

Category	Time Frame	Possible Benefit	Policy difficulties	Other local factors?
Local governance				
Comprehensive Plan	Not required by State Law; Recommend updating at least every 5 years.	Establishes a collective vision for the County and its residents Provides guidance about appropriate development types and areas	Land owner property rights Lack of knowledge about implications by decision makers Not always implemented	Cities maintain separate plans and coordinate with County on Urban Growth Boundary areas
Zoning Resolution	Takes a minimum of 3 months to amend Zoning Resolution for Sumner County; public hearing at Planning Commission & County Commission	Rezoning can be denied if does not match adopted Comprehensive Plan or other reasons by County Commission	Sumner County rarely changes zoning types without property owner request Land owner property rights may be impacted Can be a politically controlled process	Cities maintain separate Zoning Ordinances
Subdivision Regulations	Can be amended within one month after public hearing at Planning Commission Opportunity to pull in BMPs involving green infrastructure	Impacts properties 5 acres or less Ensure infrastructure development is coordinated	Does not impact property owners on more than 5 acres of land Some land owners purposely subdivide at 5 acres to avoid planning process	State law defines a subdivision and no property over 5 acres is ever seen by the Planning Commission or staff for adherence to the Subdivision Regulations
Forest practices regulation	Not required, but could incorporate tree canopy cover policy or goal	A goal will help establish a community benchmark	Increased cost to developer and difficulty of monitoring	n/a
State governance				
Forest land governance	State Forest Assessment will be completed in 2010 TDA's Best Management Practices Guide	Eventually knowledge on county level of forest issues and status Ability to monitor changes over time	Very little monitoring and regulation on private lands involving forest issues No permitting involving logging is maintained by the State	Much responsibility for forested lands falls within the realm of influence of private property owners
Tennessee Water Quality Control Act	Can be amended by General Assembly in any legislative session	Strengthen permitting and stop work order processes involving BMPs and discharges	Permitting will be strengthened in future but not likely regarding forestry activities because considered agriculture	Sumner County has limited financial resources to implement processes
Non-governmental measures				
Conservation Easements	Land Trust of Tennessee actively works in the Middle Tennessee region with property owners	Education of property owners Land conserved for future generations Maintain rural feel Positive economic impacts	Lack of funding Very little local gov't planning to identify open space opportunities	Working with private property owners is important
Historical Associations	Some groups working to preserve cultural and historical resources particularly Bledsoe Lick Historical Association	Education of property owners Positive economic impacts with tourism Preserve the past Input on land use decisions	Lack of funding Lack of involvement in land use decision making in the past	Working with private property owners is important

6.6 Water Assessment of Sumner County

A water assessment of Sumner County was conducted for the CSU curriculum. The purpose of the water assessment is to fully understand the history of water resources in Sumner County. This involves assessing growth and development impacts upon the watersheds, quality of water bodies in Sumner County, and quantity issues in ensuring clean water to residents. CSU faculty assisted Sumner County and the Natural Resources Protection Focus Group in pulling together this information and assessing water resources.

6.6.1 Watersheds

The Hydrologic Unit Code (HUC) 8 watersheds are most commonly referred to in Sumner County. There are four watersheds that carry water either through the Nashville area or north into southern Kentucky. The Ridge or northern portion of the Highland Rim which is mostly forested separates these waters.

- Barren River Watershed (05110002)
- Cheatham Lake Watershed (05130202)
- Old Hickory Lake Watershed (05130201)
- Red River Watershed (05130206)

These watersheds are depicted along with city limit boundaries and major thoroughfares in unincorporated Sumner County in Figure 6-19. Figures 6-20 depicts a further breakdown of watersheds by HUC-12 codes.

Barren River Watershed (05110002)

The Barren River Watershed is 1,661 square miles with 432 square miles in Tennessee. It is part of the Ohio River drainage basin and has 563.2 stream miles and 45 lake acres in Tennessee. There are 14 USGS-delineated subwatersheds (HUC-12) that compose the Barren River Watershed. Twelve rare plant and animal species have been documented in the watershed, including seven rare fish species and one rare snail species.[2]

The watershed in Sumner County is primarily rural and covers northern portions of unincorporated County. The western portion of the watershed has the highest number of development issues with the City of Portland straddling the boundary between the Barren River and Red River Watersheds. Agricultural activities are still prominent on the plateau north of the Ridge between Portland and Westmoreland. Residential developments are dotted along the landscape throughout the watershed. The limited extension of water and sewer services has limited development to around the cities and along major thoroughfares.

The Barren River Watershed has a Watershed Management Plan maintained by TDEC.

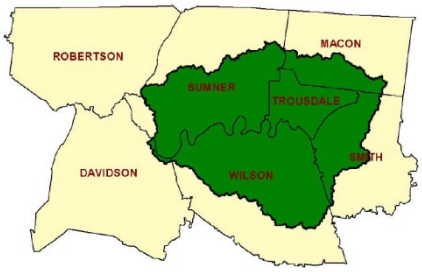
Cheatham Lake Watershed (05130202)

The Cheatham Lake Watershed is approximately 647 square miles and is part of the Cumberland River drainage basin. It has 773 stream miles and 7,507 lake acres. There are 13 USGS-delineated subwatersheds (HUC-12) that compose the Cheatham Lake Watershed. Sixty rare plant and animal species have been documented in the watershed, including five rare fish species, one rare crayfish species, and one rare mussel species.[3]

The watershed in Sumner County stretches into the high growth Goodlettsville and Hendersonville areas south into Metro-Nashville. Within the county, it covers an area of high terrain near Goodlettsville and Millersville. Most of the watershed is within incorporated limits of these cities. It has mostly been built with residential uses or the hilly terrain has limited development in some areas. I-65 runs through an important stretch of the watershed in Sumner County. Very few farming activities still take place within the watershed since most of the land was converted to residential uses. Urban development is the primary issue within the watershed in Sumner County.

The Cheatham Lake Watershed has a Watershed Management Plan maintained by TDEC.

Old Hickory Lake Watershed (05130201)



The Old Hickory Lake Watershed is approximately 983 square miles and is part of the Cumberland River basin. It has 1,164 stream miles and 27,439 lake acres. There are 20 USGS-delineated subwatersheds (HUC-12) that compose the Old Hickory Lake Watershed. One designated state natural area, one state historic area, one state park, and two wildlife management areas are located in the watershed. Fifty-three rare plant and animal species have been documented in the watershed, including six rare fish species, one rare amphibian species, and nine rare mussel species. Portions of two streams in the Old Hickory Lake Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values. The Old Hickory Lake Watershed is rich in environmental and cultural history.[4]

The watershed covers most of the southern portion of Sumner County and is therefore a key watershed for the county to address. Fast growing cities are located within the watershed including Hendersonville and Gallatin. The watershed stretches to the Ridge that runs through Sumner County and acts as a natural barrier to growth and development because of the steep slopes and forest cover. The Old Hickory Lake Watershed has experienced significant residential and commercial growth in Sumner County. Old Hickory Lake is also an important recreational lake and tourist attraction.

The Old Hickory Lake Watershed has a Watershed Management Plan maintained by TDEC.

Red River Watershed (05130206)

The Red River Watershed is 1,444 square miles with 801 square miles in Tennessee. There are 788.7 stream miles and 15 lake acres in Tennessee. There are 25 USGS-delineated subwatersheds (HUC-12) that compose the Red River Watershed. One designated state natural area is located in the watershed. Fifty-seven rare plant and animal species have been documented in the watershed, including five rare fish species, one rare snail species, three rare amphibian species, and two rare crustacean species. Portions of four streams in the Red River Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.[5]

The watershed in Sumner County is situated along the high-growth I-65 corridor connecting Nashville to south-central Kentucky. The Cities of White House and Portland have grown within the watershed. It

would be anticipated that growth within the watershed will continue because of water and sewer availability and the proximity of the watershed to the interstate connecting to major cities. Limited farming activities take place within the watershed and these activities will likely diminish as the area has the potential to suburbanize because of the mostly flat terrain north of the Ridge and proximity to corridors leading to Nashville.

The Red River Watershed has a Watershed Management Plan maintained by TDEC.

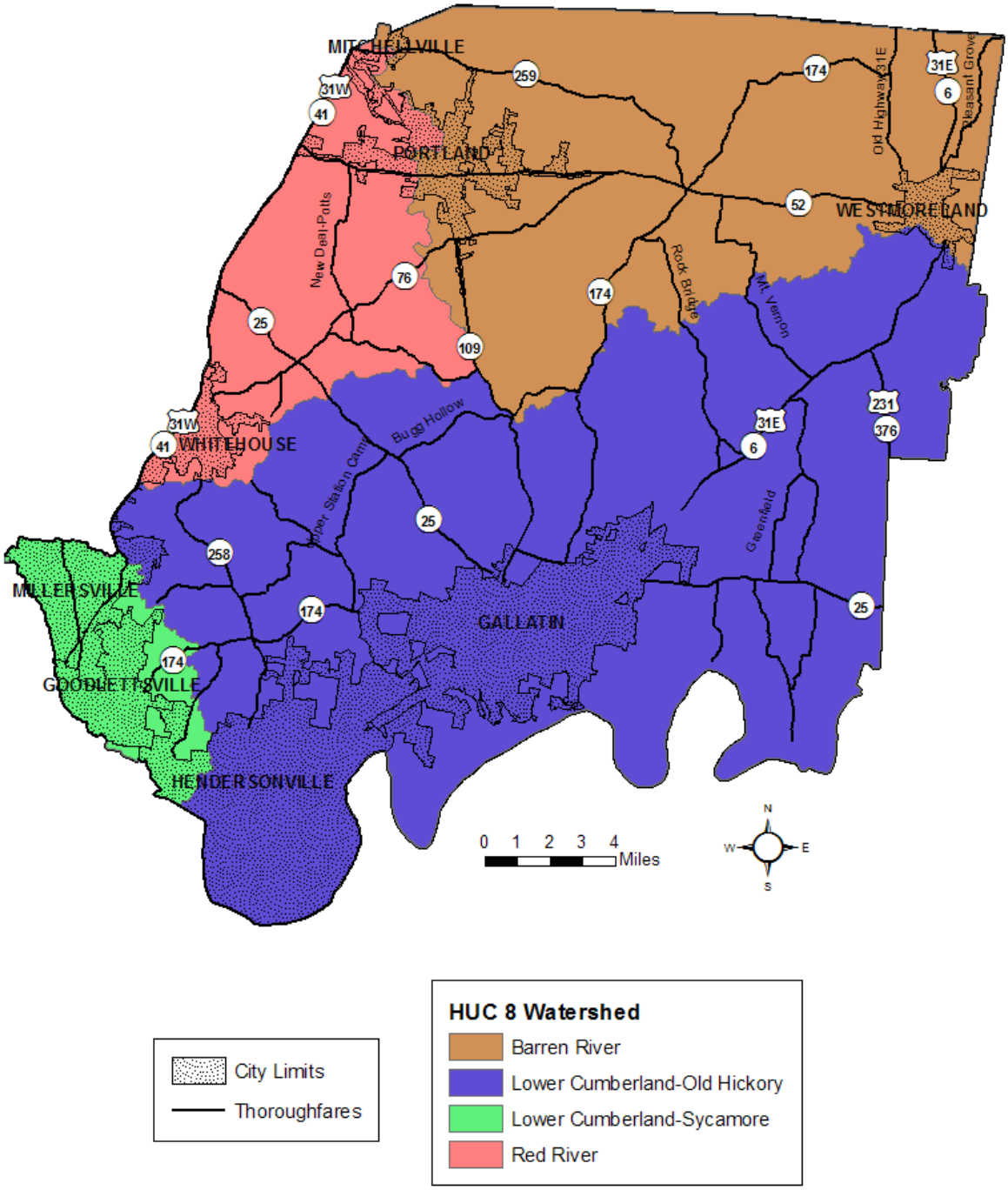


Figure 6-19: Hydrologic Unit Code 8 Watersheds
Data Source: Cumberland Region Tomorrow

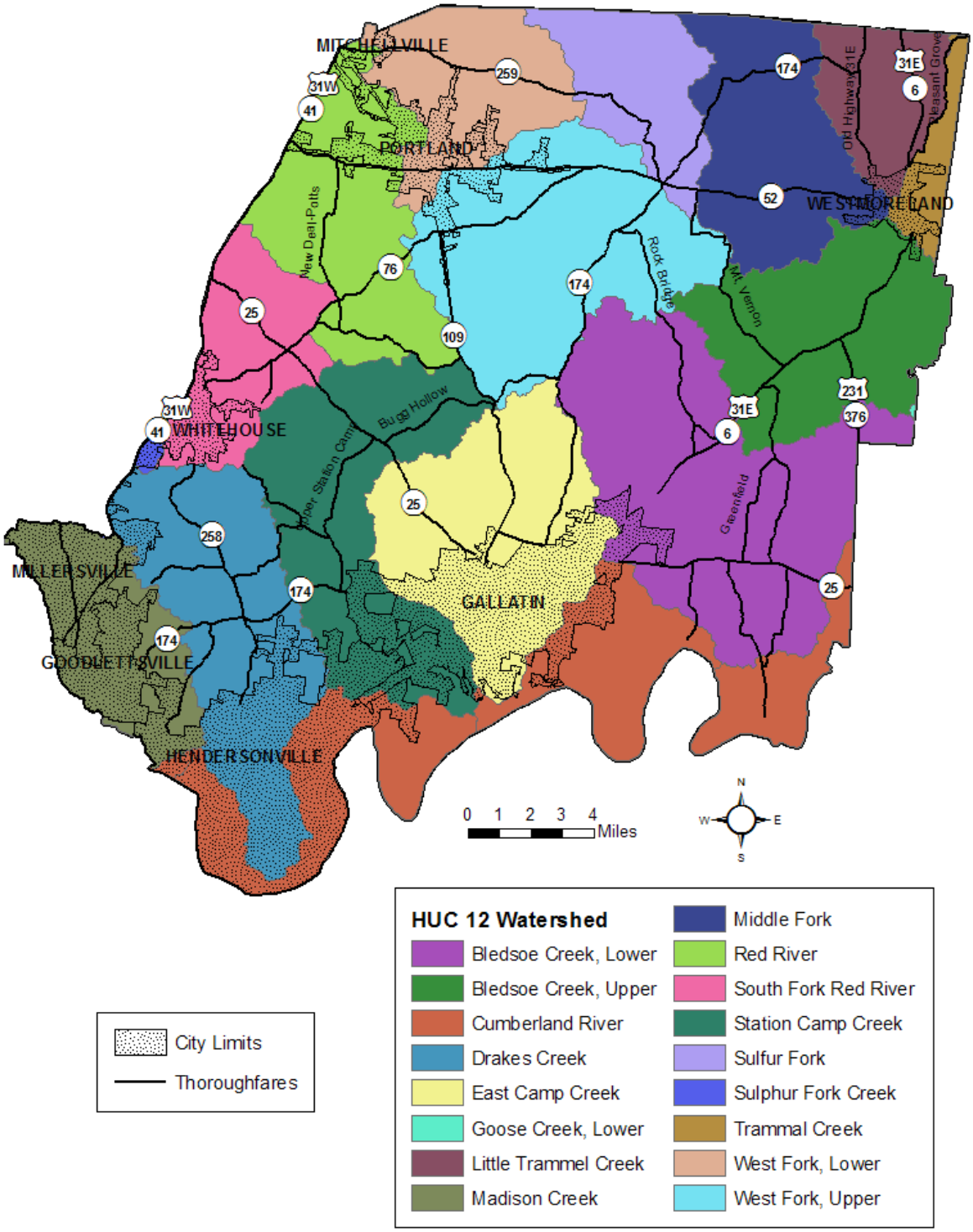


Figure 6-20: Hydrologic Unit Code 12 Watersheds
Data Source: Cumberland Region Tomorrow

Figure 6-21: Major Creeks, Streams, Rivers, and Lakes in Sumner County

Figure 6-21 depicts the major creeks, streams, rivers, and lakes in Sumner County. Below is a brief description of some of the water bodies in unincorporated Sumner County.

Old Hickory Lake

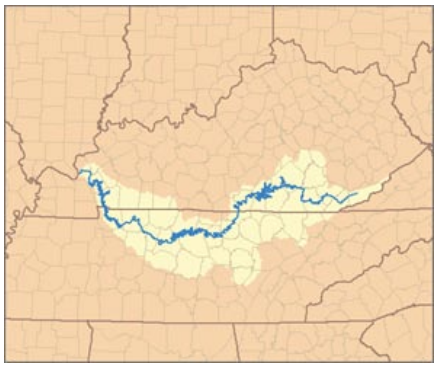
Old Hickory Lake has 440 miles of shoreline at normal pool elevation. It extends 97.3 river miles from the Old Hickory Lock and Dam located on the Cumberland River in Sumner and Davidson Counties to the Cordell Hull Lock and Dam at Carthage, Tennessee. The U.S. Army Corps of Engineers maintains 30 recreation areas on Old Hickory Lake that comprise 895 acres. Bledsoe Creek State Park encompasses 164 acres of land. The City of Hendersonville operates 240 acres for municipal recreation use. The City of

Gallatin maintains a 30-acre soccer complex on Station Camp Creek as well as 158 acres at Lock 4, Gallatin, and Cedar Grove recreation areas. There are eight commercial concessions around the lake occupying a total of 134 acres of land and water.

Land not developed along the lake is now extremely beneficial for providing areas of valuable recreational pursuits such as bird watching, photography, etc., as well as much needed wildlife habitat. Native plantings and species are encouraged along the shoreline. Old Hickory Lake is a major recreational lake in Sumner County for boating and fishing activities. Its development was a significant growth generator for the Cities of Hendersonville and Gallatin over the last few decades.[6]

The U.S. Army Corps of Engineers developed the 2008 Update to the Old Hickory Lake Shoreline Management Plan (SMP). It is anticipated to be updated again in 2013. The SMP provides updates to policies and guidelines for the effective long-range management of the shoreline resources of Old Hickory Lake and outlines permitting criteria.

Cumberland River



The Cumberland River is 688 miles long and starts in Harlan County, Kentucky, and ends at the Ohio River at Smithland, Kentucky. The river snakes it way south through northern Tennessee, including Sumner County, before moving back into Kentucky. Most of the river is navigable below the Wolf Creek Lock and Dam.[7]

The Cumberland River is used for recreational purposes, too. These activities include boating and fishing. The river has experienced significant growth through the Middle Tennessee region around cities such as Nashville and Clarksville and their suburban communities. Lakes in these areas that are part of the lock and dam system have drawn residents to these communities.

The Cumberland River Compact addresses issues and works with local governments including Sumner County regarding the environmental stewardship of the watershed. The Compact is a non-profit organization that has taken on the mission of educating residents and local officials in the watershed about the importance of the Cumberland River to the many communities located within the watershed.[8]

The Cumberland River was a key waterway in the flooding events of May 2010. It was this river and many of its tributaries that overflowed into Downtown Nashville and impacted communities to the west of Sumner County including Cheatham County, Dickson County, and Clarksville-Montgomery County.

Red River

The Red River is a major stream running through north-central Tennessee and south-central Kentucky. It is a tributary of the Cumberland River. It drains the northern Highland Rim in Tennessee and the Pennyroyal Plateau in Kentucky. Its headwaters are in Sumner County. The stream's name derives from its typical water color caused by a large load of clay and silt which contains iron oxides. As the area drained by the Red River becomes somewhat less agricultural and more of the remaining farmers switch to techniques involving less cultivation, it is likely that this color will continue to lessen in intensity, but certainly will not vanish. Development impacting water quality within the Red River watershed is important to consider as parts of Robertson and Montgomery Counties grow.[9]

The Red River Watershed Association is a community-based organization and initiated by the Cumberland River Compact. The Association is dedicated to enhancing and protecting the quality and quantity of water in the creeks and streams that flow into the Red River.

