

Roadless Areas and Designated Wilderness

Introduction

People are interested in the number, size, location, and status of roadless areas in the Southern Appalachians. This is the first step in the evaluation of potential wilderness, which is to identify and inventory all roadless, undeveloped areas that satisfy the definition of wilderness found in Section 2 (c) of the 1964 Wilderness Act (FSH 1909.12, Chpt. 7, item 7.1). Roadless areas are places that have regained or are regaining a natural, untrammeled appearance; any signs of prior human activity are disappearing or being muted by natural forces. Criteria provide for an individual roadless area to include no more than one-half mile of improved road for each 1,000 acres.

Roadless areas are thought to comprise the last remaining large tracts of natural appearing land in the region, other than wilderness. Some people want to know where roadless areas occur because of their interest in protecting natural areas from development. Others are interested in identifying future potential wilderness.

Public land is viewed as the chief provider of roadless areas in the Southern Appalachians. This assessment reports the current status of these areas on public land. In national forests, roadless areas are the tracts that are evaluated for potential wilderness designation during the forest land management planning process.

People are also interested in the current condition of wildernesses. Wilderness as defined by the 1964 Wilderness Act is a congressionally designated area of undeveloped federal land which generally appears to have been affected primarily by the forces of nature, without permanent improvements or human habitation, which possesses outstanding opportunities for solitude or a primitive and unconfined type of recreation and which is protected and managed so as to allow natural ecological processes to operate freely.

For this assessment, three major questions about roadless areas and wilderness were developed from public input:

- 1. Where are roadless areas on the national forests in relation to existing wildernesses on national forest and national park land and primitive areas on state and private land in the Southern Appalachians?**
- 2. What is the Forest Service doing to maintain or enhance the health and integrity, including scientific, educational, scenic or historic values, of roadless areas and wildernesses?**
- 3. Are major population centers and the culture, background, beliefs and values of the people affecting wilderness areas? If so, how?**

These questions were modified to clarify intent and to facilitate our analysis. For Question 1, it was not feasible to include private, county, city and other municipal land in the inventory process. For Question 2, wilderness and roadless areas were addressed separately because they have different status and management objectives. "Health" was interpreted to apply to natural processes. This interpretation is especially germane to wilderness. Area integrity is interpreted to apply to the attributes that affect identification as wilderness or roadless. For the assessment, this concept seems most applicable to roadless areas because the public is interested in how these areas are affected by USDA Forest Service management. For Question 3, data were not available to correlate wilderness use with the cul-

ture, background, beliefs and values of urban populations. However, we did examine the relationship between use of wildernesses and their proximities to population centers. A fourth question was added to examine the spatial relationships of roadless areas and wilderness to selected resources. These relationships will aid in the evaluation of roadless areas in individual forest plan revisions.

The four questions addressed in this report are:

1. **Where are roadless areas on national forests in the Southern Appalachian Assessment area? What are the spatial relationships of these roadless areas to units of the National Wilderness Preservation System and to areas with general roadless character on state and other federal land?**
2. **What is the Forest Service doing to maintain or enhance natural processes in national forest wildernesses? What is the Forest Service doing that affects the integrity of roadless areas on national forests?**
3. **Is there a relationship between the amount of use wildernesses are receiving and their proximity to major population centers?**
4. **What are the spatial relationships of wilderness and roadless areas to other assessment resources, including, but not limited to, old growth, critical habitat, tentatively suitable acres for timber management, recreation settings and use patterns, special classification areas, and land-type associations on national forests?**

This assessment primarily addresses roadless areas and wilderness on national forests in the Southern Appalachians. General information about wildernesses and areas with roadless character on other federal and state land is provided. The analysis focuses on the location of

these areas and their spatial relationships to each other and to selected resources in the study area.

Question 1:

Where are roadless areas on national forests in the Southern Appalachian Assessment area? What are the spatial relationships of these roadless areas to units of the National Wilderness Preservation System and to areas with general roadless character on state and other federal land?

The assessment primarily addresses roadless areas and wilderness on national forest lands in the Southern Appalachian Assessment (SAA) area because the status of these areas is chiefly a national forest issue. Data were taken from roadless area inventories developed by each national forest. General information about wilderness and about roadless areas on national parks are also considered. State land is included only where areas generally meet roadless criteria and state officials agreed to their inclusion.

Key Findings

Roadless areas are a limited resource in the Southern Appalachians. One hundred forty-four areas occur in national forests, national parks, and state parks throughout the region (fig. 5.1). They include 1,231,961 acres and account for about 3 percent of all land in the study area (table 5.1).

Roadless areas or portions of them are found in each state in the study area. Virginia has the most roadless areas with 66. North Carolina is second with 35 areas. Georgia and Tennessee follow with 20 areas each. Alabama and South Carolina have the fewest areas, but they also have the fewest acres among states in the study area. There are five areas in each of these states.

The majority of roadless areas occur in national forests. Only one area is in a national park. Four areas are in state parks in North Carolina, South Carolina, and Tennessee.

The largest roadless area identified is in the Great Smoky Mountains National Park. Some 464,544 acres of roadless area are found there.

Except for one roadless area that adjoins wilderness, all roadless areas in the Southern

Appalachians qualify on their own merits rather than on location. The one exception is the small roadless area in Mt. Mitchell State Park, NC. It is included on the inventory because it adjoins a larger roadless area on the Pisgah National Forest.

There are 139 roadless areas on national forests in the Southern Appalachians. They include 752,654 acres and comprise 61 percent of all roadless acres in the study area.

Sixty-three national forest roadless areas are larger than 5,000 acres. They account for 45 percent of the roadless acreage on national

forests. Forty-seven of these 63 range from 5,000 acres to 10,000 acres. Another 13 areas are between 10,000 and 20,000 acres. Three areas are larger than 20,000 acres. The largest area, Little River in Virginia, covers 27,293 acres.

Twenty-three national forest roadless areas are smaller than 5,000 acres and do not adjoin wilderness. Of these areas, 6 are smaller than 4,000 acres. The smallest area, The Friars in Virginia, includes 2,035 acres.

Fifty-five national forest roadless areas adjoin wilderness. The sizes of 53 of these are

Figure 5.1 Roadless areas in the Southern Appalachians.

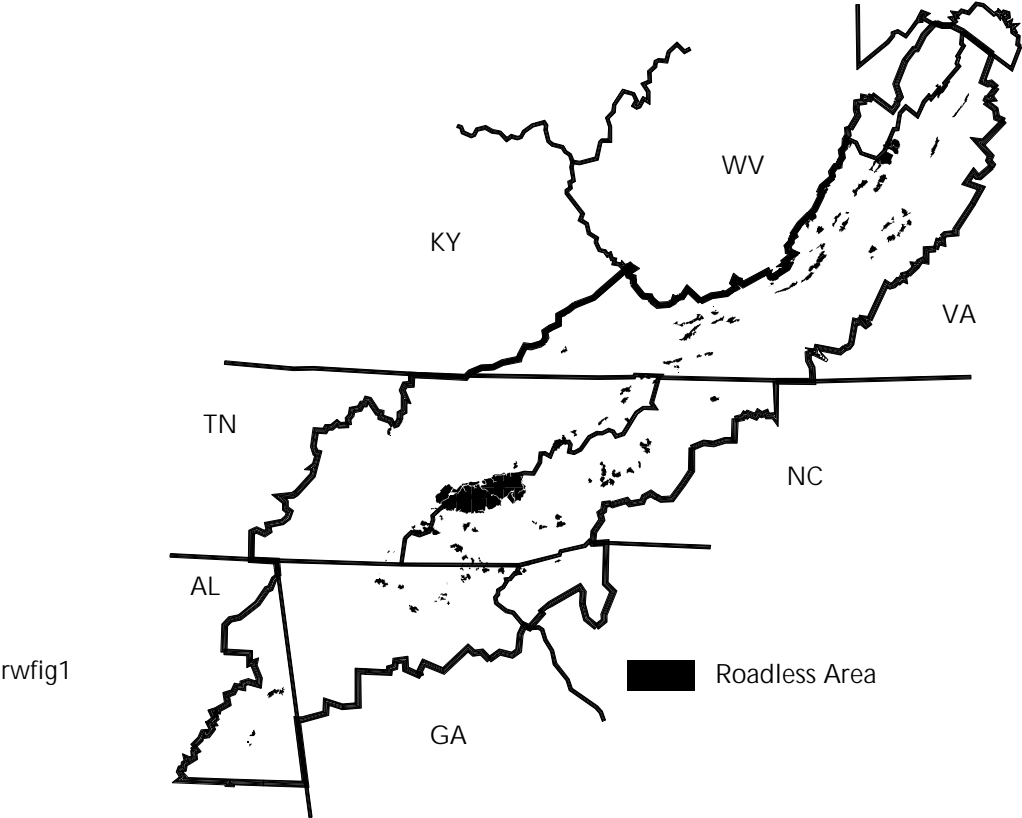


Table 5.1 Roadless areas on national forests, national parks, and state parks in the SAA area.

