

## SECTION C – SOCIAL AND ECONOMIC ENVIRONMENT

### C1- RECREATION

National Forests provide over 191 million acres of public land within the United States. National Forests in the Southern Appalachian region contribute approximately 4 million acres to the national total and provide unique settings for a variety of outdoor recreation activities such as primitive and developed camping, hunting, fishing, hiking, backpacking, horseback riding and off-highway vehicle driving, canoeing/kayaking and whitewater rafting as well as picnicking, sightseeing, nature watching, walking for pleasure and driving for pleasure.

#### ANALYSIS AREA

Market areas have been established for different national forests to better evaluate public demand for recreation opportunities. Past research has demonstrated that most national forest visits originate from within a 75-mile (1 ½ hour driving time) radius. Variation in preferences varies surprisingly little for broad population groups (i.e., age strata) across geographic areas. Therefore, the use of a market area provides a reasonable basis for assessment of recreation demand (*George Washington National Forest Recreation Realignment Report* Overdest and Cordell, 2001). For this analysis, the market area has been defined as all counties that fall within a 75-mile straight-line radius from the national forest border. For the George Washington National Forest (GWNF), the market area entails portions of Virginia, West Virginia, Pennsylvania, Maryland and North Carolina. The population living within the market area is about 9,200,204 (Source: U. S. Census Bureau. July 1, 2004 estimate). Table C1.1 provides a summary of the cities, counties and population within the market area

**Table C1.1 Summary of States, Counties, Cities and Population within the Market Area for the GWNF**

DC and States	Number of Counties & Cities	Population
DC	1	553,523
MD	9	2,794,633
PA	6	523,223
VA	83	4,351,587
WV	32	977,238
TOTAL	131	9,200,204

Source: National Survey on Recreation and the Environment, Southern Research Station, Last Updated August 2010

#### AFFECTED ENVIRONMENT

The most populated counties in the market area are Fairfax, Virginia, and Montgomery and Prince George’s Counties, Maryland, followed by Washington, DC. Other large municipalities within the market area include Alexandria, Arlington, Blacksburg, Charlottesville, Fredericksburg, Harrisonburg, Lynchburg, Manassas, Staunton, Vienna, and Winchester, Virginia; Beckley, Bluefield, Elkins, Martinsburg and Princeton, West Virginia; and Frederick and Silver Spring, Maryland.

Opportunities for outdoor recreation within the market area are not limited to the GWNF. Within the market area, the U.S. Forest Service offers additional opportunities on the Jefferson and Monongahela National Forests. The National Park Service offers opportunities in Shenandoah National Park, Blue Ridge Parkway, Harpers Ferry National Historic Park, C&O Canal National Historic Park, multiple historic sites, and the National Capital Region (mall, memorials and historic sites in Washington, DC). All of these areas connect and expand opportunities for recreation on federally managed public lands. The Appalachian National Scenic Trail also provides a unique long distance hiking opportunity north to south across the entire length of the market area. It connects multiple National Forests and Parks as well as State Forests and Parks from northwest Georgia to northwest Maine, with approximately one-fourth of its length being in Virginia.

A key finding of the Southern Forest Resource Assessment is that “of public ownerships, Federal tracts typically are large and mostly undeveloped. They fill a niche of providing back-country recreation. State parks and forests are usually smaller and more developed.” (Southern Forest Resource Assessment, Chapter 11: Forest-Based Outdoor Recreation, H. Ken Cordell and Michael A. Tarrant, 2002.) Within the Commonwealth of Virginia, many state parks are located within a 75-mile radius of the GWNF border. Claytor Lake, Douthat, Fairystone, James River, Lake Ana, Shenandoah, Sky Meadows and Smith Mountain State Parks provide higher levels of development including overnight lodges and/or cabins. Smith Mountain Lake and Claytor Lake provide water-based recreation opportunities within the Market Area. West Virginia State Parks and Forests within the GWNF market area include Cacapon Resort, Lost River, Cass Scenic Railroad, Seneca, Watoga, Beartown, Greenbrier, Moncove Lake, Babcock, Bluestone and Pipestem. Likewise, a majority of these West Virginia State Parks and Forests offer highly developed recreation facilities.