Drakes Creek

Drakes Creek's headwaters are located in the Ridge of Sumner County. The creek runs south into Old Hickory Lake at Hendersonville and is the reason the Shackle Island community exists today. The William Montgomery Farm located along the creek was the location of a grinding mill and sawmill in the early 1800s. Today, Drakes Creek winds its way through the fast growing residential developments in Hendersonville.

Suburban development is an issue involving the creek. Limited farming activities still take place along the creek north of Long Hollow Pike and moving into the Ridge. Hendersonville has developed recreational parks and greenway amenities along Drakes Creek as it drains into Old Hickory Lake.

Station Camp Creek

Station Camp Creek runs along today's Bugg Hollow Road, Upper Station Camp Creek Road, and Lower Station Camp Creek Road before draining into Old Hickory Lake near Gallatin. The southern portion of Station Camp Creek has mostly been developed as a natural boundary between the Cities of Hendersonville and Gallatin. North of Long Hollow Pike, Station Camp Creek still has adjacent farming activities. The community of Cottontown was founded in the late 1700s along the creek.

Greenway amenities are planned to parallel Station Camp Creek from Cottontown to Gallatin.

Bledsoe Creek

Bledsoe Creek roughly parallels US 31E moving through the communities of Bransford and Bethpage before connecting to the Cumberland River system. This creek has historical significance as a cornerstone in these communities.

Deshea Creek

Deshea Creek's headwaters are located in the Ridge north of Hickory Ridge Road and meanders south following Deshea Creek Road and eventually connects with Bledsoe Creek leading to the Cumberland River system.

Many of the creeks mentioned have experienced development along adjacent properties of these waters. The intensity of development increases as one travels towards the county's municipalities. These creeks have headwaters in the Ridge and travel towards Old Hickory Lake or the Cumberland River.

6.6.2 Critical Habitats

The Tennessee Wildlife Resource Authority (TWRA) developed the State Wildlife Action Plan (SWAP) called Tennessee's Comprehensive Wildlife Conservation Strategy in 2005. This plan identified priority terrestrial, subterranean, and aquatic habitats throughout the state. The SWAP identifies some key locations within Sumner County. Figure 6-22 identifies these critical habitats along with other critical conservation areas such as shorelines, high quality streams, and floodplains.

Aquatic habitats of low priority are shaded in light brown, and those of medium priority are yellow on the map. The habitats to the north of the Ridge are part of the Barren River Drainage, which makes up

only 1 percent of landmass in the state barely dipping into Tennessee along the Interior Low Plateau. Some sources of stress in this area include incompatible grazing and residential development. Those habitats to the south are part of the Cumberland River Drainage, which is the second largest aquatic region in Tennessee with 25.4 percent of the state's total land area. Incompatible grazing, construction of dams, and incompatible mining practices are some sources of stress upon these habitats. No aquatic habitats are identified in the SWAP of high or very high priority within or immediately nearby Sumner County.

Subterranean habitats are identified by the medium brown shading on the map. The habitat to the south in Gallatin is part of the Nashville Basin Subterranean Region (NAB) composing 14.4 percent of land area in the state. Residential sewage/septic systems, primary residential development, and construction of roads/railroads/utilities are some sources of stress to the habitat. The habitat to the north near Portland is part of the Central Uplands Subterranean Region (CUP), which composes 20.2 percent of land area in Tennessee. Some sources of stress include primary residential development, residential sewage/septic systems, and incompatible grazing.

Terrestrial habitats are the dark brown in Figure 6-22 and are part of the Interior Low Plateau (ILP), which is the largest terrestrial region in Tennessee covering 37.3 percent of the state's landmass. Some sources of stress to terrestrial habitats in the ILP are primary residential development, agricultural conversion, and commercial/industrial development. The SWAP should be consulted for more details regarding the natural, semi-natural, and non-natural habitats in the ILP.

The SWAP also identifies portions of Sumner County for the grassland/shrub focus area and wetlands focus area. The Nature Conservancy also has obtained Taylor Hollow as part of its Ecoregional Planning Terrestrial Portfolio. The northwestern portion of Sumner County is identified as a Freshwater Initiatives Conservation Area by The Nature Conservancy.[10]

The high quality streams and 100-year floodplains mapped by the Federal Emergency Management Agency (FEMA) are discussed in Section 6.6.3 and Section 6.6.7 respectively. The areas identified in Figure 6-22 are overlapped with additional natural resources data later in this element to determine areas where certain risks and opportunities exist.

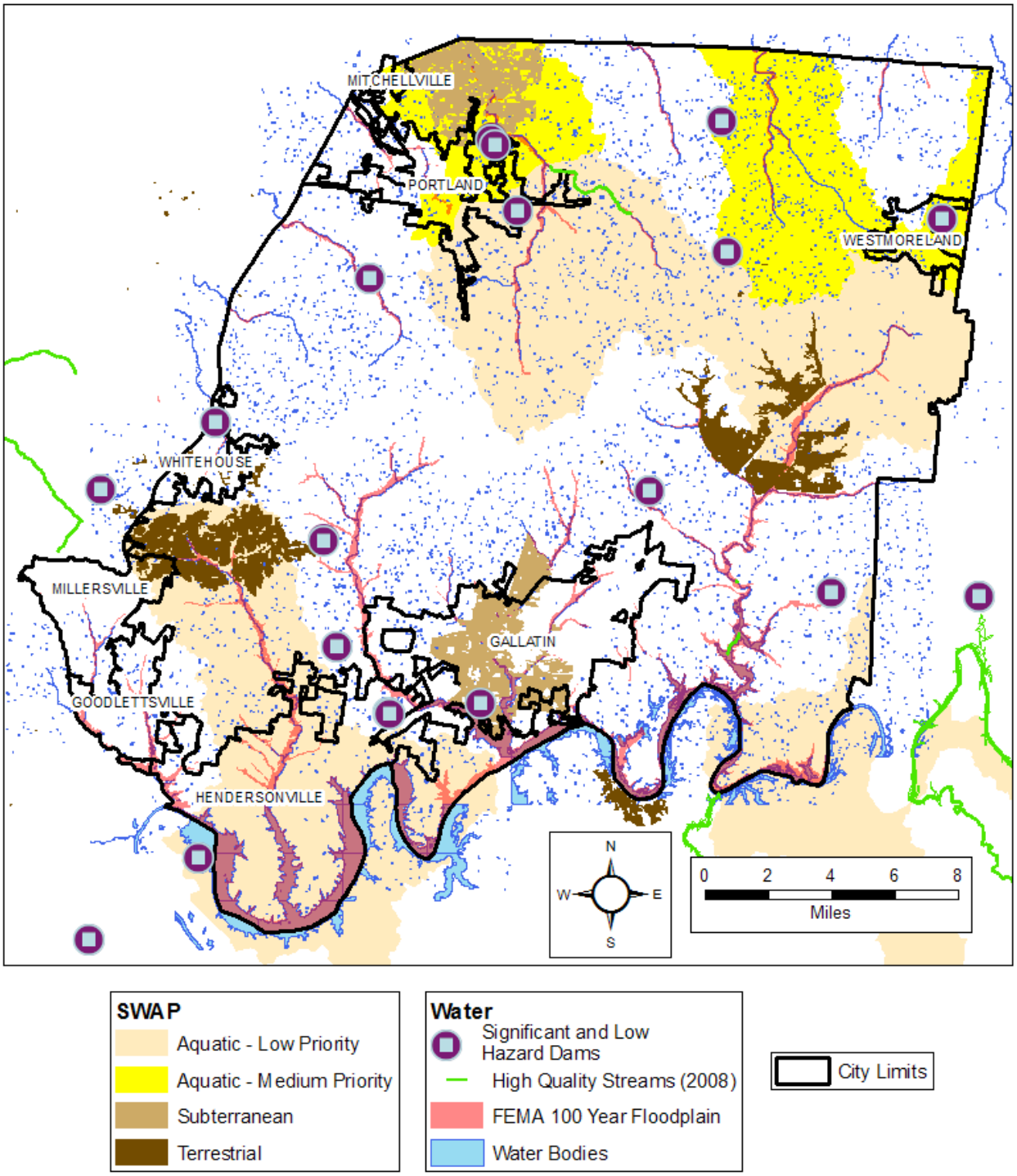


Figure 6-22: Critical Conservation Areas in Sumner County
Data Sources: Cumberland Region Tomorrow, TDEC Interactive Mapping, and FEMA

6.6.3 Water Quality

All watersheds in Sumner County have 303(d) listed or impaired streams or lakes. The impaired streams and lakes are depicted in Figure 6-23. Table 6-5 lists all of the impaired streams or lakes along with impairment type and source of pollution in Sumner County. Many of these areas are located within

municipalities. Also noted in the table are summary details about the general land use and whether the water body is located within one of the conservation areas identified in the SWAP for critical habitats.

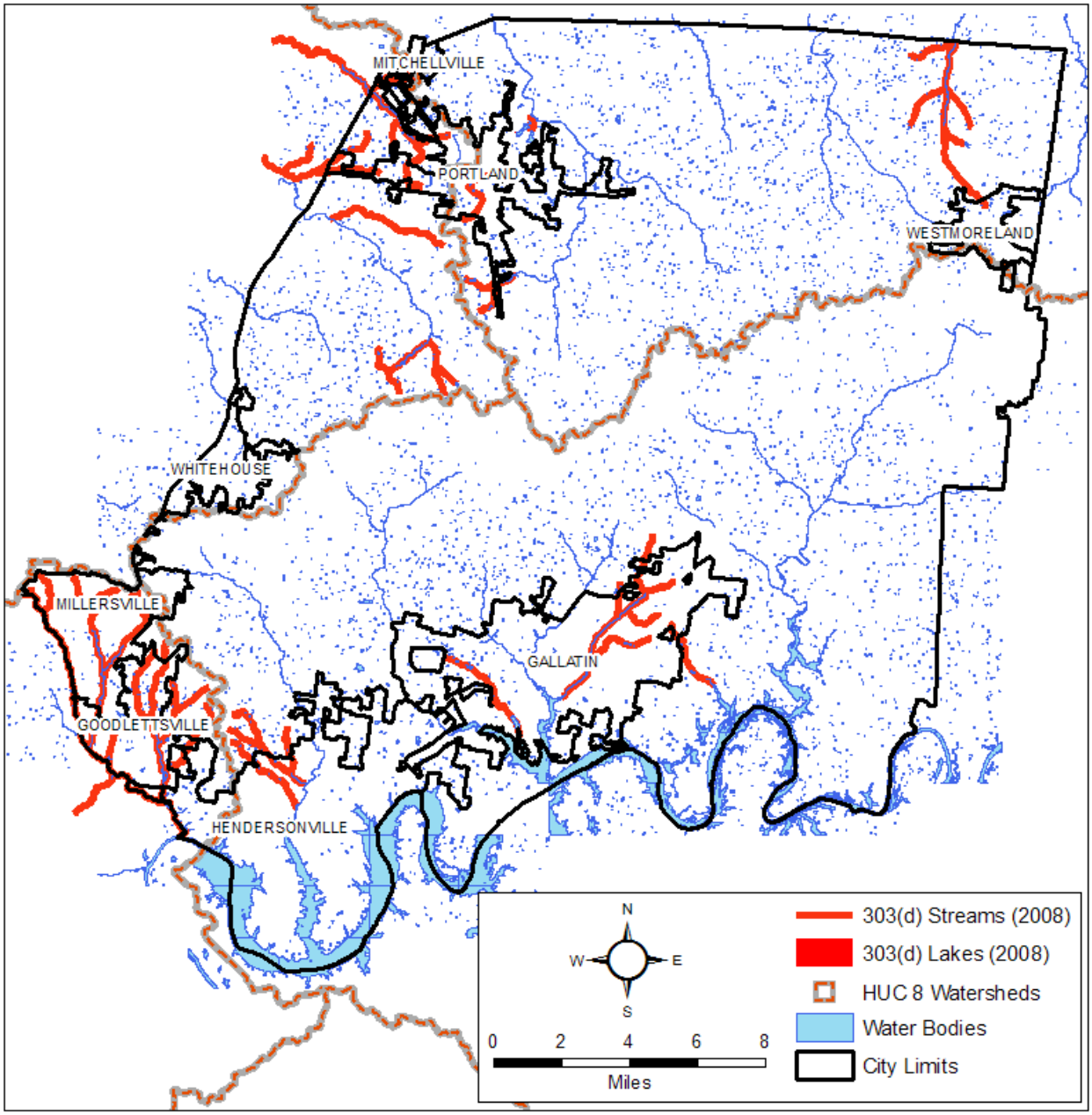


Figure 6-23: 303(d) Impaired Waters in Sumner County, 2008
Source: TDEC

Table 6-5: 303(d) Impaired Waters in Unincorporated Sumner County

								303(d) List					
Watershed	Name of Water Body	HUC ID #	Miles or Acres	2010 Impairment Types	2010 Pollutant Source	ESA	Land Use	2010	2008	2006	2004	2002	1998
Barren River	UNNAMED TRIB TO WEST FORK DRAKES CREEK	TN05110002 008 – 0550	2.7	Flow Alterations NA	Upstream Impoundment	Aquatic & Subterranean	Rural	X	X				
Barren River	DONAHO BRANCH	TN05110002 008 – 0600	3	Nitrate+Nitrite L Total Phosphorus L Physical Substrate Habitat Alterations H Escherichia coli NA	Collection System Failure Urbanized High Density Area Channelization	Aquatic & Subterranean	Suburban	X	X	X	X	X	
Barren River	LITTLE TRAMMEL CREEK	TN05110002 010 – 0500	11	Nitrate+Nitrite L Total Phosphorus L	Municipal Point Source	Aquatic	Rural	X	X	X	X	X	
Barren River	CITY LAKE PORTLAND	TN05110002 CTYLKPO_10 00	34 ac	Loss of biological integrity due to siltation M Low dissolved oxygen L Nutrients L Taste & odor L	Urbanized High Density Area Animal Feeding Area	Aquatic & Subterranean	Rural	X	X	X	X	X	
Barren River	CITY LAKE WESTMORELAND	TN05110002 CITYLKW_10 00	11 ac	Nutrients L Low dissolved oxygen L Taste & odor L	Pastureland Urbanized High Density Area	Aquatic	Suburban	X	X	X	X	X	
Barren River	MIDDLE FK DRAKES CR	TN05110002 00918.6	29.8 (partial)	(1998) Other inorganics S Taste & odor H	(1998) Petroleum activities	Aquatic	Rural						X
Old Hickory	RANKIN BRANCH	TN05130201 001T-0100	3.3	Alteration of stream-side or littoral vegetation H Nutrients L	Channelization Discharges from MS4 area	Subterranean	Suburban	X	X				
Old Hickory	TOWN CREEK	TN05130201 001T-0200	12.1	Loss of biological integrity due to siltation H Other Anthropogenic Habitat Alterations H	Discharges from MS4 area Hydromodification	Subterranean	Urban	X	X	X	X	X	X
Old Hickory	UNNAMED TRIB TO OLD HICKORY RESERVOIR	TN05130201 001T-0400	2.57	Loss of biological integrity due to siltation H	Discharges from MS4 area	None	Suburban	X	X				
Old Hickory	UNNAMED TRIB TO DRAKES CREEK	TN05130201 047 – 0100	3.16	Alteration of stream-side or littoral vegetation H	Discharges from MS4 Area	Aquatic	Suburban	X	X				

								303(d) List					
Watershed	Name of Water Body	HUC ID #	Miles or Acres	2010 Impairment Types	2010 Pollutant Source	ESA	Land Use	2010	2008	2006	2004	2002	1998
Old Hickory	UNNAMED TRIB TO DRAKES CREEK	TN05130201 047 – 0200	6.13	Alteration of stream-side or littoral vegetation H	Discharges from MS4 Area	Aquatic	Suburban	X	X				
Cheatham Reservoir	SLATERS CREEK	TN05130202 220 – 0300	11.3	Loss of biological integrity due to siltation H Escherichia coli NA	Sand/Gravel/Rock Quarry Discharges from MS4 area Bank Modification	None	Suburban	X	X	X	X	X	
Cheatham Reservoir	MADISON CREEK	TN05130202 220 – 0400	14.4	Loss of biological integrity due to siltation H	Land Development	None	Suburban	X	X	X	X	X	
Cheatham Reservoir	MANSKERS CREEK	TN05130202 220 – 1000	7.9	Loss of biological integrity due to siltation H Escherichia coli NA	Discharges from MS4 area Land Development	None	Urban	X	X	X	X	X	
Cheatham Reservoir	MANSKERS CREEK	TN05130202 220 – 2000	7.6	Loss of biological integrity due to siltation H Escherichia coli NA	Discharges from MS4 area Land Development	None	Urban	X	X	X	X	X	
Red River	SUMMERS BRANCH	TN05130206 024 - 0150	12.6	Total Phosphorus L Loss of biological integrity due to siltation M Escherichia coli M	Municipal Point Source Urbanized High Density Area	None	Suburban	X	X	X	X	X	
Red River	BUNTIN BRANCH	TN05130206 024 - 0200	7.6	Loss of biological integrity due to siltation M Alteration of stream-side or littoral vegetation M	Pasture Grazing	None	Rural	X	X	X	X	X	
Red River	SOMERVILLE BRANCH	TN05130206 024 - 0600	4.3	Loss of biological integrity due to siltation M	Pasture Grazing	None	Rural	X	X	X	X	X	
Red River	AUSTIN BRANCH	TN05130206 024 - 0300	3.9	(2006) Loss of biological integrity due to siltation M	(2006) Pasture Grazing	None	Rural			X	X	X	
Red River	HALL TOWN CREEK	TN05130206 024 - 0400	6.4	(2006) Loss of biological integrity due to siltation M Other Habitat Alterations M	(2006) Pasture Grazing	None	Rural			X	X	X	

ESA = Environmentally Sensitive Area

Comparing the 303(d) Lists from 1998 to 2010, streams and lakes were added compared to the initial list. Several streams were delisted, but the listing of impairments has remained consistent. The severity of the impairment types changed, but Table 6-5 lists only the most recent in the proposed 2010 list. There is roughly an increase in impaired stream miles and lake acres compared to 10 years ago.

By watershed the primary pollutant sources include:

- Barren River – Mostly urbanized high density areas and animal feeding or pastureland
- Old Hickory – Discharges from the MS4 area
- Cheatham – Mostly land development and discharges from the MS4 area
- Red River – Mostly pasture grazing

Since land uses and the threat of development are sometimes causes of impaired streams, analyzing the land uses from the watershed level could yield some interesting results. These watersheds are not restricted to Sumner County but cross county lines and state lines and include the land uses in those areas. The land use information was acquired from the Watershed Management Plans for each watershed coordinated by TDEC (Figure 6-24 – Figure 6-27).