Managing Agency, Forest or Park, and Specific Area Name	Acres	Managing Agency, Forest or Park, and Specific Area Name	Acres
National Park Service		USDA Forest Service	
Great Smoky Mountains National Park	464,544	George Washington National Forest	
Total	464,544	Adams Peak	7,137
State of North Carolina		Beards Mountain	7,509
Mt. Mitchell State Park	630	Big Schloss	20,752
Stone Mountain State Park	7,142	Crawford Mountain	9,892
Total	7,772	Dolly Ann	7,854
State of South Carolina		Dry River	7,332
Table Rock State Park	2,191	Elliott Knob	9,379
Total	2,191	Gum Run	12,609
State of Tennessee		Hoop Hole ¹	836
Frozen Head State Park	4,800	Jerkentight	16,688
Total	4,800	Kelley Mountain	7,634
USDA Forest Service		Laurel Fork	9,966
Chattahoochee National Forest		Little Alleghany	10,214
Ben Gap (Add.)	1,291	Little River	27,293
Big Mountain ¹	2,757	Mill Mountain	10,850
Boggs Creek (Add.)	2,071	Mt. Pleasant	8,940
Cedar Mountain (Add.)	374	Northern Massanutten	9,443
Duck Branch (Add.)	195	Oak Knob	10,887
Ellicott Rock Add.	707	Oliver Mountain	13,090
Foster Branch (Add.)	176	Ramseys Draft Add.	12,780
Helton Creek (Add.)	2,414	Rough Mountain Add.	1,142
Joe Gap	5,340	Saint Marys Add.	1,453
Kelly Ridge	8,359	Skidmore	5,641
Lance Creek	9,064	Southern Massanutten	11,970
Miller Creek (Add.)	704	The Friars	2,035
Patterson Gap (Add.)	1,203	The Priest	5,742
Pink Knob	12,121	Three Ridge	4,748
Rocky Mountain	4,283	Three Sisters	8,169
Sarah's Creek	6,895	Total	261,985
Shoal Branch (Add.)	403	USDA Forest Service	
Tate Branch (Add.)	1,087	Jefferson National Forest	
Tripp Branch (Add.)	627	Audie Murphy Monument	4,957
Turner Creek (Add.)	1,486	Barbours Creek Add.	806
Total	61,557	Bear Creek	18,253
USDA Forest Service		Beartown Add. A	1,361
Cherokee National Forest		Beartown Add. B	3,131
Bald Mountain ¹	12,017	Beaver Dam Creek ¹	1,072
Bald River Gorge Add.	1,737	Broad Run	10,994
Beaver Dam Creek ¹	5,130	Brush Mountain	6,004
Big Frog Addition	365	Brushy Mountain	4,185
Big Laurel Branch Add.	5,589	Devil's Fork	4,460
Brushy Ridge	7,389	Garden Mountain	3,945
Devil's Backbone	4,283	Hickory Flats	5,182
Flint Mill Gap	9,511	Hoop Hole ¹	4,608
Joyce Kilmer-Slickrock Add.	1,425	Hunting Camp/Little Wolf Cr.	8,932
Little Frog Addition NE	335	James River Face Add.	1,284
Little Frog Addition NW	642	Kimberling Cr. Add.– A	86
London Bridge Branch ¹	3,431	Kimberling Cr. Add.–B	195
Rogers Ridge ¹	4,753	Lewis Fork Add.	722
Sampson Mountain Add.	4,524	Little Dry Run Add.	2,184
Slide Hollow ¹	4,195	Little Horse Heaven	4,989
Stone Mountain	5,373	Little Walker Mountain	9,763
Sycamore Creek	6,994	Little Wilson Cr. Add.– A	60
Upper Bald River	9,112	Little Wilson Cr. Add.– B	1,705
Total	86,805	London Bridge Branch ¹	798
		Long Spur	6,721

Table 5.1 (cont.) Roadless areas on national forests, national parks, and state parks in the SAA area.

Managing Agency, Forest or Park, and Specific Area Name	Acres	Managing Agency, Forest or Park, and Specific Area Name	Acres
Mottesheard	6,521	Bald Mountain ¹	10,971
Mountain Lake Add.–A	1,455	Balsam Cone	10,663
Mountain Lake Add.– B	4,242	Bearwallow	4,116
Mountain Lake Add.– C	495	Craggy Mountain	2,659
North Fork Pound	4,766	Dobson Knob	6,128
North Mountain	8,404	Graveyard Ridge (Add.)	1,973
Patterson Mountain	4,942	Harper Creek	7,351
Peters Mtn. Add. A	1,612	Jarrett Creek	7,500
Peters Mtn. Add. B	2,911	Laurel Mountain	5,683
Price Mountain	9,090	Linville Gorge (Add.)	2,800
Raccoon Branch	4,437	Lost Cove	5,954
Rogers Ridge ¹	181	Mackey Mountain	5,934
Seng Mountain	6,383	Middle Prong (Add.)	1,852
Shawver's Run Add.	2,058	Sam Knob (Add.)	2,583
Total	163,894	Slide Hollow ¹	200
USDA Forest Service		South Mills River	8,629
Nantahala National Forest		Wilson Creek	4,990
Barkers Creek (Add.)	976	Woods Mountain	9,606
Big Indian (Add.)	1,154	Total	99,592
Boteler Peak	4,221	USDA Forest Service	
Cheoah Bald	7,810	Sumter National Forest	
Cherry Cove (Add.)	844	Bee Cove	2,999
Chunky Gal (Add.)	3,475	Big Mountain ¹	2,332
Deep Creek/Avery Creek (Add.)	1,896	Ellicott Rock 1	300
Little Indian (Add.)	647	Ellicott Rock 2	530
Overflow	3,509	Total	6,161
Sharptop Ridge (Add.)	594	USDA Forest Service	
Snowbird	8,504	Talladega National Forest	
Tusquitee Bald	13,791	Blue Mountain	3,896
Wesser Bald	4,094	Cheaha Addition A	228
Yellowhammer Branch (Add.)	1,271	Cheaha Addition B	706
Total	52,786	Dugger Mountain	9,027
USDA Forest Service		Oakey Mountain	6,017
Pisgah National Forest		Total 19,874	
		Grand Total	1,231,961

¹Indicates an area shared by two national forests.

less than 5,000 acres, and the majority are smaller than 3,000 acres. The other two areas adjoining wilderness are large. Big Laurel Branch in Tennessee includes 5,589 acres and Ramseys Draft Addition in Virginia includes 12,780 acres.

The George Washington National Forest contains the largest amount of roadless acres at 261,985 acres or 35 percent of all roadless acres on national forest land (fig. 5.2).

There are 39 units of the National Wilderness Preservation System in the Southern Appalachians (fig. 5.3). These wildernesses account for 428,545 acres or about 1 percent of the study area (table 5.2). All occur on national

forest land except for one area in the Shenandoah National Park in Virginia.

National forest land accounts for 81 percent of existing wilderness within the Southern Appalachians. Some 347,990 acres of designated wilderness are found there.

The Chattahoochee has the largest number of wilderness acres of any national forest. It contains 114,789 acres or 33 percent of all wilderness on national forests in the Southern Appalachians (fig. 5.4).

Wilderness and roadless acres account for 16 percent of all federal land, 19 percent of all national forest land, and 4 percent of all land in the Southern Appalachians.

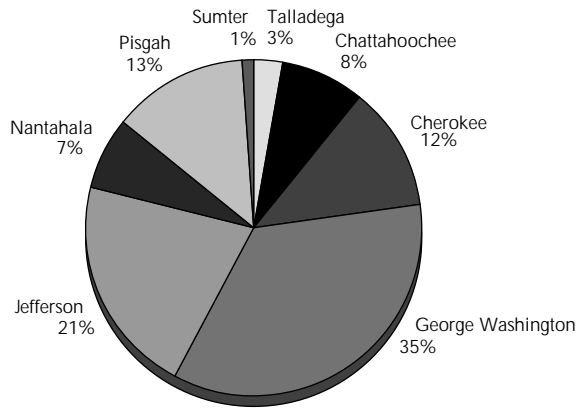


Figure 5.2 Percentage of roadless acres by national forest based on a total of 752,654 acres of forest service roadless areas.

Table 5.2 Acres of officially designated wilderness in the Southern Appalachian mountains.