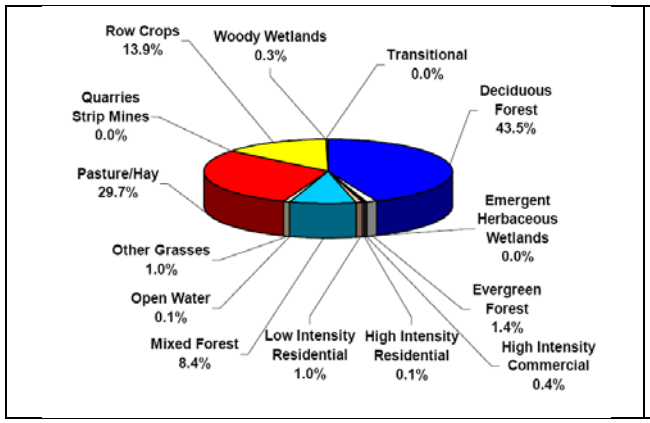


Figure 6-24: Barren River Watershed Land Uses
Source: Barren River Watershed Management Plan (2007)

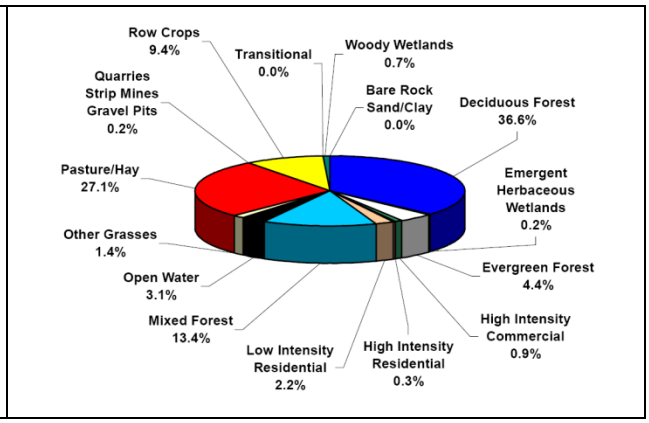


Figure 6-25: Old Hickory Lake Watershed Land Uses
Source: Old Hickory Lake Watershed Management Plan (2007)

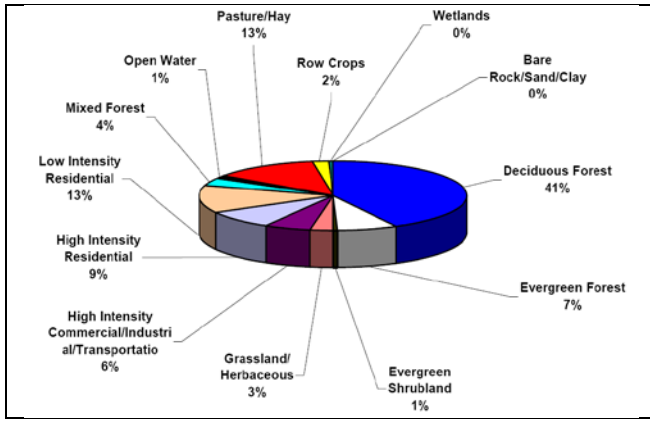


Figure 6-26: Cheatham Lake Watershed Land Uses
Source: Cheatham Lake Watershed Management Plan (2008)

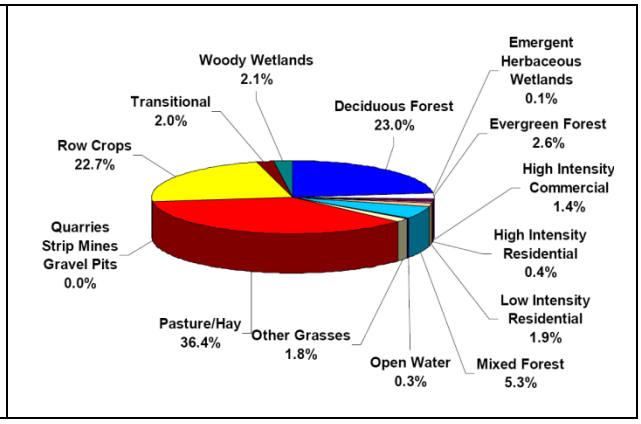


Figure 6-27: Red River Watershed Land Uses
Source: Red River Watershed Management Plan (2007)

The primary land uses in each watershed is deciduous and evergreen forest except for the Red River watershed which is pasture/hay. Developed land uses such as residential and commercial are the highest percentage in the Cheatham Lake watershed. For Sumner County, this is probably the most developed watershed.

In general, the pollutant sources and land uses are mostly human-induced related to development throughout the Middle Tennessee region. Conversion of land to other uses and construction activities increase stormwater runoff. There is a tendency to increase the flashiness of stream flows and impact properties downstream in flooding events.

Figure 6-28 shows the streams that are impaired by siltation and their drainage areas. These impairments are confined near Summers Branch, Buntin Branch, and Portland City Lake in Portland, Madison Creek and Slaters Creek in Goodlettsville and Millersville, and Town Creek in Gallatin.

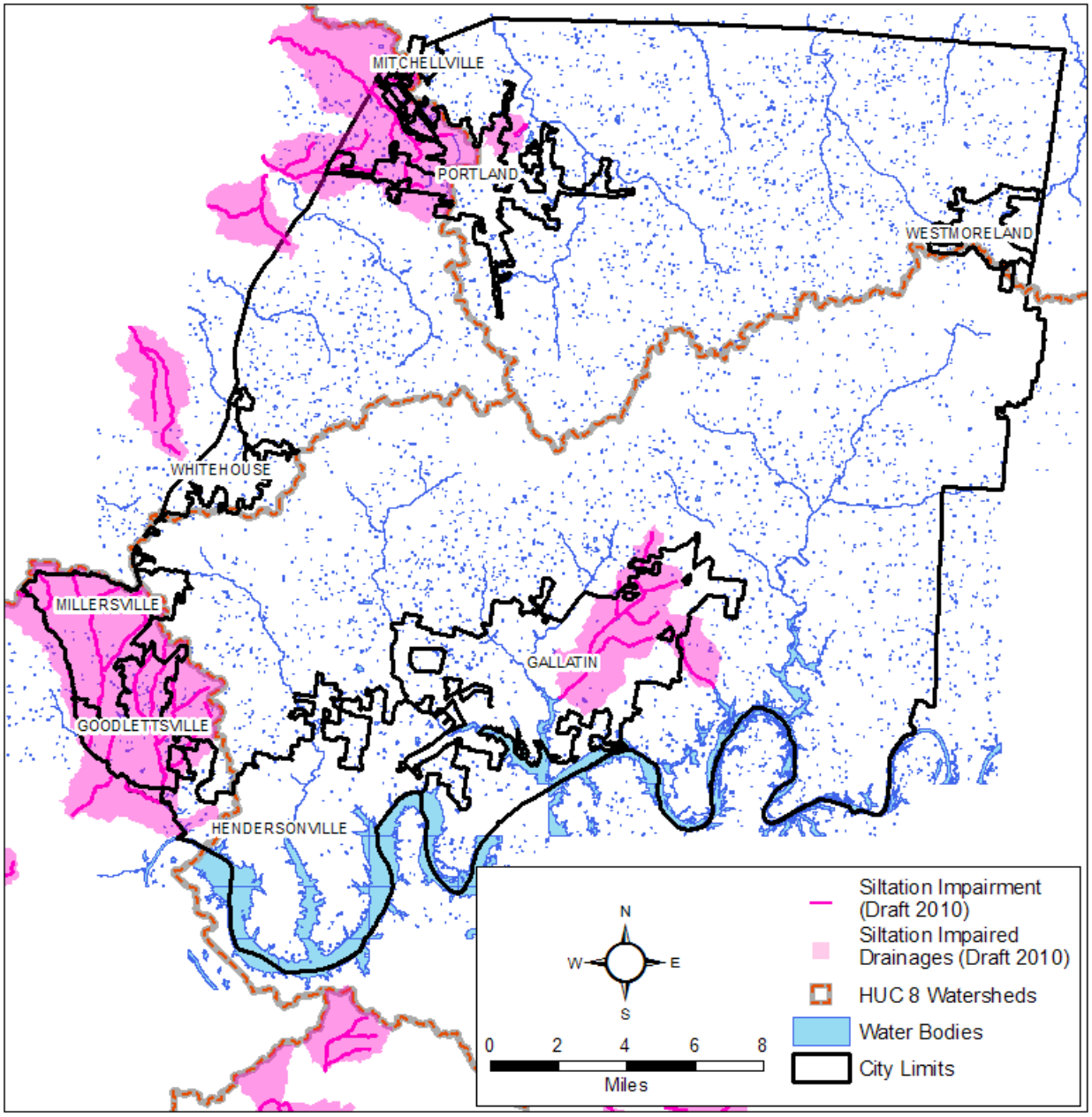


Figure 6-28: Siltation Impaired Streams and Drainages in Sumner County, 2010 DRAFT
Source: TDEC Interactive Mapping

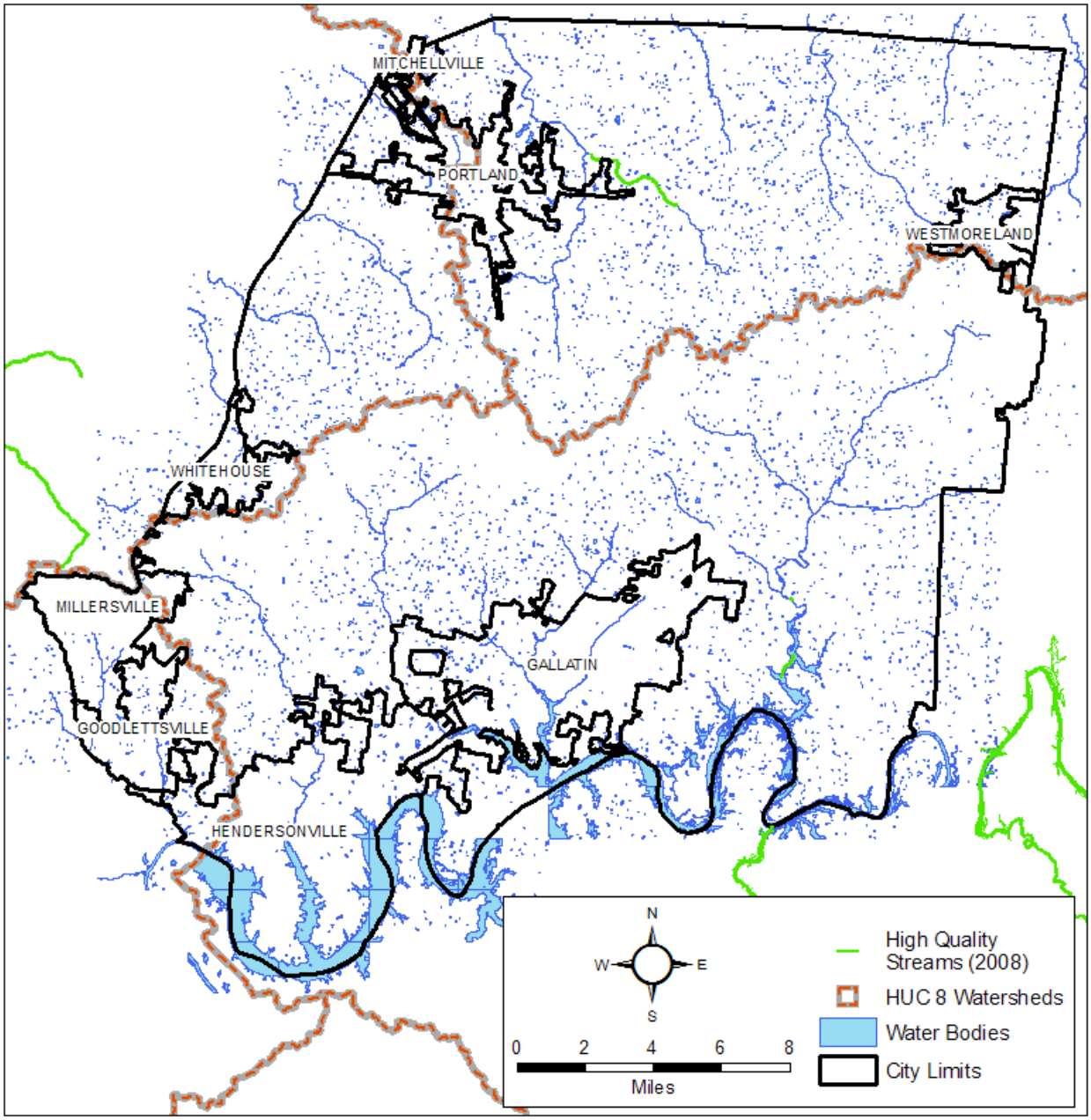


Figure 6-29: High Quality Streams in Sumner County, 2008
Source: TDEC Interactive Mapping

High quality streams are illustrated in Figure 6-29. These streams are found only in two areas of Sumner County, just east of the Portland City Limits and along Old Hickory Lake near the Castalian Springs area and Bledsoe Creek State Park.

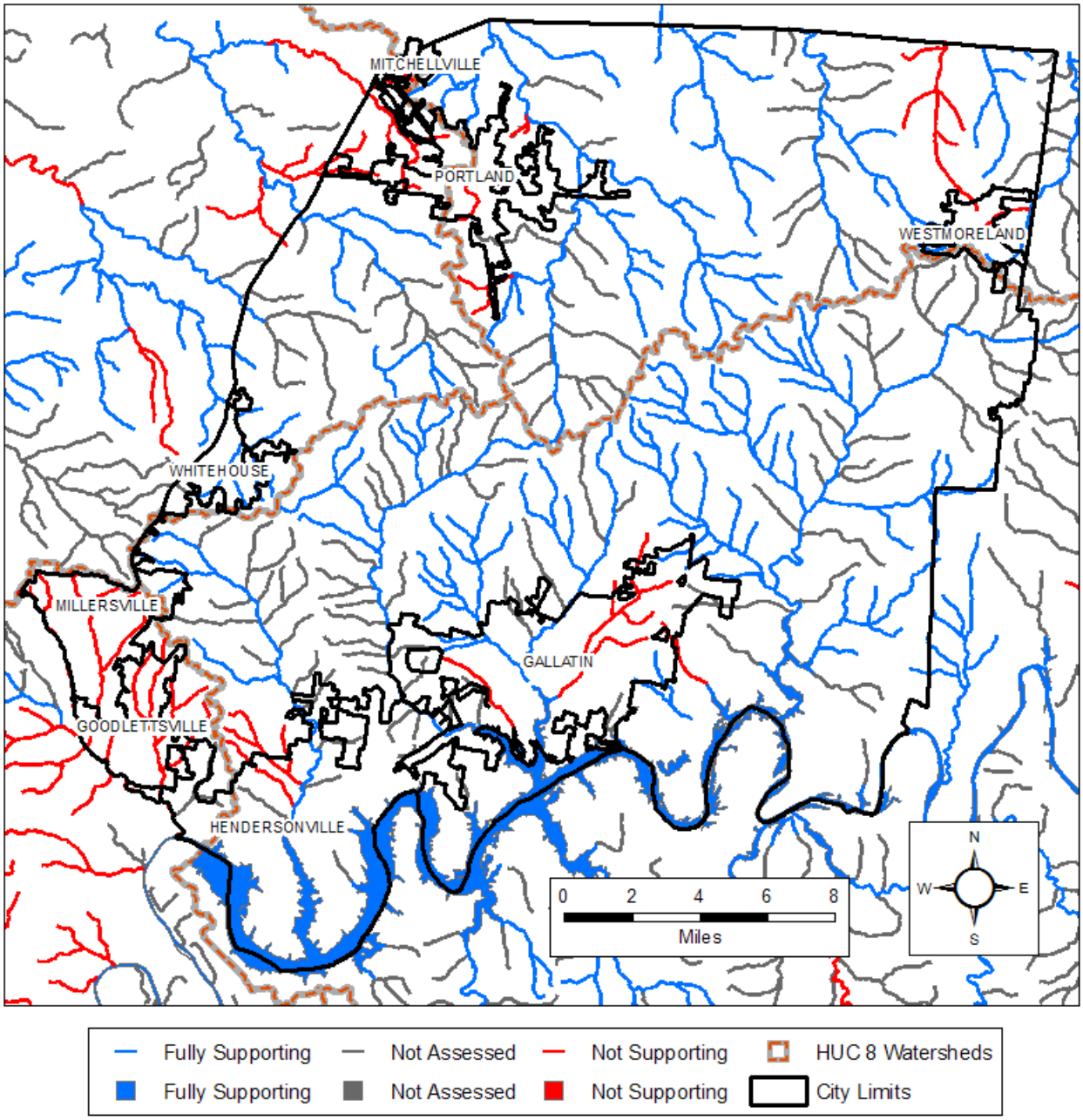


Figure 6-30: 305(b) Stream Assessments in Sumner County
Data Source: TDEC Interactive Mapping

Stream Assessments or the 305(b) Report was performed by TDEC's Division of Water Pollution Control in 2008. Those in red are streams that are not supporting their designated uses. These streams are moderately or severely impaired and are included in the 303(d) List. Those streams in blue are fully supporting meaning these streams are monitored and meet the most stringent water quality criteria for all designated uses for which they are classified. The gray colored streams were not assessed. This is another way to examine the impaired streams and their locations in Sumner County and to determine which streams are continually monitored.

The water pollution control monitors are highlighted with pink crosses in Figure 6-31.