Managing Agency, Forest or Park, and Specific Name	Acres	Managing Agency, Forest or Park, and Specific Name	Acres
National Park Service		USDA Forest Service	
Shenandoah National Park	80,555	Jefferson National Forest	
Total	80,555	Barbours Creek	5,378
USDA Forest Service		Beartown	5,609
Chattahoochee National Forest		James River Face	8,886
Big Frog	89	Kimberling Creek	5,542
Blood Mountain	7,800	Lewis Fork	5,618
Brasstown	12,975	Little Dry Run	2,858
Cohutta	35,268	Little Wilson Creek	3,613
Ellicott Rock	2,021	Mountain Lake	11,113
Mark Trail	16,400	Peters Mountain	3,328
Raven Cliffs	9,115	Shawvers Run	3,366
Rich Mountain	9,649	Thunder Ridge	2,344
Southern Nantahala	11,770	Total	57,655
Tray Mountain	9,702	USDA Forest Service	
Total	114,789	Nantahala National Forest	
USDA Forest Service		Ellicott Rock	3,394
Cherokee National Forest		Joyce Kilmer-Slickrock	13,562
Bald River Gorge	3,721	Southern Nantahala	11,944
Big Frog	7,993	Total	28,900
Big Laurel Branch	6,332	USDA Forest Service	
Citico Creek	16,226	Pisgah National Forest	
Cohutta	1,709	Linville Gorge	12,002
Gee Creek	2,493	Middle Prong	7,460
Joyce Kilmer-Slickrock	3,832	Shining Rock	18,483
Little Frog Mountain	4,666	Total	37,945
Pond Mountain	6,929	USDA Forest Service	
Sampson Mountain	7,992	Sumter National Forest	
Unaka Mountain	4,496	Ellicott Rock	2,859
Total	66,389	Total	2,859
USDA Forest Service		USDA Forest Service	
George Washington National Forest		Talladega National Forest	
Barbours Creek	4	Cheaha	7,245
Ramseys Draft	6,518	Total	7,245
Rich Hole	6,450	Grand Total	428,545
Rough Mountain	9,300		
Shawvers Run	101		
St. Marys	9,835		
Total	32,208		

Data Sources and Methodology

The process and criteria for identifying roadless areas on national forests is in Forest Service Handbook [(FSH) 1909.12 – Land and Resource Management Planning Handbook, Chapter 7, Items 7.1 – 7.14 USDA Forest Service]. Additional guidelines were developed by the team and the Southern Regional Office of the National Forest System to facilitate consistent application of the process. This process also was used for identifying roadless areas on state and national park land.

Processes used to identify roadless areas in each individual national forest in the assessment area are in the CD-ROM set of the SAA. Other federal and state tracts were first reviewed using 1:150,000 scale maps, general management plans and accompanying maps, state outdoor guides, and county atlases (Alabama Department of Conservation and Natural Resources 1994, 1995; DeLorme Mapping 1989, 1992, 1993; Georgia Department of Natural Resources 1984, 1986,

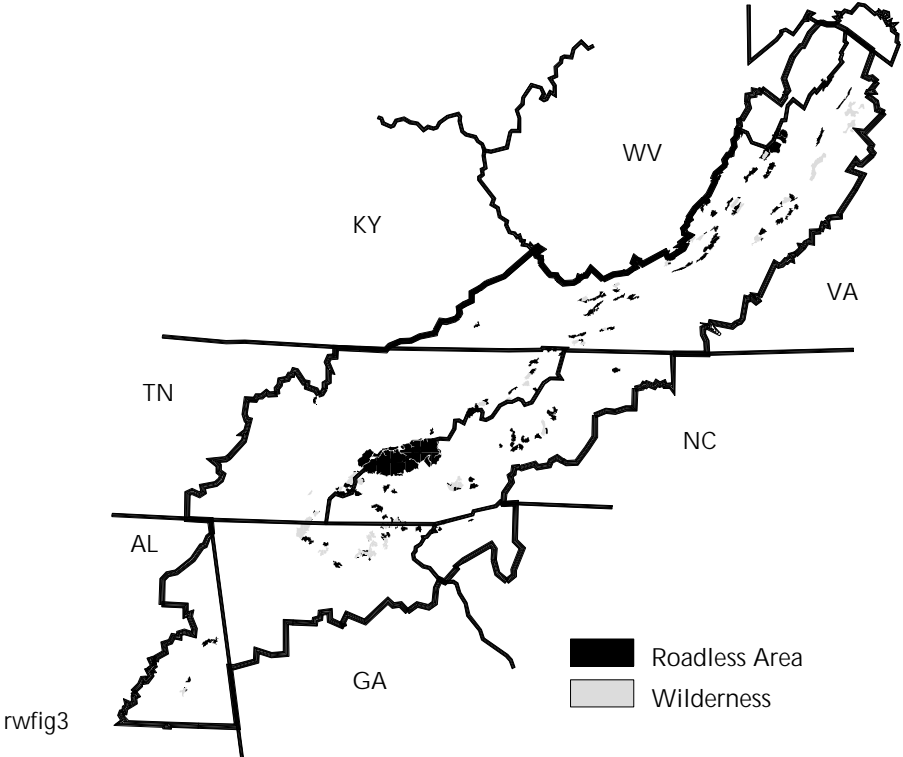


Figure 5.3 Roadless areas and wilderness in the SAA.

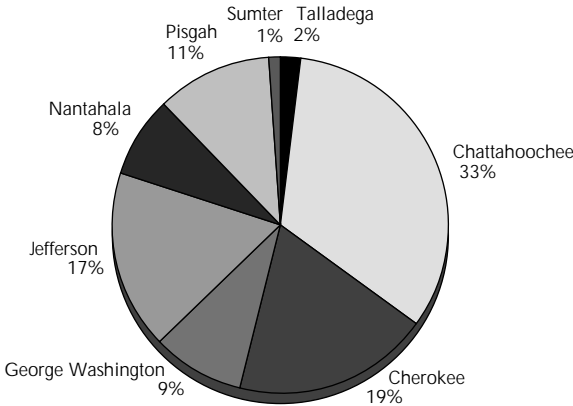


Figure 5.4 Percentage of wilderness acres by national forest based on a total of 347,990 acres of wilderness in national forests.

1994; North Carolina Wildlife Resources Commission 1989; South Carolina Department of Natural Resources 1994; South Carolina State Parks 1994; Tennessee State Parks 1993; Tennessee Wildlife Resource Agency 1994; USDI National Park Service 1982). State areas that initially qualified from this review were then studied in greater detail. Detailed reviews involved site-specific area maps, discussions with state officials, and, in some cases, on-site visits. Areas meeting the roadless criteria were then placed on the inventory. Federal areas other than those on national forests were reviewed by a similar procedure. Roadless areas were digitized at a 1:24,000 scale for mapping and calculation of acreages.

Existing wilderness was identified from Forest Service and National Park Service data. Maps were digitized at the 1:2,000,000 and 1:24,000 scales to show their locations. National forest wilderness acres were determined from legal descriptions or data maintained by the Southern Regional Office of the National Forest System. National park wilderness were digitized from maps of the Shenandoah National Park (Potomac Appalachian Trail Club 1992, 1994a,b).

Likely Future Trends

National forest roadless areas will be evaluated and considered for recommendation as potential wilderness as forest plans are revised. Since this evaluation involves the public and Congress, the results are uncertain at this point. However, the roadless area inventory can be expected to change as a result of this process. Roadless area acres may increase or decrease. Some areas will be allocated to management that will maintain their roadless character. Others will be allocated to multiple-use management. It seems likely that additional wilderness will be recommended from land now in the roadless area inventory.

Question 2A:

What is the Forest Service doing to maintain or enhance natural processes in national forest wildernesses?

Management objectives for the National Wilderness Preservation System are drawn from the 1964 Wilderness Act. One of these

objectives is to allow natural processes to operate freely within wilderness. Natural processes are synonymous with ecological processes. An ecosystem consists of a community of interacting populations and the physical environment they occupy (USDA Forest Service 1995b). An ecosystem may be a rotting log, an entire planet, or any level in between. In the case of a designated wilderness, its legally defined boundary is also considered the ecosystem boundary for purposes of management.

To understand ecological systems, it is useful to recognize their three major components: structures, functions, and the interactions among them. Structures are the physical, tangible elements of the systems – the things we can touch, see and feel. They can be living (biotic) or nonliving (abiotic); mobile or stationary. Biotic parts include plants, animals, microorganisms and humans. Abiotic parts include geology, climate, mineral soil and topography. Functions are the activities, roles or processes performed by structures. They can be classified in many ways, but the following five types are generally recognized:

Capture (input) – The bringing of resources (organisms, materials and energy) into the system. Examples are photosynthesis and migration of an organism into seasonal range.

Production – The “manufacture” of resources within the system. Examples are plant growth, animal reproduction, and snags becoming downed wood.

Cycling – The transport of resources within the system. Examples are animal migration within a system, nutrient cycling, and snow melting and becoming surface or groundwater flow.

Storage – The conservation of resources within the system. Examples are sediments retained in wetland, and carbon and other nutrient storage in down wood.

Output – The movement of resources out of the system. Examples are animals migrating out of their seasonal range, movement of the products of erosion, and the movement of products by people (Diaz and Apostol 1992).

The interactions among the structures and functions make a system dynamic. Functions may be interdependent. For example, capture

and cycling must occur for production to be sustained. Structures and functions also depend on each other, and ecological systems interact because no system is completely isolated.

Whether we recognize them or not, changes take place constantly in ecosystems. Physical, biological, and cultural/social processes are constantly at work, altering structures and functions (USDA Forest Service 1995c). A resilient ecosystem is one that can maintain its structures and functions in the face of change or disturbance (Diaz and Apostol 1992). In wilderness, the objective is to allow natural processes and events to dictate change or disturbance and to manage change from human activities within defined limits.

Key Findings

For the Forest Service to maintain or enhance natural processes in wilderness, the processes and their components must first be identified. Most efforts to date have involved inventorying and monitoring.

Many research and administrative activities are occurring or have occurred in 29 national forest wildernesses in the Southern Appalachians. Wilderness management activities are aimed at maintaining natural processes. Examples of these activities include campsite naturalization, wilderness education, trail maintenance and rehabilitation, removal of human-made structures, campfire bans, restrictions on type of use and limits on recreation use.

The following list consists of two sections: (1) research and (2) administrative activities, studies and monitoring that are ongoing or have taken place in national forest wildernesses in the Southern Appalachians. Each section is organized by wilderness.

Research

Big Frog (TN, GA)

Flora study by the University of Tennessee in 1977.

Cohutta (GA)

A 1994 conceptual and empirical analysis of visitors' relationship to wilderness by Williams of Virginia Tech. The purpose is to increase understanding of the attachment of visitors' experience for the wilderness resource.

A 1994 study measuring solitude achievement and examining trends in wilderness visitor characteristics by Watson of the USDA Forest Service and Hollenhorst of West Virginia University. Development and test of specific measures of solitude achievement, relating this achievement to potential indicators and examining trends in visitor reports about the importance of solitude and the ability to achieve it.

A 1994 study of wilderness recreation use estimation methods by Watson, Cole, and Turner of the USDA Forest Service. Development of a handbook on methods of describing wilderness recreation visit and visitor characteristics. Literature review and pilot testing of methods at Cohutta (GA), Lewis Fork, and Little Wilson Creek wildernesses (VA).

A 1994 study of wilderness visitor experiences by Hammitt and Shafer of Clemson University. Study of wilderness users on what influences the quality of visitor experiences, operationalizing privacy, primitiveness, and unconfinement.

Citico Creek (TN)

Flora of Citico Creek by the University of Tennessee in 1977.

Ellicott Rock (NC, SC, GA)

Scientific studies of vegetation in old-growth Appalachian forests by Bruce, Highlands Biological Station, University of North Carolina in 1989. Permanent plots were established and a scientific database was developed on vegetation for long-term assessment of environmental change. Information was gathered on plant diversity and biography in the Southern Appalachians and plant and animal populations were studied.

Threats to wilderness at the watershed scale are being studied by Wentworth, North Carolina State University. Purposes are to develop and test interactive computer software that provides visualization and descriptive statistics for drainage basins in wilderness.

Gee Creek (TN)

Vascular flora study by the University of Tennessee in 1992.

James River Face (VA)

A continuing study of trout stream sensitivity by the Virginia Department of Game and Inland Fisheries and the University of Virginia.

Since 1987 stream water chemistry, acid deposition, and fish and aquatic insect populations have been monitored.

Joyce Kilmer-Slickrock (NC, TN)

A comparison of the structure and composition of old-growth forests and younger managed stands by Lear and Kapeluck, Clemson University in 1992. Purposes are to determine the differences in biomass distribution, species composition, and nutrient retention in these ecosystems.

A study by Hedman to characterize riparian zones and to quantify woody debris loadings in Southern Appalachian old-growth forests.

Carbon cycling study by Vose of the USDA Forest Service, Coweeta Hydrologic Laboratory in 1995. CO₂ evolution in soil and CO₂ production in downed woody material are being studied.

A 1989 study of community patterns and mechanisms of biodiversity in old-growth and second-growth forest understory herbaceous plants by Duffy, University of Georgia. Community structure and processes of understory herbaceous plants were compared in second-growth forests and in surviving old-growth forests in the southeastern United States.

A 1988 study of forest canopy gap formation by Barden, University of North Carolina. Forest canopy gap formation and closure were measured in the hemlock/hardwood/rhododendron forest along Little Santeetlah Creek.

A 1993 study of long-term effects of disturbance on forest soil quality in the Southern Appalachians by Daniels, Virginia Tech. Purposes are to describe the morphological and physical properties of a virgin forest system and to determine the degree of change caused by disturbance history to similar soils in adjacent watersheds.

A 1992-1995 study of neotropical migratory birds by Franzreb, USDA Forest Service, Clemson. Responses of neotropical migratory birds to timber harvesting were measured in cove hardwoods forests of the Southern Appalachians. A wilderness plot in an 80+ year-old undisturbed area is the control.

A 1993 attempt to reconstruct past climatic conditions by Stahle, University of Arkansas. Tree-ring chronologies were developed from chestnut stumps in undisturbed forests to reconstruct past climatic conditions.

A 1989 study of hemlock genetic diversity

by the University of Minnesota.

Lewis Fork (VA)

Geological sampling by Sinha, Virginia Tech. Samples were taken in 1991-1992.

A 1993 salamander study by Wise, University of Southwestern Louisiana.

An ongoing study of spruce/fir mortality by Zedaker, Virginia Tech.

An ongoing study of spruce/fir mortality study by Hollingsworth, North Carolina State University.

An ongoing study of spruce/fir mortality study by McLaughlin, U.S. Department of Energy, Oak Ridge National Laboratory.

An ongoing study of trout stream sensitivity, by the Virginia Department of Game and Inland Fisheries and the University of Virginia. Stream water chemistry, acid deposition, and fish and aquatic insect populations have been monitored since 1987.

A 1994 study of wilderness recreation use estimation methods by Watson, Cole, and Turner of the USDA Forest Service. Development of a handbook on methods of describing wilderness recreation visit and visitor characteristics. Literature review and pilot testing of methods at Cohutta (GA), Lewis Fork, and Little Wilson Creek wildernesses (VA).

Linville Gorge (NC)

A 1994 study measuring solitude achievement and examining trends in wilderness visitor characteristics by Watson of the USDA Forest Service and Hollenhorst of West Virginia University. Development and test of specific measures of solitude achievement, relating this achievement to potential indicators and examining trends in visitor reports about the importance of solitude and the ability to achieve it.

Little Wilson Creek (VA)

A 1994 study of wilderness recreation use estimation methods by Watson, Cole, and Turner of the USDA Forest Service. Development of a handbook on methods of describing wilderness recreation visit and visitor characteristics. Literature review and pilot testing of methods at Cohutta (GA), Lewis Fork, and Little Wilson Creek wildernesses (VA).

Sampson Mountain (TN)

A 1993 survey of rare flora and application of a regional natural community classification

key, by the Tennessee Nature Conservancy.

Shining Rock (NC)

A 1984 study of black bear movements within and outside the wilderness by North Carolina State University.

A 1994 study of trends in wilderness visitor characteristics by Cole and Watson of the USDA Forest Service and Roggenbuck of Virginia Tech. A study to determine trends in visitor behavior, visitor characteristics, preferences, and support for management practices.

St. Mary's (VA)

An ongoing study of trout stream sensitivity study, by the Virginia Department of Game and Inland Fisheries and the University of Virginia. Stream water chemistry, acid deposition, and fish and aquatic insect populations have been monitored in the St. Mary's River since 1987.

Unaka (TN)

A 1993 salamander study by the University of Tennessee.

Administrative Activities, Studies and Monitoring

Barbours Creek (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Beartown (VA)

Ongoing monitoring of the northern flying squirrel by the USDA Forest Service and the U.S. Fish and Wildlife Service. Started in 1982.

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Big Frog (TN, GA)

Ongoing monitoring of temperature, pH, turbidity and fecal coliform bacteria in Rough Creek and Big Creek by the USDA Forest Service.

Blood Mountain (GA)

Visitor study by the USDA Forest Service completed in 1994.

Cheaha (AL)

Ongoing monitoring of ozone by the University of Alabama. Started in 1994.

Vegetative inventory by Alabama A&M University under challenge-cost agreement.

Citico Creek (TN)

Ongoing monitoring of temperature, pH, turbidity and fecal coliform bacteria monitoring in Crowder Branch, Mills Branch, Eagle Creek, and Grassy Branch by the USDA Forest Service.