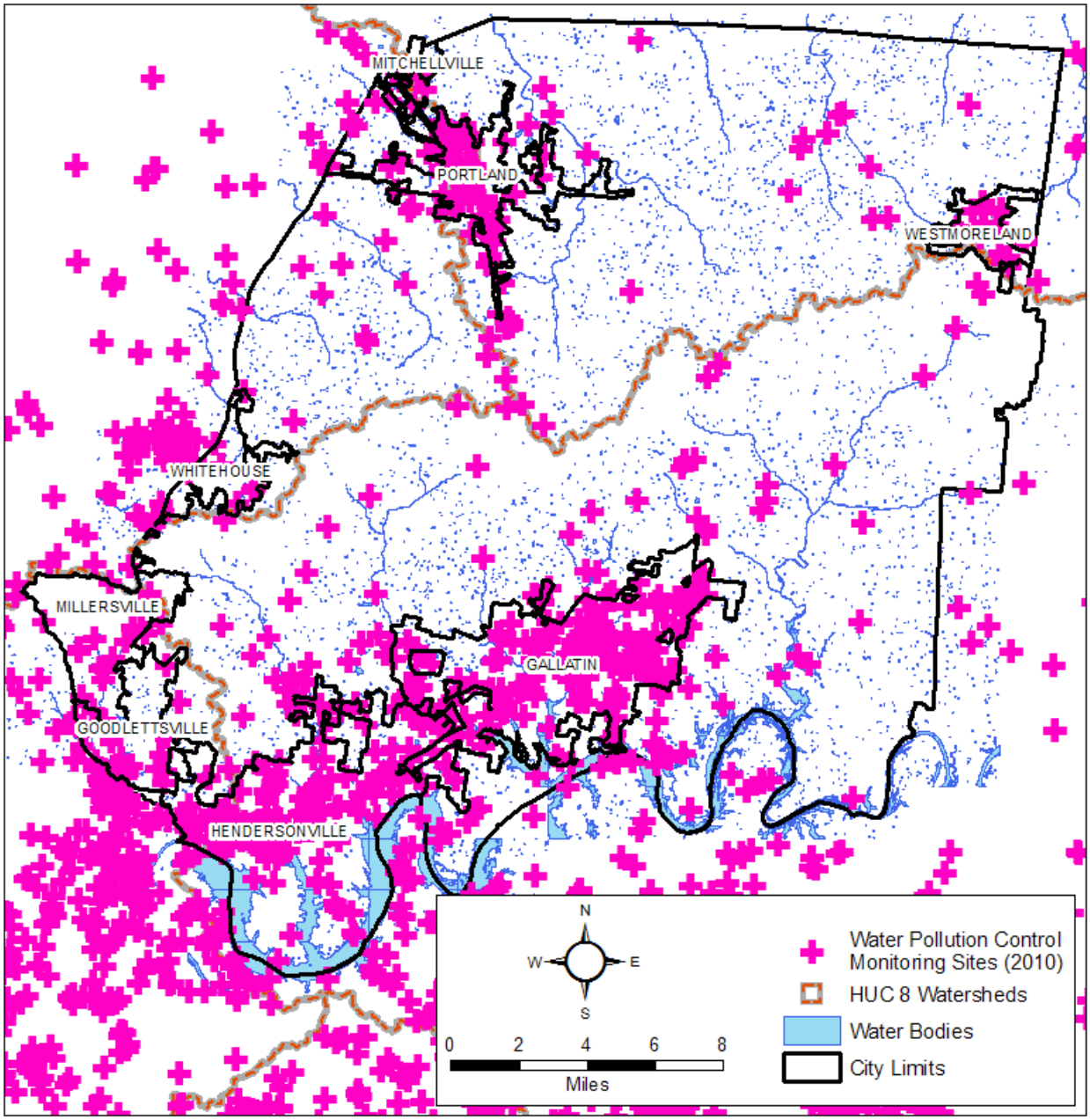
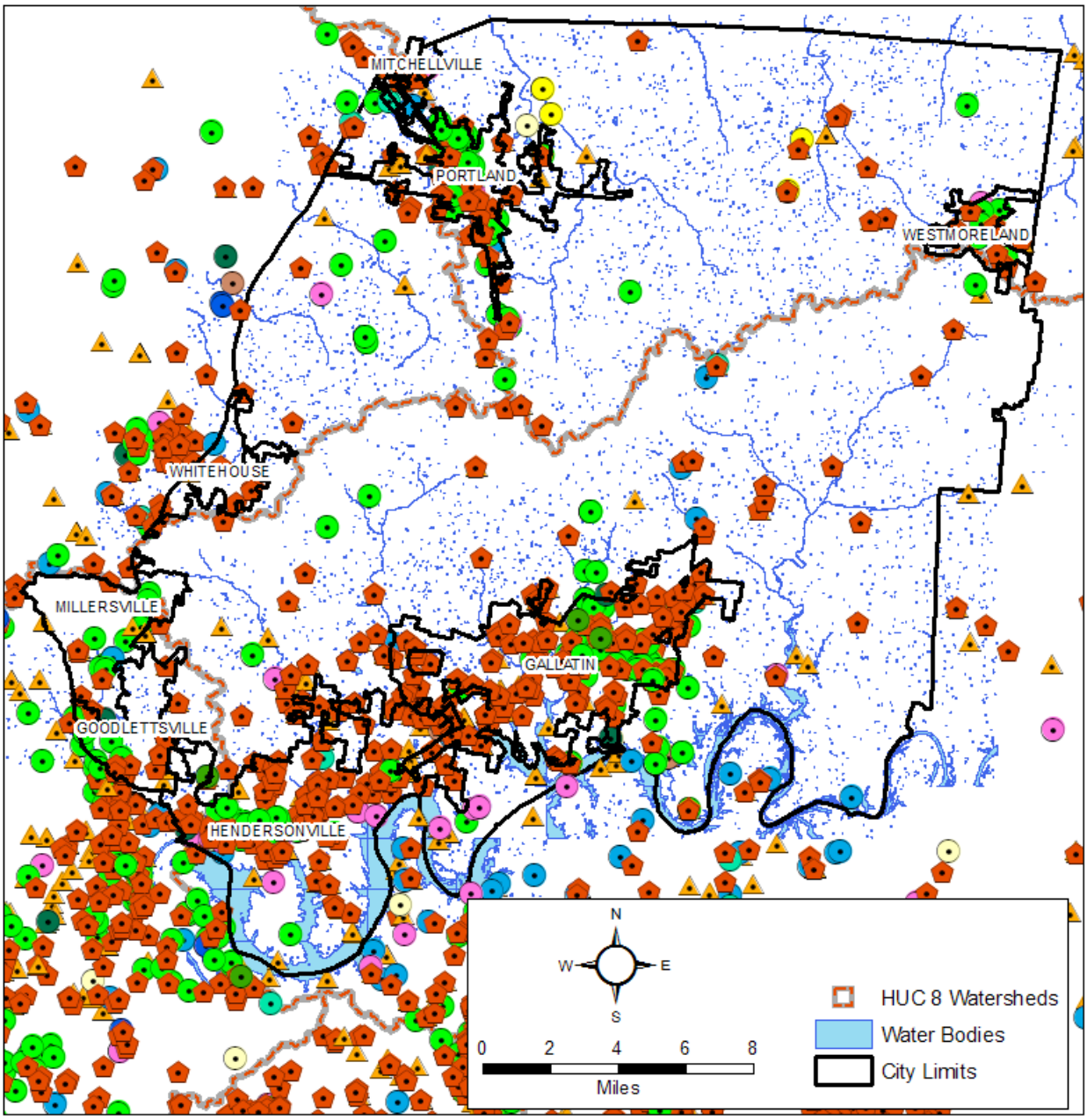


Figure 6-31: Water Pollution Control Monitors in Sumner County
Data Source: TDEC Interactive Mapping

Mapping the water permits issued by TDEC can assist in determining where streams may be disturbed in Sumner County. Figure 6-32 depicts the locations and types of Water Pollution Control Permits approved by TDEC through June 2010. The majority of issued permits is in or near the municipalities and related to construction.



- Aquatic Resource Alteration Permit
- Concentrated Animal Feeding Operation-General
- Concentrated Animal Feeding Operation-Individual
- Construction General Permit
- Hydrostatic Test Water Permit
- Inter-Basin Water Transfer Permit
- Individual Permit
- Municipal Seperate Storm Sewer System Permit
- Mining Permit
- Ready Mixed Concrete Facilities Permit
- State Operating Permit
- Contact Aquatic Herbicide Permits
- Storm Water Multi-Sector General Permit for Industrial Activities
- Underground Storage Tank Remediation Treated Discharge Permit
- Water Treatment Plant Backwash Discharge Permit

Figure 6-32: Water Pollution Control Permits in Sumner County, Through June 2010
Data Source: TDEC Interactive Mapping

6.6.3.1 Phase II MS4 General Permit

Over the past 30 years, EPA and state water quality agencies have realized the great impact that rain water runoff has on surface waters. Rain water falling on industries, urban areas and construction activities can become contaminated with sediments, suspended soils, nutrients phosphorous and nitrogen, metals, pesticides, organic material, and floating trash. These pollutants are then carried into the surface waters. Unlike sanitary wastewater and industrial wastewater, historically most stormwater has not been treated prior to entering streams. Pollution from stormwater must be prevented at the source by reducing the volume and intensity of the runoff and/or the reduction of pollutants in the runoff.

Phase I EPA stormwater regulations initiated a national stormwater permitting program in 1990 that applied to industrial activities, to construction sites of five acres or more, and to urban runoff from larger cities. Phase II regulations in 1999 address additional urbanized areas, certain cities with population over 10,000, and construction activities of one to five acres. TDEC's Division of Water Pollution Control implements the Environmental Protection Agency's (EPA) Phase I and Phase II stormwater rules programs in Tennessee. The division works with jurisdictions designated as Municipal Separate Storm Sewer Systems or MS4s. Sumner County is designated as a MS4.

The proposed National Pollutant Discharge Elimination System (NPDES) general permit to cover discharges of stormwater runoff from Phase II MS4s, including city and county-operated MS4s, will impact Sumner County. Standards are established for the permit that encourages infiltration, evapotranspiration, and capture and use of stormwater through a set of performance standards. These standards are in priority order:

- runoff reduction (infiltration or green infrastructure, see discussion below),
- pollutant removal, and
- off-site mitigation or payment into public stormwater project fund.[12]

6.6.3.2 Key Concept – Green Infrastructure

This discussion was included in the Transportation Element (5.0), but it is repeated here because of TDEC's emphasis on reducing stormwater runoff through green infrastructure implementation. The overlap between development policies and regulations and permitting involving stormwater is significant. An example of this relationship is with automobile parking standards for the county.

The Sumner County Subdivision Regulations outline the standards for streets, sidewalks, sewer lines, water lines, and other infrastructure. These regulations generally do not allow for green infrastructure such as pervious pavement, bioswales, rain gardens, and other more sustainable best management practices. In 2008, planners in Sumner County held training on green infrastructure and conducted a visual preference survey of different urban and rural design standards. A visual preference survey is conducted by showing a series of photographs of various types of developments and infrastructure. Participants are asked to rank their preference on a numeric scale. Photographs of green infrastructure were included in the series of 100 photos. The planning commissioners and staff in attendance were generally favorable to green infrastructure such as pervious pavement, bioswales, check dams, rain gardens, and green roofs. See Appendix F for the green infrastructure photos utilized in the survey.

One infrastructure policy that could be greener is the parking standards for Sumner County. Currently, dust-free parking is required with curbs leading to a detention system. Figure 6-33 shows the typical parking lot that would be required in a commercial development in Sumner County. Figure 6-34 is an

example of a parking lot that has used pervious pavement, a bioswale, and limited curbing to reduce the amount of stormwater runoff. A stormwater system encouraging green best management practices (BMPs) can alleviate urban flooding issues, improve water quality, and reduce maintenance costs. Sumner County will need to research and assess appropriate BMPs to consider and possibly offer incentives to promote the usage of BMPs within new developments.

Figure 6-33: Typical Parking Lot Design

Figure 6-34: Parking Lot with Green Infrastructure
Source: Cumberland River Compact (2008)

KEY CONCEPT: GREEN INFRASTRUCTURE
All future developments should consider proven infrastructure elements that are sustainable, reduce stormwater impacts, conserve energy, and preserve Sumner County's natural landscape. These might include pervious pavement, maximum parking standards, bioswales, and rain gardens. Development regulations should be examined and incentives should be promoted to encourage the use of green infrastructure techniques.

6.6.3.3 Key Concept – Codes and Ordinances Review and Update

The Water Quality Scorecard (the scorecard) is a tool that focuses on common municipal and county codes and ordinances provisions that can impact the effect of stormwater runoff on receiving waters. These impacts may be inadvertent; in attempts to address unrelated government issues, codes and ordinances frequently drive the creation of additional impervious surfaces such as larger parking lots, wide roads, curbed streets, etc. The scorecard addresses a variety of issues, and provides a quantitative scale that Sumner County will use to score its policies with respect to protection of receiving waters. The purpose of the evaluation is two-fold:

1. to help the permittee identify policies that may be creating obstacles to comprehensive and effective stormwater management, and
2. to identify preferred alternatives.

The county will be expected to make improvements to its policies currently creating barriers to protection of waters of the state. However, TDEC's intent is not to ultimately achieve a "perfect score". The score will not be used to measure compliance with the permit; rather, for the county to identify high priority areas for the community, and focus effort on those particular issues. Completed copies of the scorecard will be required with subsequent annual reports.[12]

The Implementation Element (7.0) identifies the use of the Water Quality Scorecard as a tool in updating the Sumner County Zoning Resolution and Sumner County Subdivision Regulations to ensure future policies remove barriers to implementing best management practices. Updating Sumner County's regulations to include options of utilizing green infrastructure BMPs or incentives for developers using the BMPs would be an appropriate next step while updating these policies.

KEY CONCEPT: CODES AND ORDINANCES REVIEW AND UPDATE
Sumner County will utilize the EPA's Water Quality Scorecard to assist in removing barriers to implementing stormwater improvement policies and to assess appropriate policies for the community. The scorecard will be a requirement of the Phase II permitting program administered by TDEC.

1 PROTECT NATURAL RESOURCES (INCLUDING TREES) AND OPEN SPACE

Sensitive Natural Lands/Critical Area Protection

QUESTION: Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?

GOAL: Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.

WHY: Protection of significant tracts of critical lands and wildlife habitat will aid in protecting and improving water quality by increasing infiltration and groundwater recharge, preventing erosion and contamination of ground water and surface water resources, and protecting sources of drinking water.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Identify and map critical natural resource areas (e.g., steep slopes, wildlife habitat, forests, drinking water source areas).	1		
The local comprehensive plan contains a natural resource protection element with goals calling for preservation of identified critical natural resource areas.	1		
Identify key natural resource areas for protection in jurisdiction's parks and open space plan.	1		
Assist landowners in identifying sensitive natural areas and laying out developments to avoid such areas.	1		
Local plans establish and enforce areas which are available for development and which lands are a priority for preservation.	1		
REMOVE BARRIERS:			
Protection of sensitive natural areas and wildlife habitat qualifies for credit towards local open space dedication and set-aside requirements.	1		
ADOPT INCENTIVES:			
Provide financial support to or collaborate with land trusts to acquire critical natural areas.	1		
Establish a dedicated source of funding for open space acquisition and management (e.g., bond proceeds, sales tax).	2		
Adopt a transferable developments rights program to provide an incentive for landowners to preserve sensitive natural lands and wildlife habitat.	1		
		PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE = _____

Figure 6-35: Example from the Water Quality Scorecard
Source: U.S. EPA (2009)

6.6.4 Water Consumption

A predominant determinant of land use development patterns is the availability of utilities—water and sewer. Traditionally, sanitary sewer service was available only within the cities. That has changed since several utility districts provide sewer service well outside the municipal limits. Lack of sewer service limits intensified development except by decentralized wastewater treatments that utilize Septic Tank Effluent Pumping (STEP) systems which have been allowed in Sumner County since 2001. Currently, there is only one STEP system operating in unincorporated Sumner County.

The provision of public water services is a similar issue. With the exception of the Cities of Gallatin, Portland, and Westmoreland, all water in Sumner County is provided by the three private utility districts—White House, Hendersonville, and Castalian Springs-Bethpage. Some portions of the county have no access to water, mostly in the northern parts of Sumner County. This population has no access to treated water and must utilize wells for a source of supply.

6.6.4.1 Utility District Service Areas & Supply Systems

Table 6-6 summarizes existing water demand of utility systems in Sumner County, and Figure 6-36 depicts the service area of the utility districts.

Castalian Springs-Bethpage Utility District serves the towns of Castalian Springs, Bethpage, and portions of Sumner County. Castalian Springs and Bethpage are located in the Cumberland River Basin. The Castalian Springs-Bethpage Utility District is a wholesale water provider and purchases all of their water supply from Gallatin, Hartsville, and Westmoreland, with the majority coming from Gallatin. The utility district has a 1.45 million gallon storage capacity which provides 38.9 hours of supply based on average gross water use. Castalian Springs-Bethpage is not certain of the ultimate capacity of their inter-connections to the utility districts from which they purchase water.

Gallatin Utility District serves the City of Gallatin and portions of Sumner County. Gallatin is located in the Cumberland River Basin. The utility district withdraws all of their water supply from the Cumberland River-Old Hickory Lake. Gallatin has two intakes built in 1954 located in the original channel of the Cumberland River prior to the lake being impounded. The depths of the intakes are 13 feet and 28 feet below the normal lake elevation of 445 feet. The original intake, built in 1925, still exists but is not utilized. Gallatin sells water daily to Castalian Springs-Bethpage and Westmoreland. White House is also connected to Gallatin, and they purchase water only during emergencies up to 1 MGD during dry summer months to fulfill their water demand. The capacities of the inter-connections from other utilities to Gallatin are 0.75 MGD to Westmoreland, 1.5 MGD to Castalian Springs-Bethpage, and 1 MGD to White House. Gallatin has a 13.5 million gallon storage capacity which provides 56.8 hours of supply based on average gross water use.

Hendersonville Utility District serves the City of Hendersonville and portions of Sumner County. Hendersonville Utility District is located in the Cumberland River Basin. Hendersonville Utility District's information is not included in much of the discussion of water consumption for the *2035 Comprehensive Plan* because much of the area around Hendersonville is serviced by White House Utility District or within the Hendersonville's planning region. There would likely be little coordination in the future between unincorporated Sumner County and the utility on planning issues at this point.

Portland Utility District serves the City of Portland and portions of northwest Sumner and northeast Robertson Counties. The utility district provides services in both the Cumberland River Basin and the Barren River Basin. Portland withdraws the majority of their water from West Fork Drakes Creek, and on

average of two months of the year during the summer to meet their requirements, they withdraw water from Portland City Lake. The Portland City Lake is used as an emergency supply when flow in West Fork Drakes Creek is too low to support water supply withdrawals. The Portland Utility District can withdraw from one source but not both, since the Portland City Lake is well above the surface level of the creek and releasing water from the lake into the treatment plant pump station results in some backflows through the intake into the creek. Since water quality in Portland City Lake is generally poorer than water quality in Drakes Creek, it is used only as an emergency supply during droughts. The Portland City Lake and West Fork Drakes Creek are located in the Barren River Basin. Portland also has an emergency connection to White House Utility District, the south and west end of the system, and Westmoreland Utility District. Portland has a 500,000 gallon clear well at the water plant and has 2.45 million gallons of tank storage which provides 35.4 hours of supply based on average gross water use.

Westmoreland Utility District serves the City of Westmoreland and portions of Macon and Sumner Counties. Westmoreland Utility District provides services in both the Cumberland River Basin and the Barren River Basin. Westmoreland is a wholesale water provider and purchases all of their water supply. They buy water from Gallatin and sell water to Castalian Springs. Westmoreland sells water to Portland only during emergencies and they purchase/sell water with Lafayette during emergencies. Portland has not bought water from Westmoreland for over four years. Westmoreland has two 500,000 gallon tanks for water storage which provides 62.7 hours of supply based on average gross water use.

White House Utility District serves the City of White House and portions of Robertson, Sumner, and Davidson Counties. The utility district is located in the Cumberland River Basin. White House withdraws their water supply from Old Hickory Lake. They have three intakes located on Old Hickory Lake in Hendersonville. On peak days in the summer, White House will purchase water from Gallatin and Springfield. On average they purchase 1 MGD from Gallatin and 0.25 MGD from Springfield during this time to fulfill their water demand. White House sells, on average, 1.6 MGD of water to Simpson County, Kentucky during dry summer months. White House has a 14 million gallon storage capacity which provides 33.6 hours of supply based on average gross water use.[12]

Table 6-6: Existing Water Demand[12]

Utility	Approx. Pop. Served	# of Accounts	Residential Accounts	Commercial Accounts	Industrial Accounts	Other Accounts	Avg. Quantity of Water Billed (MGD)	Estimate of Water Losses
Castalian Springs-Bethpage	9,958	3,772	-	-	-	-	0.66	26%
Gallatin	27,247	13,164	11,353	1,270	-	541	5.3	7%
Portland	16,005	6,613	6,109	50	454	-	1.4	30%
Westmoreland	3,450	1,480	1,327	118	1	-	0.29	30%
White House	76,464	28,671	27,505	1045	38	83 (Gov't)	7.5	32%

These utility districts mentioned except for Hendersonville are working with TDEC on a regional water resources planning pilot project for northern Sumner County. This regional planning effort was prompted by the extreme drought conditions in 2007 that posed threats to accessible water in this portion of Sumner County. The five utility districts and their water supply sources are listed in Table 6-7. More information about the regional planning pilot project is presented in Section 6.8 discussing the North Sumner County Focus Area.