Cohutta (GA, TN)

Ongoing gypsy moth monitoring by the USDA Forest Service.

Ongoing fish surveys by the USDA Forest Service.

Ongoing ozone monitoring by the USDA Forest Service.

Ongoing stream water quality monitoring by the USDA Forest Service.

Ellicott Rock (NC, GA, SC)

Monitoring of black bear populations using bait transects by the USDA Forest Service.

Visitor use study completed in 1994 by Clemson University under a cost-share agreement.

James River Face (VA)

Ecological classification based on geology, geomorphology, soils, and vegetative information. Ongoing study by the USDA Forest Service and Rowinski of the Natural Heritage Program.

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Ongoing monitoring and assessment of ozone injury to vegetation by the USDA Forest Service. Started in 1992.

From 1985 to 1995 visibility has been monitored using 35mm camera photographs by the USDA Forest Service and the University of California at Davis.

Joyce Kilmer-Slickrock (NC, TN)

A USDA Forest Service investigation of prior disturbances, both natural and human caused, to better understand current conditions.

A USDA Forest Service inventory of old-growth attributes to help develop a definition of old growth for the National Forests in North Carolina.

Order II soil surveys (inventory and mapping of major soil types).

Ozone bio-indicator surveys in 1992-1994 by the USDA Forest Service, Forest Health

Management. A pilot project to document percentage and degree of ozone damage to individual plant species in test plots.

Photographic monitoring of atmospheric conditions affecting visibility by the USDA Forest Service in 1988-1992.

USDA Forest Service study to identify the attributes of old growth mixed mesophytic forests in the southeastern United States.

USDA Forest Service survey in 1992-1994 of aquatic ecosystems, including fisheries and macroinvertebrates, to determine current conditions.

Vegetation classification. Inventories to describe all vascular plant communities. 1995.

Water chemistry survey to define current conditions. 1992-94.

Lewis Fork (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Ongoing monitoring of lichens by the USDA Forest Service. Purposes are to obtain baseline data and inventory populations.

Ongoing monitoring of macroinvertebrates by the USDA Forest Service.

Ongoing monitoring and assessment of ozone injury to vegetation by the USDA Forest Service.

Ongoing inventory and monitoring of salamanders by Organ of Virginia Tech since 1958.

Ongoing monitoring of streamwater quality by James Madison University since 1994.

Wilderness visitor use study completed in 1994 by Virginia Tech.

Linville Gorge (NC)

Ongoing *Hudsonia montana* recovery program by the USDA Forest Service, the USDI Fish and Wildlife Service, and the North Carolina Department of Agriculture. A 10-year program to recover and perpetuate federally listed threatened plant species.

Order II soil surveys (inventory and mapping of major soil types) by the USDA Forest Service.

Ozone bio-indicator surveys in 1992-1994 by the USDA Forest Service, Forest Health Management. A pilot project to document percentage and degree of damage to individual plant species in test plots.

Ongoing peregrine falcon restoration program by the USDA Forest Service, the USDI

Fish and Wildlife Service, and the North Carolina Wildlife Resources Commission. A project to reintroduce a resident population of peregrine falcons, a federally listed species.

Photographic monitoring by the USDA Forest Service of atmospheric conditions affecting visibility in 1988-1992 to determine if there was a visibility problem.

Research in 1990 by the USDA Forest Service and the USDI Fish and Wildlife Service to provide base data for the *Hudsonia montana* Recovery Program. Fire history of wilderness and test plots for treatment methods (fire, clipping, etc).

Little Frog (TN)

Ongoing monitoring of temperature, pH, turbidity and fecal coliform bacteria in Rock Creek by the USDA Forest Service.

Little Dry Run (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Little Wilson Creek (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Ongoing monitoring since 1982 of northern flying squirrel boxes by the USDA Forest Service and the USDI Fish and Wildlife Service.

Ongoing monitoring since 1994 of stream water quality monitoring by James Madison University.

Wilderness visitor use study completed in 1994 by Virginia Tech.

Kimberling Creek (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Middle Prong (NC)

A 1991 study of balsam wooly adelgid populations and damage to Fraser fir by the USDA Forest Service, Southern Forest Experiment Station.

Inventory, monitoring, and ongoing rehabilitation of wilderness campsites by the USDA Forest Service.

Mountain Lake (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Peters Mountain (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Ramseys Draft (VA)

Campsite inventory completed by James Madison University in 1993 under a cost-share agreement.

Ongoing monitoring of gypsy moth by the USDA Forest Service.

Ongoing study of woody debris and macroinvertebrate study by the USDA Forest Service, Southern Forest Experiment Station, and by Virginia Tech. Visitor use survey completed by James Madison University in 1992 under a cost-share agreement.

Rich Hole (VA)

Campsite inventory completed by James Madison University in 1993 under a cost-share agreement.

St. Mary's (VA)

Campsite inventory completed by James Madison University in 1993 under a cost-share agreement.

Ongoing monitoring of gypsy moth by the USDA Forest Service.

Ongoing monitoring and assessment of ozone injury to vegetation since 1992 by the USDA Forest Service.

Ongoing monitoring of the trout population in St. Mary's River by the USDA Forest Service and the Virginia Department of Game and Inland Fisheries. Visitor use survey completed by James Madison University in 1992 under a cost-share agreement.

Shining Rock (NC)

An ongoing investigation of prior disturbances, both natural and human caused, to better understand current conditions.

Ongoing visibility monitoring by the USDA Forest Service to determine what is causing visibility problems detected by previous photographic monitoring.

Order II soil surveys by the USDA Forest Service (to inventory and map major soil types).

Ozone bio-indicator surveys in 1989-1994 by the USDA Forest Service, Forest Health Management. A pilot project to document percentage and degree of ozone damage to individual plant species in test plots.

Ongoing ozone monitoring since 1994 of ozone levels by the USDA Forest Service in cooperation with local air pollution control agencies.

Photographic monitoring by the USDA Forest Service in 1988-1992 of atmospheric conditions affecting visibility to determine if there was a visibility problem.

Prototype study to determine public preferences for visibility.

Survey in 1992-1994 by the USDA Forest Service of aquatic ecosystems, including fisheries and macroinvertebrates, to determine current conditions.

Water chemistry survey to define current conditions. 1992-94.

Inventory, monitoring, and ongoing rehabilitation of wilderness campsites by the USDA Forest Service.

Southern Nantahala (NC, GA)

Ongoing monitoring of 1992 campsite rehabilitation.

Ongoing monitoring of visitor use by the USDA Forest Service and local ATC clubs.

Peregrine Falcon Restoration Program by the USDA Forest Service, the USDI Fish and Wildlife Service, and the North Carolina Wildlife Resources Commission. A project to reintroduce a resident population of peregrine falcons, a federally listed species.

Shawvers Run (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Thunder Ridge (VA)

Inventory and monitoring of wilderness campsite conditions in 1994 by Virginia Tech under a cost-share agreement.

Data Sources and Methodology

Information about research projects and administrative activities was obtained from Forest Service annual wilderness reports from 1993 to 1994 for the national forests in the

assessment area. Complete information on some of the research projects and studies is not available.

Likely Future Trends

Funding for research activities is limited at the present time, but the amount of research in designated wilderness is expected to continue. These areas can serve as ecological benchmarks for assessing human-induced impacts in more developed settings. They can be baselines for global monitoring studies and living laboratories to see how natural systems interact and evolve.

Question 2B:

What is the Forest Service doing that affects the integrity of roadless areas on national forests?

People are concerned about how national forest roadless areas are managed before their wilderness potential can be determined. The issue is that management actions could change the character of an area so that it is no longer suitable for wilderness consideration.

Key Findings

Resource management activities could affect the character of a roadless area. An area's inclusion on the Forest Service roadless area inventory does not preclude management activities from taking place there. Roadless areas are managed according to their allocation in the forest land management plans. Some areas currently are managed to maintain their undeveloped character while others are available for resource utilization. Management activities that could change the conditions in a roadless area so that all or portions of it no longer meet roadless criteria include:

- Timber harvesting, if more than 20 percent of the area is in acres less than 10 years old.
- Road construction or reconstruction, if the resulting density of improved roads exceeds 0.5 mile per 1,000 acres.
- Planting non-native vegetation on more than 15 percent of the area.
- Constructing pipelines, transmission lines

or utility corridors with cleared rights-of-way.

- Mining.
- Prospecting with mechanical earth-moving equipment.
- Building major recreation developments (campgrounds, visitor centers, etc).
- Changing recreation activities from non-motorized to motorized.
- Constructing buildings or other structures.
- Building high-standard surfaced trails.

When a proposed site-specific action is located in an identified roadless area, Forest Service policy, in compliance with the National Environmental Policy Act (NEPA), requires that the effects of that action be evaluated to determine whether it significantly affects the roadless character of the area. The responsible official determines the appropriate level of analysis and NEPA documentation. This decision is based on the potential effects of the proposed action on the area's unique characteristics and its suitability for future uses. The responsible official also decides whether to proceed with a proposed action that would affect the roadless character of the area. Project analysis is conducted with full public participation, including the opportunity to have a procedural review.

Data Sources and Methodology

Forest Service Handbook 1902.12, Chapter 7 was consulted to determine resource management activities that can affect roadless character.

The following documents were consulted to determine policy and direction for managing roadless areas:

- The National Environmental Policy Act (NEPA).
- The preamble to updated Forest Service Handbook 1909.15 published in the Federal Register, September 18, 1992, p.43182.
- The February 3, 1989, 1950/1920 letter from the Chief of the Forest Service about NEPA and project decisions.
- The June 3, 1993, 1950/2310 letter from the Regional Forester that outlines current direction for complying with NEPA requirements when considering projects

within roadless areas.

- The September 15, 1994, letter from the Region 8 Director of Planning and Budget about NEPA requirements in roadless areas.
- The October 21, 1994, 1920/2320 letter from the Region 8 Director of Planning and Budget about NEPA disclosure in roadless areas.

Likely Future Trends

Forest plans will continue to determine the activities that may occur within each roadless area. The management status of individual roadless areas may change as forest plans are revised. Some areas will remain in an undeveloped condition and others will be available for resource utilization. The current policy for evaluating and disclosing the effects of management activities described above will continue to be implemented.

Question 3:

Is there a relationship between the amount of use wildernesses are receiving and their proximity to major population centers?

Some wildernesses in the Southern Appalachians are close to large metropolitan areas. As population increases and urban areas expand, there is a concern that the wilderness resource will be adversely affected.

Key Findings

Proximity to a major city does not appear to explain the amount of use a wilderness receives (fig. 5.5). For example, 75-mile radii drawn around all of the metropolitan areas incorporate 78 percent of the wildernesses in the assessment area, but exclude four high-use areas. In addition, the high-use Cohutta Wilderness is outside the 50-mile radius of Atlanta, GA, where studies indicate the majority of use originates, but it is within the 50-mile radius of Chattanooga, TN, where little use originates. Also, the Cohutta is contiguous to the Big Frog Wilderness, which receives low use that originates from the local area (Carlisle 1992).

Large metropolitan areas are obvious sources of visitors to wilderness. However, there is no definitive evidence that a wilderness' proximity to a large metropolitan area is the sole factor or even a major factor influencing the amount of use it receives. Most likely, a combination of factors account for an area's

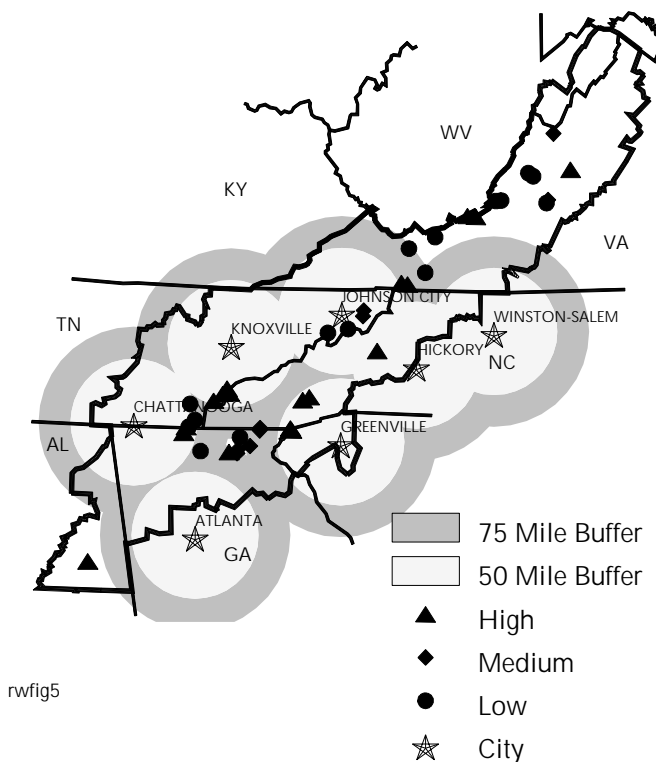


Figure 5.5 Proximity of large metropolitan areas and use levels within wilderness.

level of use. For example, use data seem to indicate that most of the wildernesses that were designated first, including Linville Gorge and Shining Rock (1964) and Joyce Kilmer-Slickrock, Ellicott Rock and Cohutta (1975), attract relatively high levels of use. High use there may be attributable to wide public knowledge. James River Face and Gee Creek are exceptions to this hypothesis. At Gee Creek, prohibitions on campfires and overnight stays limit visitor use. In some cases, scenic features or special destinations may draw users to an area. Examples of such attractions are the huge white quartz boulders in Shining Rock Wilderness or the summit of Blood Mountain in the Blood Mountain Wilderness. Often, streams are the key attraction. The heavily used Cohutta Wilderness has numerous streams and two major rivers, while the adjacent Big Frog has less water and is lightly used.

The amount of publicity a wilderness receives through the media and commercial publications may also play a key role in the area's level of use. Proximity to small cities such as Asheville, NC, and Roanoke, VA, may also influence use. Finally, the location of a wilderness within a larger, well-known unit of a national forest or park may be a primary factor in determining the level of use: Heavily used Lewis Fork and Little Wilson Creek Wildernesses are both in the popular Mount Rogers National Recreation Area.

Studies are needed to determine what factors draw users to individual wildernesses.

Data Sources and Methodology

Potential use pressure on each wilderness from nearby large metropolitan areas was analyzed by placing radii of 50 and 75 miles around each city that is near the study area. These radii represent driving times of less than a 1/2 day. Then each wilderness within a radius was reviewed for its level of use.

Large metropolitan areas were defined and identified from cities and towns in the Southern Appalachian Assessment area using census data (USDC Bureau of the Census 1994). Large metropolitan areas meeting the criteria are Atlanta, GA; Greenville, SC; Hickory and Winston-Salem, NC; and Johnson City, Knoxville, and Chattanooga, TN. Large metropolitan areas outside the study area were ignored even though they have the potential to

affect wilderness use there.

Wilderness use was categorized as low, medium, or high based on current use data and a visual comparison of these data for obvious breaking points between use levels.

Visitor use data for national forest wildernesses were obtained from annual reports prepared for each area. The Shenandoah National Park does not differentiate between wilderness and nonwilderness use. Park data, therefore, were not suitable for this analysis. Wilderness use data by area and category are displayed in table 5.3.

Likely Future Trends

Wilderness use will continue to be influenced by a combination of factors unique to each area. Proximity to large metropolitan areas may be one of these factors for certain wildernesses. Research will continue to explore the issue of wilderness use.

Question 4:

What are the spatial relationships of wilderness and roadless areas to other assessment resources, including, but not limited to, old growth, critical habitat, tentatively suitable acres for timber management, recreation settings and use patterns, special classification areas, and land-type associations on national forests?

The locations of selected resources with respect to roadless areas and wildernesses provide useful information for forest planning. These data may be used to evaluate individual roadless areas, guide roadless area allocations, and revise wilderness management direction. They also may help to provide a regional context for planning.

In this assessment, Question 4 is only partially addressed because some resource information was not available. This analysis includes the following resources: ecosystem sections and subsections; federally listed threatened and endangered species; possible old growth; potential suitable black bear habitat; recreation settings; and congressionally designated areas.

Refer to the terrestrial team report for definitions and discussions of ecosystem

Table 5.3 Annual recreation use of national forest wilderness in the Southern Appalachians.