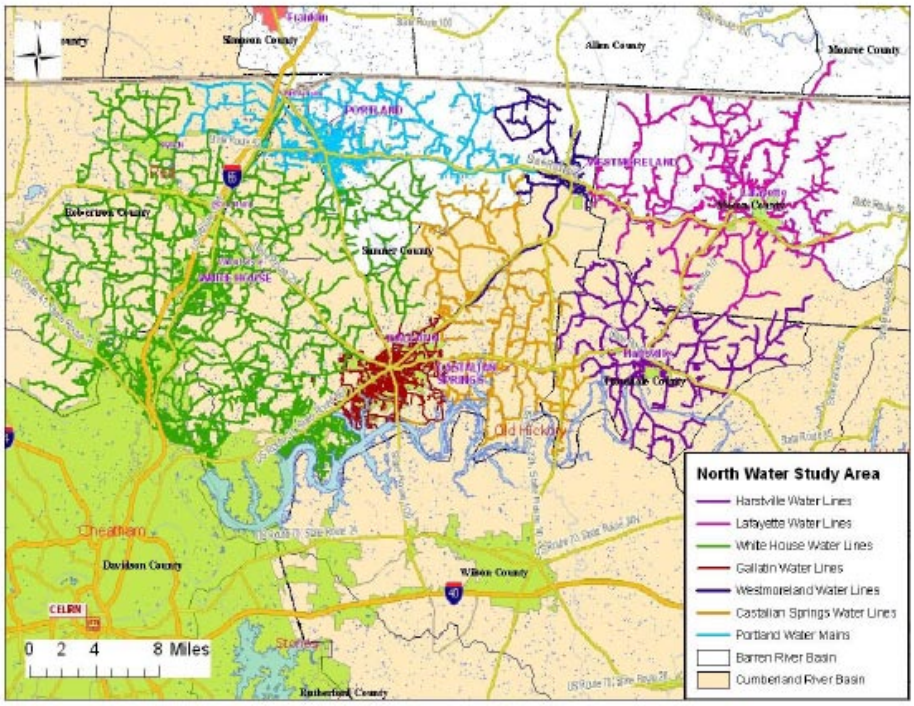


Figure 6-36: Water Supply Lines
Source: Regional Water Resources Planning Pilot Study for North Central Tennessee, U.S. Army Corps of Engineers (2009)

Table 6-7: Water Use Trends in Sumner County

Water Systems	Treatment Plant Capacity (MGD)	Sources/ Buyers/ Suppliers	Average Withdrawal (MGD)	Water Purchased (MGD)	Water Sold (MGD)	Gross Water Use (MGD)
Castalian Springs – Bethpage Utility District	-	Gallatin (seller) Hartsville (seller) Westmoreland (seller)	- - -	0.861 0.0167 0.0174	- - -	0.895
Gallatin Public Utilities	16.1	Cumberland-Old Hickory Lake Castalian Springs – Bethpage (buyer) Westmoreland (buyer) White House (summer buyer)	7 - - -	- - - -	- 0.861 0.4 -	5.7
Portland Utilities	2.4	Portland City Lake West Fork Drakes Creek	0.5 (2 mos/year) 2 (10 mos/year), 1.5 (2 mos/year)	- -	- -	2
Westmoreland Utilities	-	Gallatin (seller) Castalian Springs – Bethpage (buyer)	- -	0.4 -	- 0.0167	0.383
White House Utility District	20	Old Hickory Lake Gallatin (seller) Springfield (seller)	10 - -	- 1 (summer) 0.25 (summer)	- - -	10

Figure 6-37 reflects the water intakes and treatment plant locations in Sumner County. Not all of the utility systems in the North Central TN Study Area are situated to be able to economically take their

supply directly from the Cumberland River or its reservoirs. Many systems utilize tributary streams to the Cumberland River or, in some cases, ground water sources.[12]

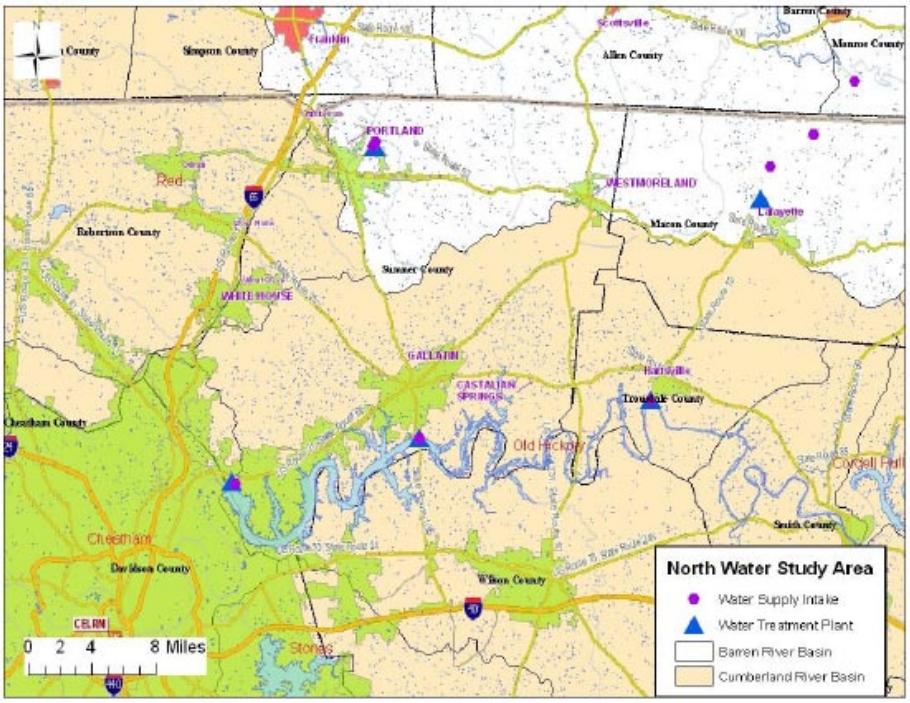


Figure 6-37: Water Supply Intakes and Treatment Plants
Source: Regional Water Resources Planning Pilot Study for North Central Tennessee, U.S. Army Corps of Engineers (2009)

The utility districts' source water protection areas are also relevant to their water intakes and treatment plants. Figure 6-38 shows source water protection areas and utility districts in the region. Safe and secure source water protection areas are a regional issue because adjacent utility districts are impacted by activities beyond their jurisdiction. Land use in these source water areas are rural to suburbanizing for the most part. Since these waters are located primarily south of the Ridge, areas adjacent to these water bodies would be susceptible to land development changes.

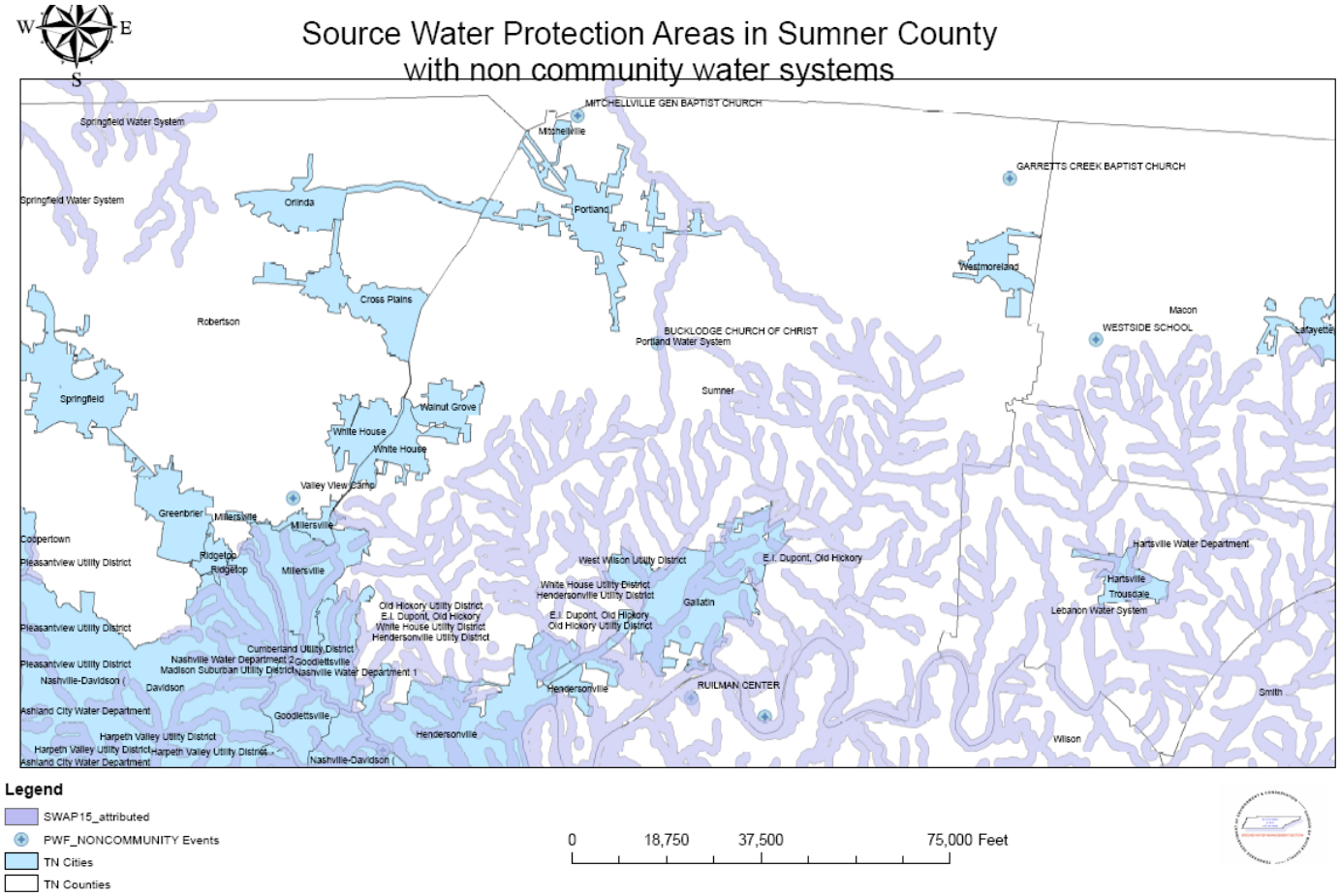


Figure 6-38: Source Water Protection Areas in Sumner County & Utility Districts
Source: TDEC Division of Water Supply

6.6.4.2 Utility Expansion Plans

Castalian Springs-Bethpage Utility District recently completed some expansions to their existing distribution system by extending lines to Taylor Hollow, off US 231. Macon County is expanding the distribution system past Taylor Hollow into Macon County. This will add 30-35 additional customers that are not able to be served by the Lafayette Utility District.

Gallatin Utility District plans to expand their water treatment plant when gross water use reaches 10 MGD (estimated next 20 to 30 years.)

Westmoreland Utility District recently completed two phases of expansion that extended 26,000 feet of 6 inch pipe to Dutch Creek Road.

White House Utility District has plans for expanding treatment and distribution in their district (details of this expansion have not yet been received). When White House reaches 90% of capacity they will upgrade their water treatment plant. They are currently at 80% of capacity. In the year 2013, a new plant is expected to be online with an increase in capacity of 4 MGD.[12]

6.6.4.3 Limiting Factors for Utility Expansion

Castalian Springs-Bethpage Utility District claims that money is their limiting factor for expansion of their existing distribution system. At the same time, Gallatin Utility District cannot extend service into areas controlled by other utility districts. The limiting factors of expansion for Portland are limited raw water supply and small rural line sizes. White House and Castalian Springs-Bethpage do not have any current limiting factors for expansion.

Existing demand for the current population, the number of utility connections, the number of municipal and industrial connections, current percent of water produced that is billed, and system losses within north Sumner County are shown in Table 6-6. The approximate population served for each utility district was calculated by taking the average household size from the 2000 U.S. Census and multiplying it by the number of residential accounts in the service areas.

Castalian Springs-Bethpage Utility District serves mainly residential accounts. The district serves only three convenience stores and one elementary school. They do not bill their water separately for these accounts. The average household size for Castalian Springs-Bethpage and surrounding Sumner County area is 2.64 persons.

Gallatin Utility District serves residential, commercial, and other accounts such as sprinkler systems. The majority of Gallatin's water is billed to residential accounts (80 to 90 percent). The rest of the water billed is to commercial or other accounts. The average household size for the Gallatin service area is 2.40 persons.

Portland Utility District serves a majority of residential accounts and a small amount of commercial and industrial accounts. On average, 90 percent of Portland's water billed is to residential accounts, six percent to commercial accounts, and four percent to industrial accounts. The average household size for the Portland area is 2.62 persons.

Westmoreland Utility District serves a majority of residential accounts and a fair amount of industrial accounts. The average household size for the Westmoreland area is 2.60 persons.

White House Utility District serves a majority of residential accounts, a fair amount of commercial accounts, and a small amount of industrial/other accounts. The average household size of the White House area is 2.78 persons.[12]

6.6.4.4 Self Supplied Users (Water Wells)

Water wells are still utilized in Sumner County, particularly in the northeast quadrant. All of the self supplied users in northern Sumner County are assumed to withdraw their water from groundwater sources. Since none of the utility districts provided their water use broken into different accounts, an average of 125 gallons per day per person was used to determine the estimated amount of water use by self supplied users in the study area.

Castalian Springs-Bethpage Utility District serves an area of roughly 124 square miles. Using 2000 U.S. Census data, it was determined that the service area has an approximate population of 20,040 persons. Since Castalian Springs-Bethpage serves an approximate population of 9,958, it was estimated that the population of self-supplied users in the service area is 10,082. With the average household size of 2.64 persons, the estimated number of potential new residential accounts is 3,819. With each person using

an average of 125 GPD, the estimated amount of self supplied water use in the service area is 477,375 GPD.

Gallatin Utility District serves primarily the City of Gallatin and the approximate population served is roughly the same as the approximate population of Gallatin. Therefore, it is estimated there are very few self supplied water users in the service area of the Gallatin Utility District.

Portland Utility District serves an area of roughly 104 square miles. Using 2000 U.S. Census data, it was determined that the service area has an approximate population of 20,824. Since the utility district serves an approximate population of 16,005, it was estimated that the population of self-supplied users in the service area is 4,819. With the average household size of 2.62 persons, the estimated number of potential new residential accounts is 1,839. With each person using an average of 125 GPD, the estimated amount of self supplied water use in the service area is 229,875 GPD.

Westmoreland Utility District serves an area of roughly 35 square miles. Using 2000 U.S. Census data, it was determined that the service area has an approximate population of 5,646. Since the utility district serves an approximate population of 3,450, it was estimated that the population of self-supplied users in the service area is 2,196. With the average household size of 2.60 persons, the estimated number of potential new residential accounts is 845. With each person using an average of 125 GPD, the estimated amount of self supplied water use in the service area is 105,625 GPD.

White House Utility District serves an area of roughly 385 square miles. Using 2000 Census data, it was determined that the service area has an approximate population of 102,229. Since the utility district serves an approximate population of 76,464, it was estimated that the population of self-supplied users in the service area is 25,835. With the average household size of 2.78 persons, the estimated number of potential new residential accounts is 9,293. With each person using an average of 125 GPD, the estimated amount of self supplied water use in the service area is 1.162 MGD.[12]

6.6.4.5 Water Shortages

Some of the utility systems in Sumner County experience shortages during periods of peak demand or face a situation where peak demand exceeds, or will exceed, local supply capabilities. Shortages may also occur due to inadequate treatment, transmission, or distribution capacity. These systems must supplement their supplies by further source development or water purchased from other systems.

During the 2007 and 2008 drought, Portland issued a mandatory cutback on water usage and utilized their emergency connections from White House Utility District. They evaluated their lake source daily, to determine if declaration of emergency status was necessary. They came close to determining it was an emergency situation but ultimately did not have to.

6.6.5 Existing Wastewater Systems

Wastewater treatment and discharge points are also relevant to the source water protection areas and infrastructure provided to residents. Figure 6-39 illustrates those points on a map within Sumner County.

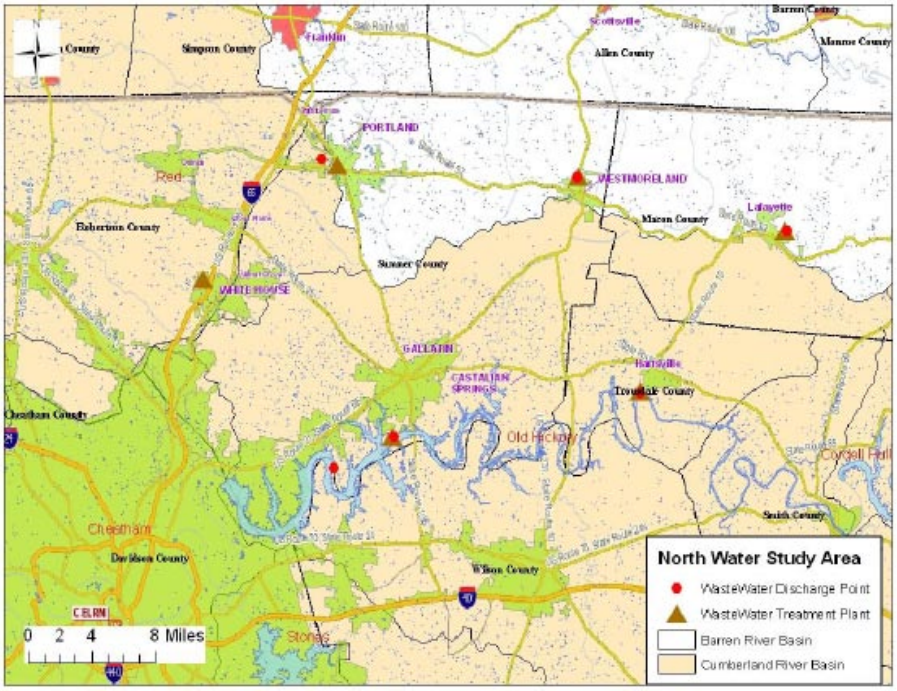


Figure 6-39: Wastewater Treatment Plants & Discharge Points
Source: Regional Water Resources Planning Pilot Study for North Central Tennessee, U.S. Army Corps of Engineers (2009)

Table 6-8 summarizes the key characteristics of the wastewater systems in Sumner County. Castalian Springs has no sewer customers or waste water treatment plant (WWTP).

Gallatin's WWTP is currently being upgraded to treat 11.5 million gallons per day. The plant has a 25 million gallon hydraulic capacity. Gallatin discharges into the Cumberland River.

Portland's WWTP has a 3.8 MGD capacity and treats 1.9 MGD on average and 3.8 MGD for peak flow. Portland discharges into Sumner Branch, which flows into the Red River.

Westmoreland has a 300,000 GPD capacity WWTP and discharges an average of 250,000 GPD to Little Trammel Creek.

White House has a small package system located in the Tanasi Shores development in Gallatin. The treatment plant has a 40,000 GPD capacity. They discharge an average of 18,000 GPD to Old Hickory Lake. The majority of White House's wastewater is pumped to Metro Nashville and to the City of Gallatin—an average of 250,000 and 200,000 GPD, respectively.

Lack of sewer service limits intensified development except by decentralized wastewater treatments that utilize Septic Tank Effluent Pumping (STEP) systems which have been allowed in Sumner County since 2001. Currently, there is only one STEP system operating in unincorporated Sumner County, and that system is maintained by the Tennessee Wastewater Facility in Creekview Estates. Some issues with STEP systems include:

- Accountability for maintenance by a utility or service provider.
- Potential burden upon the county or residents in the event of a failed system.