Intensity of Use	Name of Area	Forest	1993 Recreation Visitor-Day
High Use	Cohutta	Chattahoochee	74,000
		Cherokee	850
	Subtotal		74,850
	Joyce Kilmer–Slickrock	Nantahala	22,500
		Cherokee	7,240
	Subtotal		29,740
	Lewis Fork	Jefferson	25,350
	Shining Rock	Pisgah	19,187
	Citico Creek	Cherokee	17,210
	Mountain Lake	Jefferson	15,600
	Cheaha	Talladega	14,600
	Middle Prong	Pisgah	13,558
	Little Wilson Creek	Jefferson	11,700
	Ellicott Rock	Sumter	10,150
		Chattahoochee	600
		Nantahala	500
	Subtotal		11,250
	Linville Gorge	Pisgah	10,700
	Peters Mountain	Jefferson	9,200
	Saint Mary's	George Washington	9,000
Bald River Gorge	Cherokee	8,650	
Blood Mountain	Chattahoochee	8,620	
Medium Use	Tray Mountain	Chattahoochee	5,700
	James River Face	Jefferson	4,466
	Ramseys Draft	George Washington	4,400
	Big Laurel Branch	Cherokee	4,400
	Mark Trail	Chattahoochee	4,400
	Southern Nantahala	Nantahala	2,374
		Chattahoochee	1,500
	Subtotal		3,874
	Raven Cliffs	Chattahoochee	3,280
	Pond Mountain	Cherokee	3,000
Low use	Barbours Creek	Jefferson	2,650
		George Washington	0
	Subtotal		2,650
	Big Frog	Cherokee	2,570
		Chattahoochee	0
	Subtotal		2,570
	Brasstown	Chattahoochee	2,500
	Rich Mountain	Chattahoochee	2,500
	Little Dry Run	Jefferson	1,950
	Beartown	Jefferson	1,540
	Shawvers Run	Jefferson	1,350
		George Washington	0
	Subtotal		1,350
	Thunder Ridge	Jefferson	1,334
	Kimberling Creek	Jefferson	1,320
	Unaka Mountain	Cherokee	600
	Rough Mountain	George Washington	600
Rich Hole	George Washington	500	
Sampson Mountain	Cherokee	400	
Little Frog Mt.	Cherokee	380	
Gee Creek	Cherokee	300	

Table 5.4 Ecosystem section occurrence in wilderness and roadless areas in the Southern Appalachians.

Ecological Province	Ecosystem Section	Section Occurrence	
		Wilderness	Roadless
(number of areas)			
Eastern Broadleaf Forest	Northern Cumberland Plateau	–	1
	Southern Cumberland Mountains	–	2
	Central Ridge and Valley	–	–
Central Appalachian Broadleaf Forest-Meadow		–	–
	Northern Ridge and Valley	12	52
	Allegheny Mountain	–	3
	Blue Ridge Mountain	29	90
Southern Mixed Forest	Northern Cumberland Mountains	–	–
	Southern Appalachian Piedmont	3	3
	Southern Cumberland Plateau	–	–
	Southern Ridge and Valley	1	5

classifications, federally listed threatened and endangered species, old growth, and black bear habitat. Refer to the recreation section of this report for definitions and discussions of recreation settings.

Key Findings

Ecosystem Classifications

The assessment area is comprised of 10 ecosystem sections in 3 provinces. Of the 10 sections, 7 are represented in wildernesses, roadless areas, or both (table 5.4). Individual roadless areas and wilderness ecosystem section tables are in the CD-ROM set of the SAA.

Six roadless areas contain a total of three ecosystem sections that do not occur in Southern Appalachian wilderness (table 5.5).

All of these areas are in Virginia except Frozen Head, which is in Tennessee.

Sixteen of thirty-five ecosystem subsections are present in at least one wilderness or roadless area (table 5.6). Individual roadless areas and wilderness subsection tables are in the CD-ROM set of the SAA.

Eleven ecosystem subsections occur in roadless areas but not in wilderness in the study area (table 5.7). Six of these roadless areas are on the George Washington and Jefferson National Forests in Virginia.

Federally Listed Threatened and Endangered Species

Nineteen federally listed threatened and endangered species are known now to occur or to have occurred in 16 roadless areas on national forests, national parks, and state

Table 5.5 Ecosystem sections that occur in roadless areas but not in wilderness in the Southern Appalachians.

Section Name	Roadless Area
Northern Cumberland Plateau	Frozen Head
	Devils Fork
Southern Cumberland Mountains	North Fork Pound
	Laurel Fork
Allegheny Mountain	Little Allegheny
	Oliver Mountain

Table 5.6 Occurrences of ecosystem subsections in wilderness and roadless areas.

Section and Subsection Names	Subsection Occurrence	
	Wilderness	Roadless
	(number of areas)	
Northern Cumberland Plateau Section		
Southwestern Escarpment	–	–
Sequatchie Valley North	–	–
Low Hills Belt	–	1
Southern Cumberland Mountain Section		
Cleveland	–	2
Central Ridge and Valley Section		
Rolling Limestone Hills	–	–
Sandstone Hills	–	–
Holston Valley	–	–
Southern Appalachian Piedmont Section		
Midland Plateau Central Uplands	–	–
Piedmont Ridge	–	–
Schist Plains	1	2
Lower Foothills	–	1
Schist Hills	2	–
Granite Hills	–	–
Opelika Plateau	–	–
Lynchburg Belt	–	–
Northern Piedmont	–	–
Triassic Basins	–	–
Southern Cumberland Plateau Section		
Table Plateau	–	–
Sandstone Mountain	–	–
Southern Cumberland Valleys	–	–
Southern Ridge and Valley Section		
Chert Valley	1	1
Sandstone	–	2
Sandstone Ridge	–	–
Quartzite and Talladega Slate Ridge	1	5
Shaley Limestone Valley	–	–
Northern Ridge and Valley Section		
Appalachian Ridges	11	43
Great Valley of Virginia	3	11
Appalachian Allegheny Ridge and Valley	–	–
Allegheny Mountain Section		
Northern High Allegheny	–	1
Eastern Allegheny Mountain and Valley	–	3
Blue Ridge Mountain Section		
Northern Blue Ridge Mountains	4	9
Central Blue Ridge Mountains	–	1
Southern Blue Ridge Mountains	19	62
Metasedimentary Mountains	11	21
Northern Cumberland Mountain Section		
Central Coalfields	–	–

Table 5.7 Ecosystem subsections represented in roadless areas but not in wilderness.

Subsection Name	State	Roadless Area
Low Hills Belt	TN	Frozen Head
Cleveland	VA	Devils Fork
	VA	North Fork Pound
Eastern Allegheny Mountain and Valley	VA	Laurel Fork
	VA	Little Allegheny
	VA	Oliver Mountain
Northern High Allegheny	VA	Little Allegheny
Central Blue Ridge Mountains	NC	Stone Mountain
Lower Foot Hills	SC	Table Rock
Sandstone	AL	Oakley Mountain
	AL	Dugger Mountain

parcs in the assessment area (table 5.8). These include 8 plant and 11 animal species. In some cases the same species, such as the peregrine falcon, is found in several areas. Only two roadless areas have occurrences of more than one species.

There are 45 known or potential occurrences of threatened and endangered species in roadless areas. Nine species account for 35 occurrences. They include peregrine falcons, carolina flying squirrels, shale-barren rockcress, red-cockaded woodpeckers, Indiana bats,

Table 5.8 Known and potential occurrences of federally listed threatened and endangered species in roadless areas. Species and their status and number of occurrences are indicated by roadless area, agency, and state. Status is indicated by E for endangered and T for threatened.

Roadless Area	State	Species–Common Name/Scientific Name	Status	Occurrence
National Forests				
Bald Mountain	NC	Peregrine falcon/ <i>Falco peregrinus</i>	E	1
Balsam Cone	NC	Peregrine falcon/ <i>Falco peregrinus</i>	E	1
Bearwallow	NC	Carolina flying squirrel/ <i>Glaucomys sabrinus coloratus</i>	E	1
Big Schloss	VA	Peregrine falcon/ <i>Falco peregrinus</i>	E	1
Cheoah Bald	NC	Noonday globe/ <i>Mesodon clarkinantahala</i>	T	1
Dugger Mountain	AL	Blue shiner/ <i>Cyprinella cairulea</i>	T	1
Gum Run	VA	Northeastern bullrush/ <i>Scirpus ancistrochaetus</i>	E	1
Jerkentight	VA	Shale-barren rockcress/ <i>Arabis serotina</i>	E	1
Joe Gap	GA	Small whorled pogonia/ <i>Isotris medeolides</i>	E	1
Kelley Mountain	VA	Swamp pink/ <i>Helonias bullata</i>	T	1
Laurel Fork	VA	VA northern flying squirrel/ <i>Glaucomys salorinus fusus</i>	E	1
Oliver Mountain	VA	Shale-barren rockcress/ <i>Arabis serotina</i>	E	1
Woods Mountain	NC	Mountain golden-heather/ <i>Hudsonia montana</i>	T	1
National Park				
Great Smoky Mountains	TN/	Peregrine falcon/ <i>Falco peregrinus</i>	E	2
	NC	Carolina flying squirrel/ <i>Glaucomys sabrinus coloratus</i>	E	4
		Red wolf/ <i>Canis rufus</i>	E	1
		Red-cockaded woodpecker/ <i>Picoides borealis</i>	E	6
		Spotfin chub/ <i>Cyprinella monaacha</i>	T	1
		Virginia spiraea/ <i>Spiraea virginiana</i>	T	1
		Spreading avens/ <i>Geum radiatum</i>	E	2
		Indiana bat/ <i>Myotis sodalis</i>	E	2
		Spruce-fir moss spider/ <i>Microhexura montivaga</i>	E	2
State Parks				
Mt. Mitchell	NC	Carolina flying squirrel/ <i>Glaucomys sabrinus coloratus</i>	E	1
		Rock gnome lichen/ <i>Gymnoderma linegre</i>	E	1
		Spreading avens/ <i>Geum radiatum</i>	E	1
Table Rock	SC	Eastern cougar/ <i>Felis concolor cougar</i>	E	1

spruce-fir moss spiders, mountain golden-heather, swamp-pink, and spreading avens. The other 10 species have one occurrence each.