- Denser development in places that may not have been likely without the STEP system.
- System must meet state requirements.

Sumner County should continue to monitor the use of STEP systems and experiences in other communities. These systems have the potential to dramatically change the landscape in areas that would not have been developed because of a lack of sewer service.

Table 6-8: Existing Wastewater Systems[12]

Utility	Existing Capacity of WW Treatment (mgd)	# Sewer Customers	Method of Discharge	Location of WWTP	Location of Discharge	Avg. Discharge (mgd)
Castalian Springs-Bethpage	-	-	-	-	-	-
Gallatin	11.5	10,518	Direct Discharge	Lock 4 Road	Cumberland River	5.25
Westmoreland	0.3	847	Direct Discharge	City Park Rd.	Little Trammel Creek	0.25
White House	0.04	2,500	Majority Pumped to Gallatin and/or Nashville	725 Industrial Drive	Cumberland River	0.018

6.6.6 Water Governance

A utility district in Tennessee once established according to state law is operated and governed by a self-perpetuating board of commissioners. The boards enjoy almost total autonomy in managing the affairs of the district, and the district has the power of eminent domain and is tax exempt. Generally, the district is immune from pressures from its customers and from local governments. Such a mode of operation can be beneficial to some areas which have no water service; however, there is also wide latitude for abuse of the service provided. A major problem and criticism of utility districts is that they tend to discharge their responsibility of providing water services within a very narrow context and ignore the implications of their activities on other government programs or on land use and development.

Within Sumner County, the utility districts and the municipal water systems operate totally as separate entities within their respective service areas.[1] There is more interconnection or regionalization as districts purchase and sell water to each other.

Two and three inch water lines serving areas that were once rural and have experienced significant amounts of subdivision development have been an issue for Sumner County for decades. Because public water is now available more houses are built and land is subdivided. Inadequate water situations can easily occur and there is little to no possibility for fire protection. Although the Sumner County Regional Planning Commission requires six inch water lines in new subdivisions, the districts generally upgrade their installations as water pressure and flow levels become overtaxed or are planned for upgrades.[1] Table 6-9 details more water governance issues.

Table 6-9: Water Governance Issues

Category	Logging Rules	County Rules	State Rules	Federal Rules
Riparian Zone Setbacks	BMPs suggested and required permitting involving stream alterations and wetlands	25' from top of bank on all waters 60' from top of bank on impaired and high quality waters	NPDES permitting defers to county to implement	Clean Water Act & other legislation requires certain actions by States
Steep Slope Restrictions	BMPs suggested	None	None	None
Stormwater Requirements	Very little impact from forests except skid trails required	Stormwater Pollution Prevention Plan required (SWPPP) describing erosion control, buffers, etc. Periodic inspections required	NPDES permit required on all construction activity discharges	Clean Water Act & other legislation requires certain actions by States
Development Permitting	None	Must meet planning requirements – erosion control plans & construction plans required for major developments	Aquatic Resource Alteration Permit (ARAP) from TDEC involving discharges	None
Stream alteration permitting	Aquatic Resource Alteration Permit (ARAP) from TDEC involving discharges	Defers to State permitting	Aquatic Resource Alteration Permit (ARAP) from TDEC required	NEPA
Mining permits	Unknown	Unknown	Unknown	Unknown
Flood plain development	BMPs suggest leaving riparian zones in natural vegetative state and required permitting if altering streams or wetlands	Must meet Floodplain Requirements in Zoning – can be developed as 1 foot above flood elevation	None	FEMA Flood Insurance Program required for local gov'ts
Land Acquisition	None	None	Any state laws would apply to non-profits and setting up land trusts	Unknown
Landowner Water Rights	Unknown	None	Waters are a body of the state	Waters are a body of the state
Water Withdrawal Permits	None	None	TDEC would give approval	Corps of Engineers
Waterborne Illness Tracking	Unknown	"Hot Spot" identification & monitoring; Track all county facilities for discharges	Stream gauges to identify pollutants, TMDLs, and track trends	Stream gauges part of STORET to track trends

6.6.7 Water Risks

The primary threats to water resources are:

1. continued population growth and development, which converts land uses causing water quality and quantity issues;
2. increased stormwater runoff caused by developed impervious surfaces;
3. increased flooding chances because of the conversion of some forest land, development, and climate change;
4. continued development in the floodplain; and
5. increased water shortages because of population growth and climate change.

Similar to forest resources, population growth and development in the Middle Tennessee region is probably the greatest risk to water resources in Sumner County. With growth, there is an increase chance of pollution because of more residents undertaking activities that generate pollution. There is also an increase chance of converting forested areas to residential uses impacting stormwater runoff, water storage, and riparian zones. Water has the potential to run at higher velocities and volumes in these areas. Shortages are also possible as more demand causes strain on the existing infrastructure,

and utility districts may not be able to sustain their current systems, upgrade systems where there are issues, and expand systems as needed.

Population projections show an increase of about 80,000 people between 2010 and 2035. Figure 6-40 is used in earlier elements of the *2035 Comprehensive Plan*. Population growth is an important factor while analyzing water risks in Sumner County.

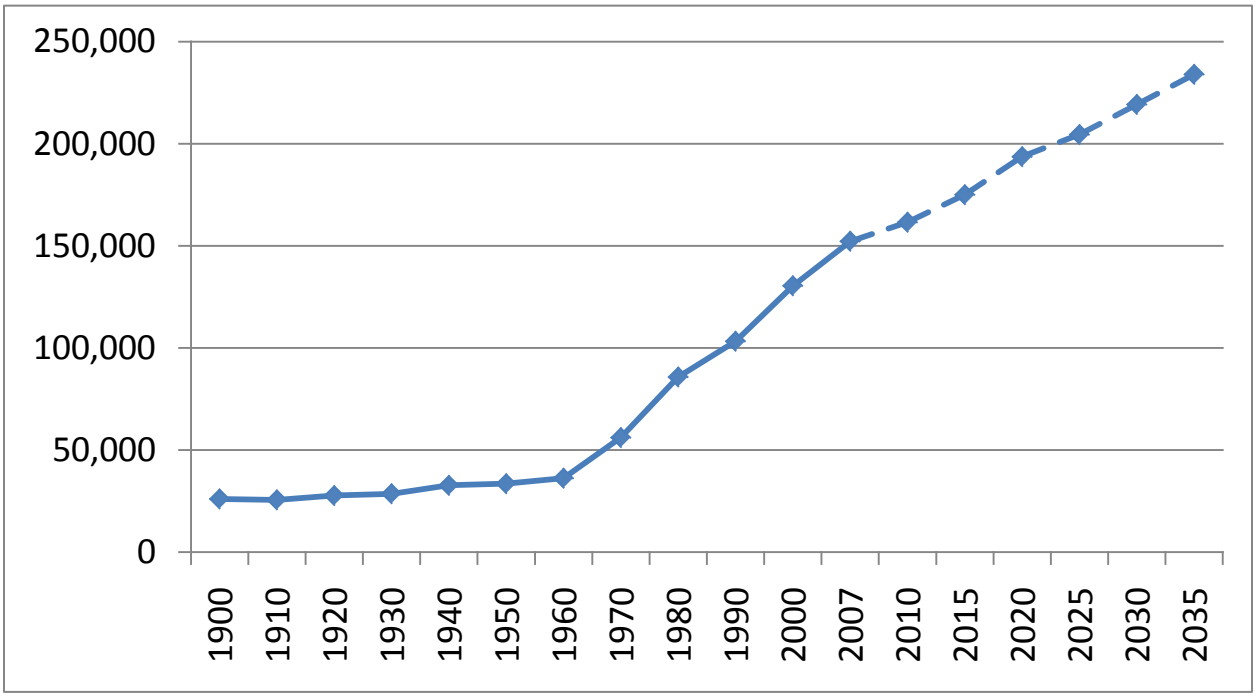


Figure 6-40: Sumner County Population - 1900-2035 (Projected)
Sources: U.S. Census, Bureau, Tennessee State Data Center, and Nashville Area MPO

Areas most prone to development are located within the urban growth boundaries of the municipalities and adjacent areas where water and sewer lines have been extended or upgraded. These areas include the Shackle Island and Tyree Springs areas. Castalian Springs has water lines but lacks efficient and effective solutions for wastewater treatment; however, that could change as a new planned community is anticipated at the end of Harsh Lane along the Cumberland River which will require the Castalian Springs-Bethpage Utility District to accommodate more water usage and solutions to wastewater treatment.

Other risks include flooding from increased stormwater runoff caused by development and removal of forested areas in the Middle Tennessee region. The climate of the Sumner County is characterized by warm, humid summers, relatively mild winters and generally abundant rainfall. The mean annual temperature for the area is around 60 degrees. Precipitation ranges from 44 to 52 inches per year, the majority of which occurs in the winter and spring.[1] With climate change, these weather trends are more extreme with longer periods of hot and cold temperatures and generally longer periods of wet and dry weather.

Looking back in history, there are several noteworthy years involving droughts and floods in Middle Tennessee (Table 6-10). Although pattern is difficult to discern, these events should be kept in mind

while making growth and development decisions. The Middle Tennessee region tends to go many years without a drought or flood, but when one of those severe weather events takes place, it causes significant damage and economic costs. Long range planning can help mitigate these situations or at least help Sumner County adapt to changing climate trends.

Table 6-10: Years of Weather Extremes

Years of Major Drought	Wettest Months on Record	
	May 2010*	16.43”
1930-1936	January 1937	14.54”
1987-1989	January 1882	14.51”
2007-2008	January 1950	13.92”
	December 1978*	13.63”
	December 1926*	13.53”
	February 1880	12.37”
	March 1975*	12.35”
	January 1913	12.30”
	June 1998	11.95”

*known association with major flooding

The 100 year floodplains are denoted on Figure 6-41. The May 2010 floods were believed to be a 500 year flood caused by a storm system sitting over Middle Tennessee for two days in a row dumping heavy rainfall for 12 hours or more at a time. It is imperative that Sumner County and its municipalities seriously examine their floodplain regulations and ensure the highest standards for building within floodplains or restricting development within floodplains. These risks are a matter of life and safety involving homes and entire communities. Currently, it is difficult to estimate how much development is occurring within the 100 year floodplains. These development issues along with the potential for longer periods of intense weather are the county’s reasons to examine its growth policies and regulations.

Figure 6-41: 100 Year Flood Plains in Sumner County
Data Source: FEMA

The Cumberland River Dam System was important in controlling flooding in many communities during the May 2010 flood event. Figure 6-42 shows significant and low hazard dams in Sumner County identified by TDEC.

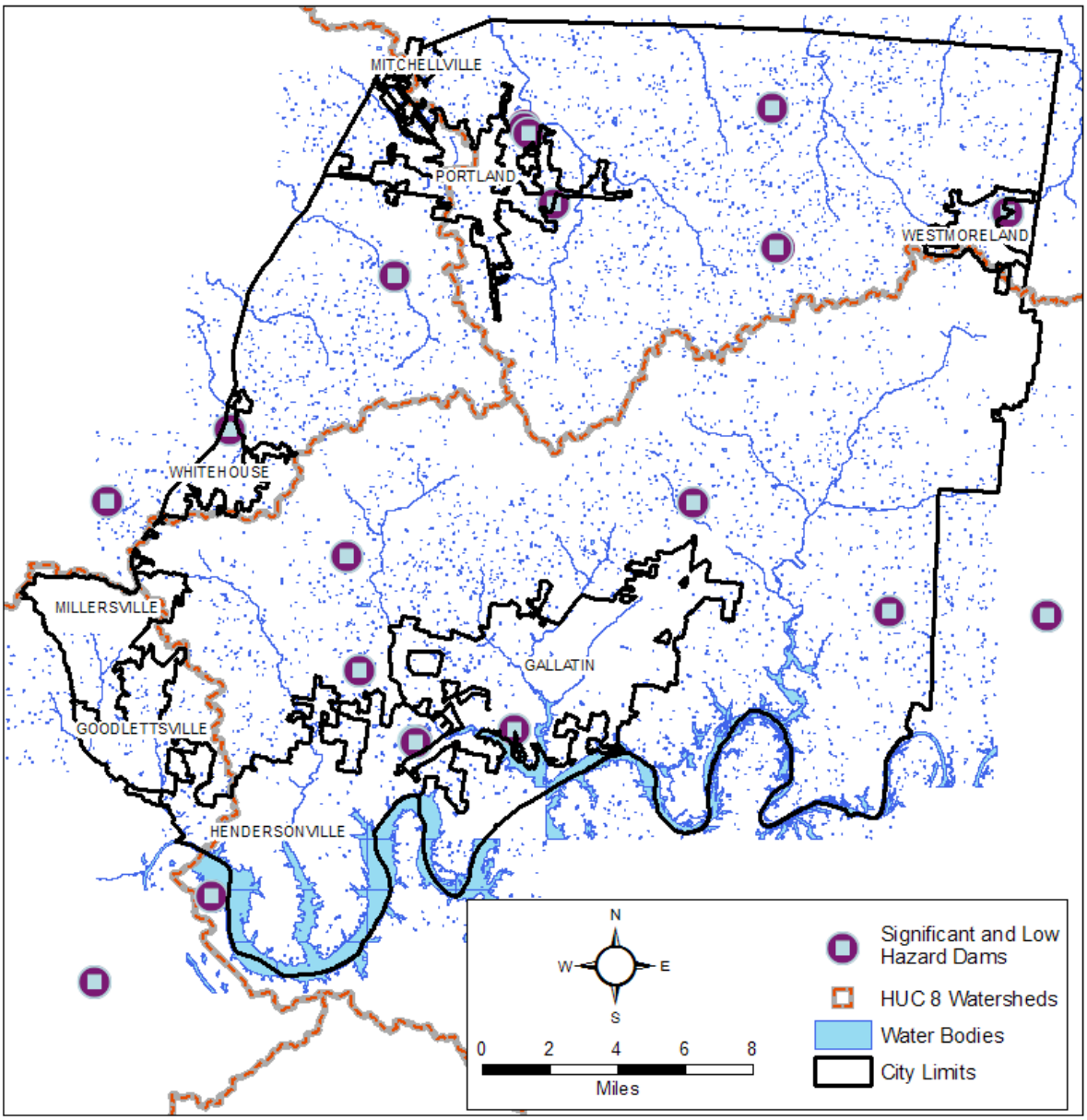


Figure 6-42: Significant and Low Hazard Dams in Sumner County
Source: TDEC Interactive Mapping

Water shortages are another significant risk to unincorporated Sumner County. The drought of 2007 and 2008 triggered the regional planning pilot for north-central Sumner County involving water quantity issues. This study is still underway, but it will lend guidance to water quantity issues in providing consistent service and in times where the weather might impact the ability to provide normal operations.

6.6.8 Water Opportunities

Table 6-11 summarizes opportunities for Sumner County involving water resources.

Table 6-11: Water Opportunities

Category	Time Frame	Possible Benefit	Policy difficulties	Other local factors?
Local governance				
Comprehensive Plan	Not required by State Law; Recommend updating at least every 5 years.	Establishes a collective vision for the County and its residents Provides guidance about appropriate development types and areas	Land owner property rights Lack of knowledge about implications by decision makers Not always implemented	Cities maintain separate plans and coordinate with County on Urban Growth Boundary areas
Zoning Resolution	Takes a minimum of 3 months to amend Zoning Resolution for Sumner County; public hearing at Planning Commission & County Commission	Rezoning can be denied if does not match adopted Comprehensive Plan or other reasons by County Commission	Sumner County rarely changes zoning types without property owner request Land owner property rights may be impacted Can be a politically controlled process	Cities maintain separate Zoning Ordinances
Subdivision Regulations	Can be amended within one month after public hearing at Planning Commission Opportunity to pull in BMPs involving green infrastructure	Impacts properties 5 acres or less Ensure infrastructure development is coordinated	Does not impact property owners on more than 5 acres of land Some land owners purposely subdivide at 5 acres to avoid planning process	State law defines a subdivision and no property over 5 acres is ever seen by the Planning Commission or staff for adherence to the Subdivision Regulations
Stormwater Resolution & Illicit Discharge Resolution	Can be amended by County Commission	Primarily impacts large developments by requiring SWPPP, erosion control & drainage plans Requires land disturbance permitting of major subdivisions Streams buffers will subdividing all properties	Land owner property rights may be impacted Can be a politically controlled process	Cities maintain own stormwater permitting programs
State governance				
Tennessee Water Quality Control Act	Can be amended by General Assembly in any legislative session	Strengthen permitting and stop work order processes involving BMPs and discharges	Permitting will be strengthened in future but not likely regarding forestry activities because considered agriculture	Sumner County has limited financial resources to implement processes
Watershed Management Plans	Most watershed plans last updated in 2008 by TDEC	Provides a watershed or regional approach to water issues Open and transparent process	Has been little coordination with local gov't planning divisions in the past	n/a
Non-governmental measures				
Conservation Easements	Land Trust of Tennessee actively works in the Middle Tennessee region with property owners	Education of property owners Land conserved for future generations Maintain rural feel Positive economic impacts	Lack of funding Very little local gov't planning to identify open space opportunities	Working with private property owners is important
Historical Associations	Some groups working to preserve cultural and historical resources particularly Bledsoe Lick Historical Association	Education of property owners Positive economic impacts with tourism Preserve the past Input on land use decisions	Lack of funding Lack of involvement in land use decision making in the past	Working with private property owners is important
Watershed Associations	Groups actively conduct educational workshops and programs for citizens and elected officials Provide advocacy	Provides an advocacy voice within the community of citizens Personal responsibility involving water issues	May have not been involved in land use decision making in the past	Financial resources

6.7 Cultural Resources in Sumner County

Sumner County was created by act of the North Carolina General Assembly, November 17, 1786, and obtained its area from the eastern portion of Davidson County, then the only county in Middle Tennessee. It is the second oldest county in the middle grand division and was at the time the fifth county organized in the state. The original bounds of Sumner County included areas that were later incorporated into the present counties of Wilson, Macon, Smith, and Trousdale, and it now contains 538 square miles.

The first permanent settlement in the area which is now Sumner County was made in 1779 at Bledsoe Lick. This is now known as Castalian Springs. Prior to that time, the territory had only been visited by hunters and explorers. The area was then a vast wilderness inhabited only by Indians and wild animals such as buffalo, bear, wildcat, deer, and a variety of small game. Thomas Spencer, a hunter and explorer, is known as the first permanent settler in the county and is reputed to have lived in a hollow sycamore tree at Bledsoe Lick in 1779.

Early settlements took place in close by forts or stations which were erected by the settlers for protection from Indian attacks. The most notable of these were Bledsoe's Station, at Bledsoe Lick, Mansker's Station, near Mansker Creek; Greenfield Station, about two miles north of Bledsoe Lick; Zeigler's Station, on Zeigler Creek about five miles southeast of Gallatin, and near Cairo; White's and Lander's Stations on Deshea Creek; and Hamilton's Station at the headwaters of Drakes Creek. There were other forts as well erected at various places in the county. These forts consisted mostly of stockades, made of timbers set upright, and they afforded good protection from Indian attacks. The early pioneers settled in groups around these forts.