The roadless area in the Great Smoky Mountains National Park contains the largest concentration of federally listed species. In that park, 9 species occur a total of 21 times. Six species have multiple occurrences.

Nine federally threatened and endangered species are known to occur or to have occurred in six wildernesses on national forests and national parks in the assessment area (table 5.9). These include six plant and three animal species. In some cases the same species, such as the Carolina flying squirrel, has more than one occurrence in the same wilderness.

Possible Old Growth

The 1,098,491 acres of inventoried possible old growth on national forest lands represent about 3 percent of all land in the Southern Appalachians. Roadless areas and wildernesses in the national forests account for 48 percent of this old growth.

Possible old growth is present in 125 of the 139 national forest roadless areas. These areas account for 173,641 acres or 16 percent of all national forest old-growth acres.

All acres within wilderness are considered possible old growth. The 38 national forest wildernesses in the Southern Appalachians include 347,990 acres or 32 percent of all national forest old-growth acres.

The amount of old growth in individual national forest roadless areas is generally low

(table 5.10). Of the 125 areas that include old growth, 116 or 93 percent have less than half their total acres in old growth. These areas are about equally distributed among areas larger and smaller than 5,000 acres. In addition, most of these 116 areas have less than 25 percent old growth.

Nine national forest roadless areas include more than 50 percent old growth. They are Bee Cove, Dry River, Ellicott Rock-1, Flint Mill Gap, Joyce Kilmer-Slickrock Addition, Ramseys Draft Addition, Rogers Ridge, The Friars, and Shoal Branch. All but Dry River, Flint Mill Gap, and Ramseys Draft Addition are smaller than 5,000 acres. Ellicott Rock-1 has 98 percent or the most old growth acres of any roadless area. It is also one of the smallest areas with 300 acres.

The fourteen roadless areas that do not contain any old growth acres are Cedar Mountain, Cheaha Addition-A, Cheaha Addition-B, Cherry Cove, Kimberling Creek Addition-A, Lewis Fork Addition, Little Frog Addition-NW, Little Wilson Creek Addition-A, Little Wilson Creek Addition-B, Patterson Mountain, Peter's Mountain Addition-A, Saint Mary's Addition, Sam Knob, and Tripp Branch.

Table 5.10 also shows the correlation between roadless area size and the amount of possible old growth. Amounts of old growth in roadless areas smaller than 5,000 acres ranges from less than 1 percent to 98 percent. In many of these small areas the proportion in old growth is 0 to 10 percent. All but three of the roadless areas larger than 5,000 acres have 0 to 50 percent old growth, with the largest number of areas in the 26 to 50 percent range.

Table 5.9 Known and potential occurrences of federally listed threatened and endangered species in wilderness. Species and their status and number of occurrences are indicated by wilderness, agency, and state. Status is indicated by E for endangered and T for threatened.

Wilderness	State	Species—Common Name/Scientific Name	Status	Occurrence
National Forests				
Ellicott Rock	NC	Rock gnome lichen/ <i>Gymnoderma lineare</i>	E	2
Ellicott Rock	SC	Small whorled pogonia/ <i>Isotria medeolides</i>	E	1
Linville Gorge	NC	Mountain golden-heather/ <i>Hudsonia montana</i>	T	1
Linville Gorge	NC	Peregrine falcon/ <i>Flaco peregrinus</i>	E	1
Linville Gorge	NC	Hellers blazing star/ <i>Liatris helleri</i>	T	1
Middle Prong	NC	Carolina flying squirrel/ <i>Glaucomys sabrinus coloratus</i>	E	2
Rough Mountain	VA	Shale-barren rockcress/ <i>Arabis serotina</i>	E	1
St. Mary's	VA	Swamp pink/ <i>Helonias bullata</i>	T	1
National Park				
Shenandoah	VA	Shenandoah salamander/ <i>Plethodon shenandoah</i>	E	1

Table 5.10 Amount of possible old growth in individual national forest roadless areas. Acres of old growth are shown as a percentage of total area acres.

Percent of Roadless Area in Old Growth	Total Number of Areas	Size of Area	
		Smaller Than 5,000 Acres	Larger Than 5,000 Acres
0-10	42	27	15
11-25	36	23	13
26-50	38	13	25
51-75	8	5	3
76-100	1	1	0

Potentially Suitable Bear Habitat

Approximately 56 percent of the land, or 20.9 million acres, in the Southern Appalachians is classed as potentially suitable habitat for black bears. Roadless areas and wilderness account for about 7 percent of these acres.

All 144 roadless areas and 39 wildernesses include bear habitat. Ninety-five percent of all roadless acres and 92 percent of wilderness acres are classed as potential bear habitat.

In all but a few wilderness and roadless areas, at least 75 percent of the total area is suitable habitat for bears. Exceptions are six roadless areas and three wildernesses (table 5.11). Hickory Flats and Mottesheard roadless areas in Virginia are the largest of these exceptions among roadless areas and contain the smallest percentages of bear habitat.

Recreation Settings

The recreation settings and roadless area inventories both used semi-primitive type settings as one of their criteria. However, the interpretation of this setting type and its application differed, as did the overall purpose, criteria, and process for each inventory. While the results show some similarities, a direct correlation cannot be made between the two data sets. The findings would lead to confusion and erroneous conclusions about roadless areas.

Congressionally Designated Areas

Congressionally designated areas include national recreation areas, scenic areas, wild and scenic rivers, and scenic trails. All or portions of 40 roadless areas and 18 wildernesses occur within congressionally designated special areas in the Southern Appalachians. They are distributed among five congressionally designated areas (table 5.12).

Table 5.11 Roadless areas and wildernesses in the Southern Appalachians with less than 75 percent of total acres identified as potentially suitable bear habitat. Areas are identified by name, state, size, and percent of acres in bear habitat.

Area	State	Total Area (acres)	Proportion of Habitat Suitable for Bears %
Roadless Area			
Devil's Backbone	TN	4,283	74
Graveyard Ridge	NC	1,973	45
Hickory Flats	VA	5,182	31
James River Face Addition	VA	1,284	60
Mottesheard	VA	6,521	38
Raccoon Branch	VA	4,437	72
Wilderness			
Middle Prong	NC	7,460	73
Raven Cliffs	GA	9,115	61
Thunder Ridge	VA	2,334	39

Table 5.12 Roadless areas and wildernesses that occur within congressionally designated areas in the Southern Appalachians.

Special Area	State	Roadless Areas	Wildernesses
Chattooga Wild and Scenic River	NC, SC, GA	3	1
Mount Rogers National Recreation Area	VA	10	3
Mount Pleasant National Scenic Area	VA	1	0
Springer Mt. National Recreation Area	GA	1	0
Appalachian National Scenic Trail	VA, TN, NC, GA	25	14

Data Sources and Methodology

Data for selected resources were obtained from other teams in the SAA. Terminology and definitions can be drawn from the respective team reports. No attempt was made to corroborate data received from these teams. The data were linked by the Geographic Information System to the roadless area and wilderness inventories for analysis. Inaccuracies exist in the derived products due to variability in data sources.

Likely Future Trends

Ecosystem Classifications: The number and the acreage of ecosystem sections and subsections represented in wilderness will likely increase as new areas are designated. Some sections and subsections do not occur on public land. Thus, all sections and subsections cannot be represented in either roadless areas or wilderness. As the refinement of ecological classification data increases, classes will offer greater utility in land allocation decisions.

Federally Listed Threatened and Endangered Species: Federally listed species will continue to be protected wherever they occur. Documented occurrences of these species in

roadless areas and wilderness will change. Known and potential occurrences of these species may influence allocation decisions for some roadless areas and management direction for some wildernesses. The degree of influence will depend upon factors such as the number and distribution of species and/or communities, their degree of sensitivity, and their habitat needs. Species that require undisturbed habitats are most likely to influence allocation decisions for roadless areas.

Possible Old Growth: The amount and location of old-growth forest types will be important in assessing the degree of naturalness of individual roadless areas. In turn, this information will influence land allocation decisions and management direction for these areas. Old-growth forest components in wilderness will continue to be valuable for obtaining baseline data for research and monitoring.

Congressionally Designated Areas: Congressionally designated areas are managed according to directions that are unique to each and are defined by the enabling legislation. Therefore, allocation decisions for a roadless area may be influenced by its location within a congressionally designated area.