In addition to hardships caused by the Indians, early settlers also had to carve a place for home and farm out of a heavily wooded wilderness. The timber consisted of such excellent hardwoods as oak, poplar, chestnut, walnut, beech, maple, elm, and hickory. The settlers were forced to reduce grain to flour or meal by the use of the mortar, and later by small horse mills. The first permanent water mill was erected by George Winchester on Bledsoe Creek at the crossing of the Nashville and Carthage Turnpike. This was later known as Stump's Mill. Soon after 1800, another mill was erected on Station Camp Creek near Gallatin, and a third mill on Drakes Creek now in Hendersonville. Grist and saw mills were continuously erected as the county was settled and developed.

After fields were created from wooded areas, the raising of cotton and tobacco was introduced, and cotton was a staple crop. Tobacco has long been a vital crop on the highlands in the northern part of the county where the soils are particularly well suited for that crop.

By an act passed in November of 1801, the General Assembly of the State of Tennessee appointed Samuel Donelson, Shadrick Nye, James Wilson, Charles Donoho, and Major Tomas Murray commissioners to purchase forty acres of land and lay out a town for the seat of justice to be called Gallatin, to superintend the sales of lots, the erection of public building, and for other purposes. Accordingly, the commissioners on February 25, 1802, purchased from Captain James Trousdale, for $490, the original site of the Town of Gallatin which contained 42.5 acres, including one acre reserved by the grantor and 1.5 acres in the public square. The town was surveyed and platted, and the sale of lots made in the spring of 1802.

Numerous springs were found throughout the county, many with mineral waters. These contributed to the early development of the county. The variety of mineral waters at Tyree Springs at the head of Drakes Creek in western Sumner County earned Tyree the reputation as "the most celebrated watering place in the state." The mineral waters at Castalian Springs provided the basis for a spa and resort development which began around 1828 and was quite noteworthy with Nashvillians as Nashville began to grown and urbanize.[1]

The details described in the above paragraphs were extracted from the *Land Use Plan for Sumner County* in 1977. This plan was developed for 2000, and it recognized the importance of the county's history. Through the vision surveys and feedback from public meetings the rural atmosphere in the county and its cultural resources were mentioned as important qualities to maintain for Sumner County. Unfortunately, the *2035 Comprehensive Plan* does not have sufficient room to further identify the cultural resources of historic significance in Sumner County. The goal of this plan was to at least mention the value of the county's natural and cultural heritages and prepare the county for more detailed work needed to identify and assess these cultural resources that are worthy of preservation. In the Implementation Element (7.0), the creation of subarea plans is identified as action items. During this process, county officials should collect and assess cultural resources information unique to each subarea and more heavily consider these resources as part of those plans.

The Bledsoe Lick area or Castalian Springs is noted in this element as a focus area because of involvement of the Bledsoe Lick Historical Association in the *2035 Comprehensive Plan* and because of the association's detailed work to protect Sumner County's early settlement and develop a tourism industry encompassing the county's cultural heritage. The land ownership information included in numerous maps in this element show some of the properties of significance in the Bledsoe Lick area. More specific noteworthy strategies are explored in the Focus Area discussion (Section 6.10) and within the Implementation Element (7.0) that build upon the Historical Association's plan for Bledsoe Lick.

6.8 Putting It All Together

The Natural & Cultural Resources Element contains a variety of information never analyzed together in one document for Sumner County. The element was developed because of the large amount of public and stakeholder input emphasizing the importance of Sumner County maintaining its natural resources and preserving its past. Although these resources are discussed rather distinctly within the element, it is necessary to pull these together and identify possible areas for Sumner County to consider for action strategies during implementation of the *2035 Comprehensive Plan*. Figure 6-43 identifies all the "high value" resources in Sumner County. These areas include forest cover; high productivity forests; all water bodies; high quality streams; floodplains; critical aquatic, subterranean, and terrestrial habitats; and properties within a land trust or maintained for conservation.

Figure 6-44 overlays potential development threats to water, forest, and cultural resources in relationship to the high value resources. This is best illustrated by the adopted Growth Plan from 1999 required by Tennessee's Public Chapter 1101 depicting urban growth boundaries, planned growth areas, and rural areas for the county. City limits are also noted on the maps. Growth and development is anticipated to occur over the next 10 to 25 years in these areas. The Growth Plan has not been updated since its initial adoption, so changes will be necessary in the future to the 1101 Growth Plan for Sumner County. At that time, serious consideration should be given to the analysis of water, forest, and cultural resources in this element to modify growth areas.

The impaired waters and streams and drainages impaired by siltation are also illustrated as threats on Figure 6-44. These characteristics are likely more of a reflection of the changing development trends in Sumner County.

The dashed circles are areas where significant resources overlap with possible threats. The outline below corresponds with the numbers on Figure 6-44 and outlines the resources and threats. These areas should be further examined in subarea plans and model strategies outlined in the three Focus Areas in Sections 6.8, 6.9, and 6.10 should be considered.

1. **Tyree Springs Area**
    a. Resources:
        i. Concentrated forest cover
        ii. Some high productivity forests
        iii. Steep slopes
        iv. Terrestrial habitat identified in SWAP
        v. Streams and floodplain
    b. Threats:
        i. Portions within White House urban growth boundary
        ii. High growth area for unincorporated Sumner County particularly towards Hendersonville
        iii. Water and sewer service are available in the area
        iv. Siltation impaired streams nearby

2. **The Ridge**
    a. Resources:
        i. Concentrated forest cover
        ii. Some high productivity forests
        iii. Some extremely steep slopes
        iv. Boundary between watersheds (headwaters)
        v. Limited expansion of water and sewer through the Ridge thus far
    b. Threats:
        i. Zoning that allows intense developments on steep slopes
        ii. Identified within the county's planned growth area
        iii. Widening of SR 109 almost completed that may generate additional growth and development

3. **Bethpage-Bransford Areas**
    a. Resources:
        i. Concentrated high productivity forest cover
        ii. Steep slopes
        iii. Terrestrial habitat identified in SWAP
        iv. Taylor Hollow nearby
        v. Historic Bethpage community
        vi. Bledsoe Creek & floodplain
        vii. Greenways planned to traverse through area in the future
    b. Threats:
        i. Growth and development from US 231 and US 31E/SR 6 intersecting in the area
        ii. Limited financial resources to construct greenways

iii. Development existing that has followed valleys around the slopes
iv. No historical plan for Bethpage community
v. Current zoning does not support revitalization of Bethpage community
vi. Castalian Springs-Bethpage Utility District has expansion plans in the area

4. Castalian Springs (Bledsoe Lick) Area

a. Resources:
   i. Significant land ownership by non-profit organizations or government to preserve historic sites
   ii. Some property within a land trust
   iii. Historic community assets such as Bledsoe's Fort Historical Park, Wynnewood, Castalian Springs Mound Site, and Hawthorne Hill
   iv. Bledsoe Creek State Park and nearby recreational opportunities
   v. Bledsoe Creek & Old Hickory Lake/Cumberland River nearby with floodplain running through community
   vi. Annual Colonial Days Festival
   vii. Area is not within an municipal urban growth boundary
b. Threats:
   i. Residential development has occurred both north and south of the community which may generate need for local commercial services
   ii. Area is located within the county's planned growth area
   iii. SR 25/Hartsville Pike runs through area making development more attractive
   iv. Tornado in 2008 destroyed or damaged some key landmarks in the community and these structures have not been completely restored
   v. Current zoning does not support revitalization of Castalian Springs community – no historic zoning district or commission established
   vi. Castalian Springs-Bethpage Utility District has expansion plans in the area

5. North Sumner County

a. Resources:
   i. Aquatic and subterranean habitats identified in SWAP
   ii. Concentration of high productivity forest near Kentucky State Line
   iii. Streams connect to watersheds across state and county lines
   iv. Limited water and sewer infrastructure
b. Threats:
   i. Flat land within Portland urban growth boundary possible to develop
   ii. I-65 nearby making residential growth attractive
   iii. Expansion of water service that may bring negative growth aspects

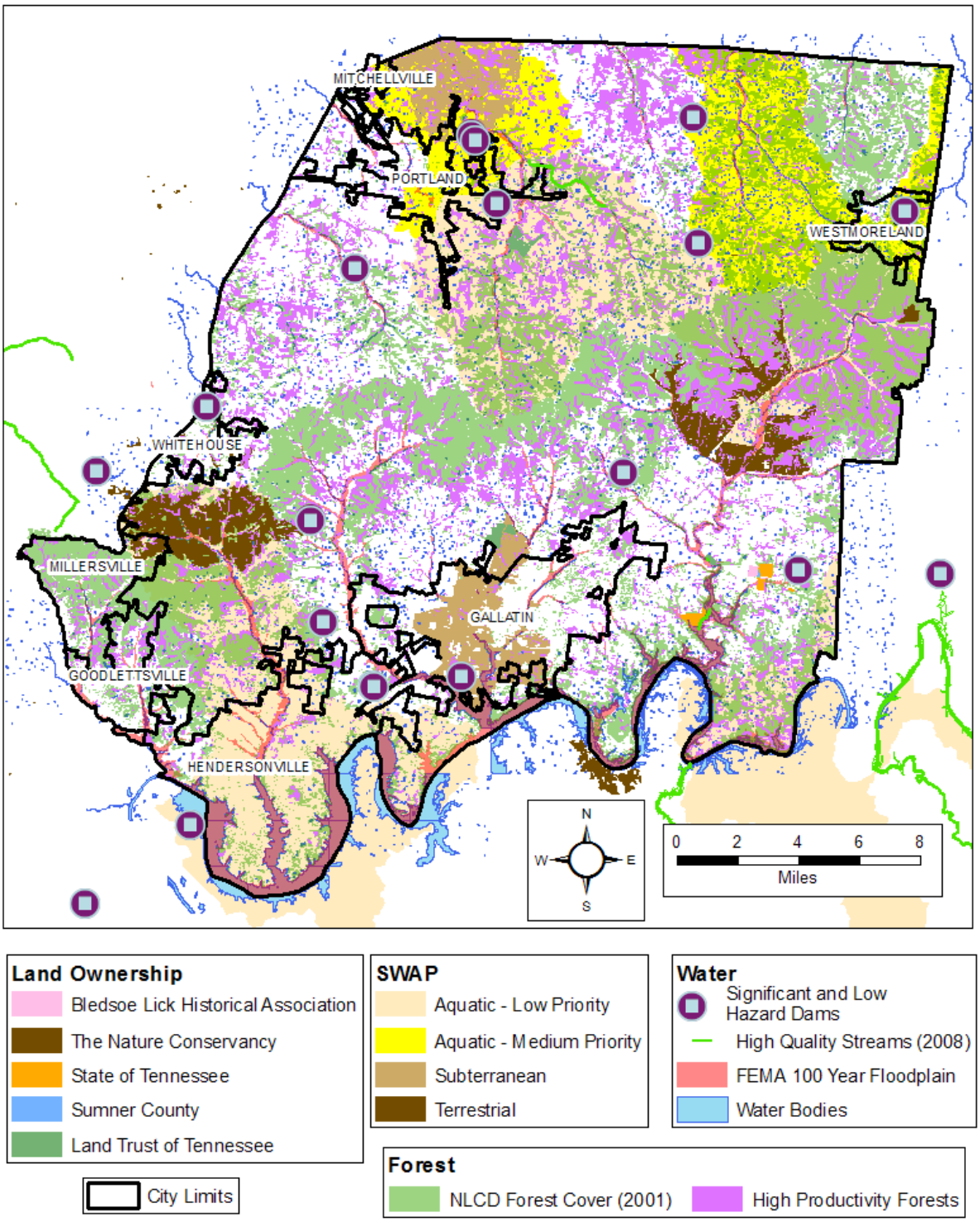


Figure 6-43: All High Value Resources in Sumner County

Data Sources: Cumberland Region Tomorrow, TDEC Interactive Mapping, FEMA, Tennessee DOA Division of Forestry Resources Management Unit, Sumner County Property Assessor, Land Trust of Tennessee, Bledsoe Lick Historical Association, The Nature Conservancy, and United States EPA's Multi-Resolution Land Characteristics Consortium

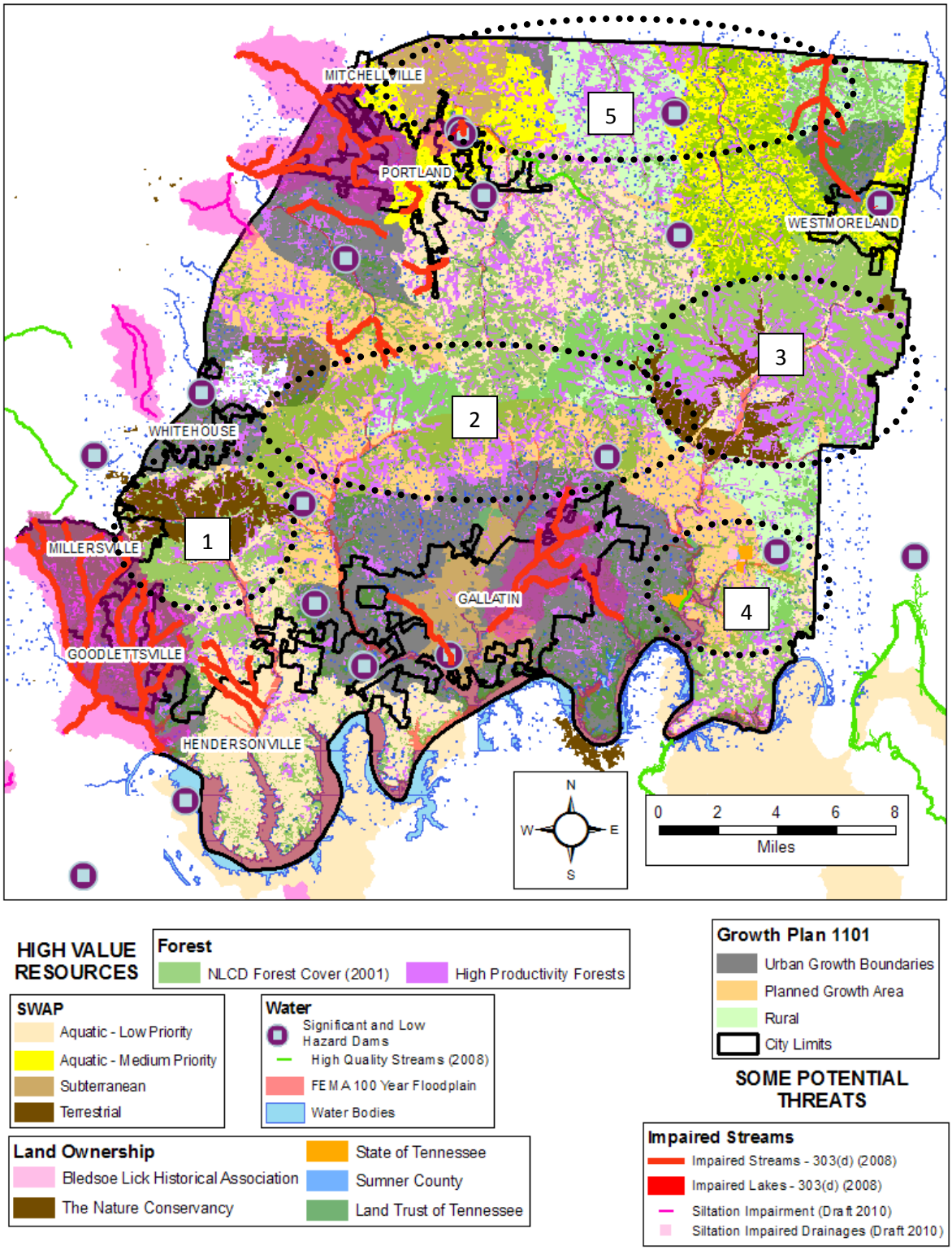


Figure 6-44: Growth Threats to High Value Resources in Sumner County

Data Sources: Cumberland Region Tomorrow, TDEC Interactive Mapping, FEMA, Tennessee Division of Forestry Resources Management Unit, Sumner County Property Assessor, Land Trust of Tennessee, Bledsoe Lick Historical Association, The Nature Conservancy, United States EPA's Multi-Resolution Land Characteristics Consortium

6.9 Focus Area: North Sumner County

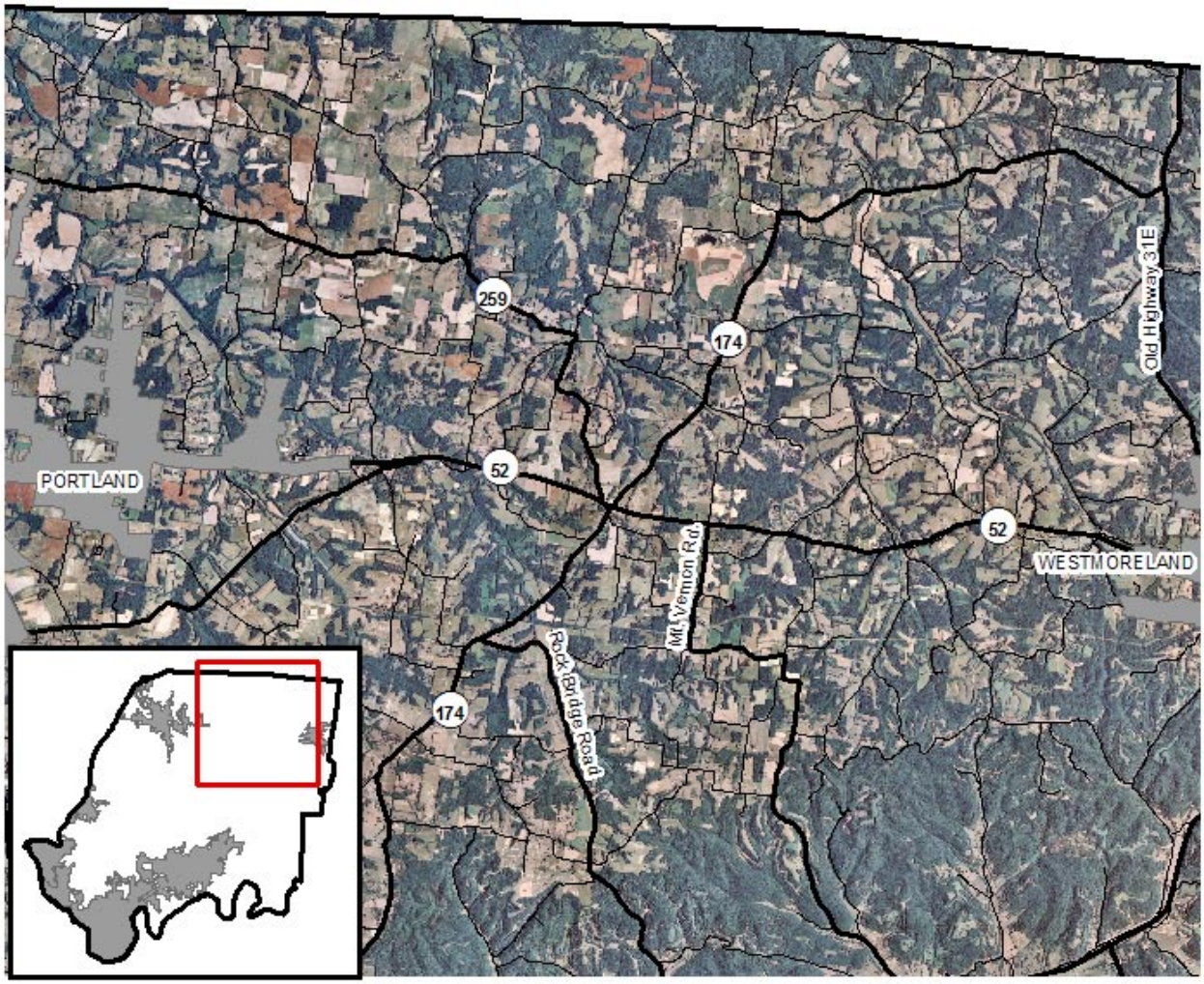


Figure 6-45: General Area of Water Quantity Issues in Northern Sumner County

Resources Issue – Water Quantity

The availability of clean water in northern Sumner County has been an issue as some residents no longer have the ability to draw from wells.

Background

Water shortages were an issue in northern Sumner County in 2007 and 2008 because of drought conditions that were experienced throughout the Middle Tennessee region. There was a desire to be better prepared for this kind of resource scarcity and the stress that growth and development are placing on water resources in some communities. In accordance to the Tennessee Water Resources Information Act, TDEC organized a Water Resources Technical Advisory Committee to make recommendations on water resources issues. The 16 member committee provides insight from diverse perspectives with the objective to help refine and improve water management policies or options for the department. The Advisory Committee consulted with TDEC on the development of a drought management plan, which was finalized in February 2009. The document is an update to a drought management plan released in 1987. It outlines TDEC's role during a drought, facilitates planning, and

provides a framework for action and cooperation in water resources management among the many local, state, and federal agencies with drought-related responsibilities.

TDEC also developed a guide entitled Guidance for Developing Community Water System Drought Management Plans to provide community water systems with the necessary elements of a drought management plan. This guide is designed to promote increased preparedness so that a drought's adverse impacts would be mitigated. The guidance includes suggested drought management planning steps.

The Advisory Committee reviewed impacts form the drought of 2007 and discussed the benefits of a regional planning effort. The Advisory Committee recommended that TDEC pilot regional water resource planning projects to validate those benefits and develop a model regional water plan.

In late 2008, TDEC partnered with the U.S. Army Corps of Engineers Nashville District, members of the Advisory Committee, and other regional planning experts to initiate a water resources planning pilot in two areas significantly impacted by the drought of 2007. The planning partners on this project also include the USGS, Tennessee Association of Utility Districts, Tennessee Department of Agriculture, Tennessee Advisory Commission on Intergovernmental Relations, Tennessee Valley Authority, Tennessee Wildlife Resources Agency, The Nature Conservancy, Land Trust for Tennessee, and Tennessee Tech University. One area included the North Central Tennessee region involving Sumner County, Portland, Gallatin, Castalian Springs-Bethpage, White House, and Westmoreland Utility Districts.[13] Currently, TDEC is conducting this process which has involved gathering of water system infrastructure data, water consumption for the area, and studying the interconnectedness of the system in Sumner County with the region. The document, *Water Resources Regional Planning Pilot for North Central Tennessee – Phase 1*, was released in March 2009 detailing much of this information. TDEC is modeling water usage in the area and examining how improvements might impact service. Presently, there have not been recommendations released from this study; however, the impacts of this study will be important as unincorporated Sumner County continues to grow in the future.

In this area of Sumner County, there are aquatic and subterranean habitats identified in the SWAP. There are also impaired streams due to some farming practices and development around the Portland City Limits. Additionally, high productivity forest cover is found around the Nubia area in north Sumner County. There are also several large parcels that have a large quantity of forested acres noted by the Division of Forestry. Currently, water infrastructure is not as prevalent as in southern Sumner County, but expansion of water infrastructure in this area could significantly impact growth and development in northern Sumner County in the future. SR 52 connecting Portland and Westmoreland is an improved highway and connects to Interstate 65 making shorter commutes to Nashville and Bowling Green, where more employment opportunities can be found. The recommendations that will be drawn from the pilot planning process will be important in preparing Sumner County for additional growth and/or protecting natural and cultural resources in this area of unincorporated Sumner County.

Model Best Practices

- Sumner County should remain actively involved in the regional water resources planning pilot.
- TDEC should continue discussions with Sumner County and municipal elected officials concerning growth concerns.
- The utility districts that serve Sumner County and planning departments should actively communicate and coordinate growth and development issues.

6.10 Focus Area: Taylor Hollow

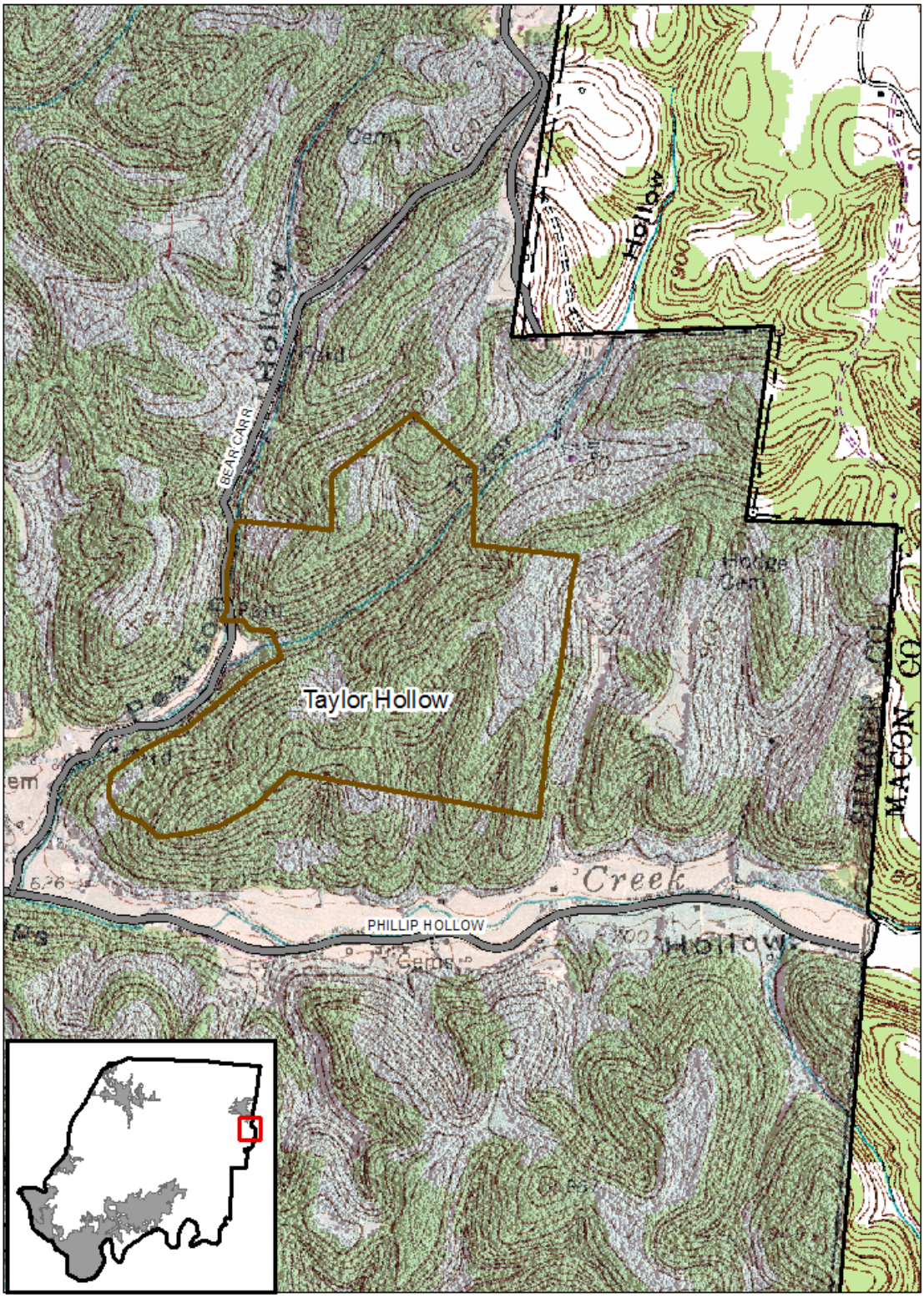


Figure 6-46: Location of Taylor Hollow State Natural Area

Resources Issues – Steep Slope & Forest Cover

The area of northern Sumner County near the Macon and Trousdale County Lines is forested with areas of steep slopes. This area is still rural; however, US 231 travels nearby and acts as a bypass for truck traffic and other vehicles around the Nashville area. The highway has been improved between Bowling Green and Scottsville, Kentucky making it an attractive travel option between I-65 and I-40 around Nashville.

Background

Taylor Hollow is a 173-acre natural area located in Sumner County on the Western Highland Rim and is owned by The Nature Conservancy. It is a Class II Natural-Scientific State Natural Area and is part of The Nature Conservancy's Ecoregional Planning Terrestrial Portfolio. It is a botanically rich and a biologically diverse area that is one of only a very few areas remaining like this in Middle Tennessee that has been minimally impacted by human activity. The natural area is characterized by narrow winding ridges and separated by steep V-shaped valleys that drop 200 to 300 feet from the ridge. Its rich hollows provide habitat for a spectacular display of spring wildflowers and is highlighted by a carpet of blue-eyed Mary (Collinsia verna). The rare Ozark least trillium (Trillium pusillum var. oazarkanum) is another noteworthy species that occurs here. It is an evolutionary intermediate between sessile and stalked forms of trillium.

Taylor Hollow's forest community is generally considered old growth though some very selective cutting for commercially important species may have occurred here. The mixed mesophytic forest is particularly interesting because its species composition is very similar to an East Tennessee forest. The forest structure is indicative of old growth with snags and large standing live trees along with decomposing logs and organic forest matter in decay on the forest floor. The vast occurrence of blue-eyed Mary is also indicative of old growth. Blue-eyed Mary is sensitive to forest disturbance like logging and probably was once much more abundant in moist rich Middle Tennessee forests before logging occurred. The mixed mesophytic forest includes sugar maple, tulip poplar, numerous oak and hickory species, ash species, buckeye, basswood, yellow wood, and beech, only to name but a few species. The mixed mesophytic forest is considered the most biologically diverse forest community in the eastern deciduous forest.[14]

Model Best Practices

- Identify other areas in Sumner County for restoration with minimal human activity.
- Identify areas in Sumner County with forest cover and steep slopes that should not be developed and work with property owners on conservation strategies.
- Work with local non-profit organizations to help manage areas with similar characteristics to ensure conservation in the future.
- Assess how future growth with improved highways and infrastructure might impact natural areas like Taylor Hollow.

6.11 Focus Area: Bledsoe Lick Area

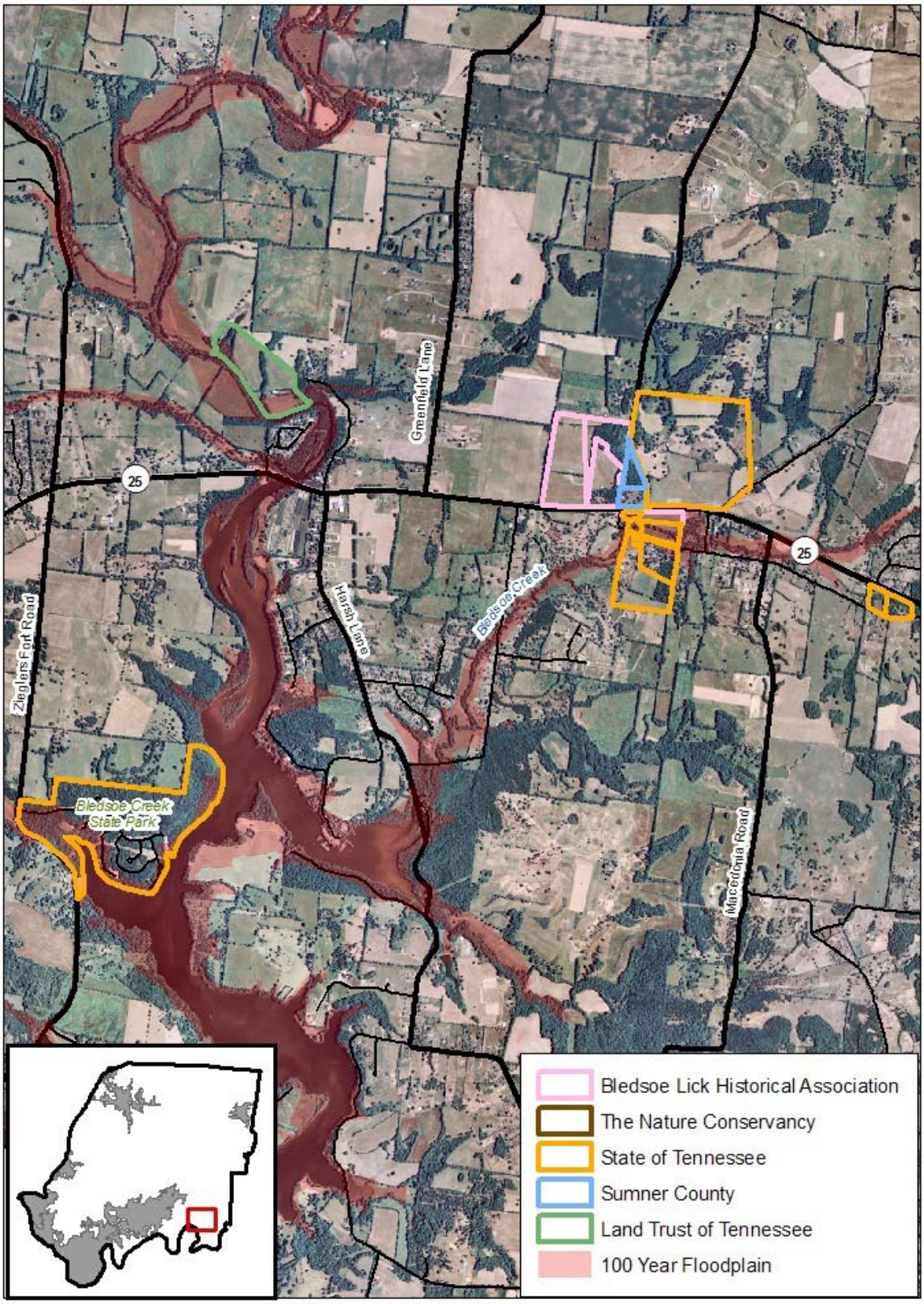


Figure 6-47: Location of Historic Bledsoe Lick

Resources Issues – Significant Cultural Resources and Water Bodies

The Bledsoe Lick area or Castalian Springs community in Sumner County is a culturally rich area founded on Bledsoe Creek. Several historic structures, landmarks, and grounds are in the area with some significant properties under non-profit organizations or governments' ownership. Bledsoe Creek meanders through the community with the State Park close by. Recreational and tourism opportunities exist and could be further expanded.

Background

There are four significant historic sites in Castalian Springs – Castalian Springs Mound Site, Bledsoe's Fort, Wynnewood State Historic Site, and Hawthorne Hill. There is evidence that people may have lived in the area of Historic Bledsoe's Lick as early as 15,000 years ago. The Castalian Springs Mound Site was occupied around 1,000 AD to 1,450 AD. When the first European settlers arrived in the late 18th century the area was a hunting ground for several Native American groups. It was toward the end of that century, about 1784, that Isaac Bledsoe built his fortified station. Bledsoe did not live to see it but by 1796 Native Americans had been driven from Middle Tennessee.

By the beginning of the 19th century substantial houses such as Hawthorne Hill (ca. 1800) were built in Castalian Springs. The massive log structure named Castalian Springs was completed about 1830. Not long after, the community of Bledsoe's Lick adopted the name. It was not until the 1940s that the property was named Wynnewood after that family that had lived there for over a century.[15]

The Bledsoe Lick Historical Association developed *A Preservation, Management, and Interpretive Plan for Historic Bledsoe's Lick* to address the four properties mentioned and future opportunities. Partners in this planning work were the Tennessee Wars Commission, Tennessee Historical Commission, Tennessee Division of Archaeology, Sumner County Commission, Sumner County Convention and Visitors Bureau, Middle Tennessee State University, and Associated Native American Tribes. The objectives of the plan are:

- construct a visitor center at Bledsoe's Fort Historical Park;
- increase visitation to both Bledsoe's Fort Historical Park and Wynnewood; and
- open Hawthorne Hill and Castalian Springs Mound Site to the public.[15]

Priorities are placed on preserving specific parcels through conservation easements and influencing future development that is appropriate for the viewshed. Issues involving identifying additional structures for preservation, managing the sites, marketing the area, and developing a well-designed interpretative program are discussed within the plan.

Model Best Practices

- Work with county officials particularly the Sumner County Board of County Commissioners and the Sumner County Regional Planning Commission to implement the Plan for Historic Bledsoe's Lick.
- Identify potential parcels and properties of historic significance for conservation easements.
- Market the area's natural and cultural resources as a tourism initiative and economic driver for the county.
- Link the natural and cultural resources that are in proximity together such as the Bledsoe Creek State Park and the original Bledsoe Lick community.
- BLHA members should stay involved in development decisions regarding private property in the immediate Bledsoe Lick area.

Natural & Cultural Resources Element Endnotes

[1]Tennessee State Planning Office, *Land Use Plan – Sumner County, Tennessee* (1977).

[2]Tennessee Department of Environment and Conservation Division of Water Pollution Control Watershed Management Section, *Barren River Watershed (05110002) of the Ohio River Basin Watershed Water Quality Management Plan* (2007).

[3]Tennessee Department of Environment and Conservation Division of Water Pollution Control Watershed Management Section, *Cheatham Lake Watershed (05130202) of the Cumberland River Basin Watershed Water Quality Management Plan* (2008).

[4]Tennessee Department of Environment and Conservation Division of Water Pollution Control Watershed Management Section, *Old Hickory Lake Watershed (05130201) of the Cumberland River Basin Watershed Water Quality Management Plan* (2007).

[5]Tennessee Department of Environment and Conservation Division of Water Pollution Control Watershed Management Section, *Red River Watershed (05130206) of the Cumberland River Basin Watershed Water Quality Management Plan* (2007).

[6]United States Army Corps of Engineers, *Old Hickory Lake Shoreline Management Plan* (2008).

[7]Cumberland River - http://en.wikipedia.org/wiki/Cumberland_River. Accessed on June 30, 2010. Cumberland river Wikipedia site

[8]Cumberland River Compact, About the Cumberland River Basin Website - http://www.cumberlandrivercompact.org/. Accessed on June 15, 2010.

[9]Red River Watershed Association, Watershed Info Website - http://www.redriverwatershed.org/. Accessed on June 15, 2010.

[10]Tennessee Wildlife Resources Agency, *Tennessee's Comprehensive Wildlife Conservation Strategy* (2005).

[11]United States Army Corps of Engineers and Tennessee Department of Environment and Conservation, *Regional Water Resources Planning Pilot Study for North Central Tennessee – Phase 1* (2009).

[12]Tennessee Department of Environment and Conservation, *Rationale Sheet for NPDES General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), Permit No. TNS000000* (2010).

[13]Tennessee Department of Environment and Conservation, Water Resources Regional Planning Website - http://www.state.tn.us/environment/regionalplanning/. Accessed June 15, 2010.

[14]Tennessee Department of Environment and Conservation Resources Management Division, Taylor Hollow State Natural Area Website - http://www.tennessee.gov/environment/na/natareas/taylor/. Accessed June 18, 2010.

[15]Tennessee Wars Commission by Mudpuppy & Waterdog, Inc. *A Preservation, Management, and Interpretative Plan for Historic Bledsoe's Lick*, (2007).

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