The George Washington National Forest provides approximately 1 million acres of public land in the Valley and Ridge and Blue Ridge physiographic regions of western Virginia and eastern West Virginia. The Shenandoah Valley divides the George Washington National Forest into two separate sections. Each section provides a variety of unique recreation opportunities.

## **RECREATION DEMAND & TRENDS**

Recreation demand is a complex mix of people’s desires and preferences, availability of time, range of price, and offering of facilities. The evaluation of current and future demand for recreation on the George Washington National Forest is based on recent surveys that identify and quantify:

- Estimated number of current recreation visits to the George Washington National Forest;
- Participation rates for recreation activities within the forest market area;
- Future activity demand based on projected population growth; and
- Activity demand by demographic strata.

The National Visitor Use Monitoring (NVUM) effort by the Forest Service has provided baselines for estimating current use of recreation sites. The 2001 and 2006 NVUM surveys data is not specific to each national forest, but rather the survey findings combined recreation use and activities for both the George Washington and Jefferson National Forests. The annual visits to the GWNF alone were estimated based on the percent of recreation sites, trailheads and access points included in the sites inventory for the 2006 NVUM that are on the GWNF. The estimated annual visits provided in Table C1.2 below only account for people engaging in recreation activities; they do not include the millions of people that drive through the national forest without stopping to recreate, unless they did so for the purpose of viewing scenery.

**Table C1.2 Fiscal Year 2006 Estimated Recreation Use on the George Washington National Forest**

Type of Recreation Sites	2006 Total Annual Estimated GW & Jeff Site Visits	2006 Total Annual Estimated GWNF Site Visits*	2006 Percentage of Total Estimated National Forests Site Visits*
Day-Use Developed Sites	399,800	202,200	19.5%
Overnight-Use Developed Sites	212,800	102,300	9.9%
Wilderness	47,100	11,200	1.1%
General Forest Areas	1,010,300	721,600	69.5%
Special Events and Organizational Camps	4,200	Not estimated	0.0%
Total Estimated Site Visits	1,674,200	1,037,300	100.0%

Source: National Visitor Use Monitoring Results, Data Collected Fiscal Year 2006, Report Last Updated March 2009.

\*Site Visit is defined as the entry of one person onto a National Forest site or area to participate in recreation activities for an unspecified period of time.

Based on this NVUM data, the “developed recreation” day and overnight use areas combined makes up almost one-third of the estimated recreation site visits on the GWNF. Approximately two-thirds of recreation site visits can be defined as “dispersed recreation” that occurs away from developed sites in general forest areas and designated Wilderness. About one-third of 1% of recreation site visits are attributed to organized special use events and camps that occur in both developed and dispersed recreation settings.

People within the defined market area for the GWNF engage in a variety of recreation activities. Table C1.3 lists the types of activities ranked in order from highest to lowest participation rates based on the 2000-2004 National Survey on Recreation and the Environment (NRSE), an on-going national telephone survey sponsored by the U.S. Forest Service. The data here is specific to participation in activities in which the market area population engaged, although the activities may or may not have occurred on the George Washington National Forest.

**Table C1.3 Types of Activities in Which the Market Area Population Engages  
 (On and Off National Forest System Lands)**

RECREATIONAL ACTIVITY	Market Area Survey	
	Percent	# of People*
Walk for pleasure	87.7%	6,303,054
Family gathering	75.2%	5,405,870
Visit historic sites	64.0%	4,602,377
Visit nature centers, etc.	63.7%	4,581,037
Picnicking	63.3%	4,551,409
View/photograph natural scenery	63.2%	4,545,428
Driving for pleasure	61.3%	4,406,426
Sightseeing	60.3%	4,332,833
View/photograph other wildlife	48.8%	3,510,264
Swimming in an outdoor pool	48.6%	3,489,977
View/photograph wildflowers, trees, etc.	48.3%	3,471,564

RECREATIONAL ACTIVITY	Market Area Survey	
	Percent	# of People*
Visit a beach	47.5%	3,416,639
Swimming in lakes, streams, etc.	45.4%	3,260,576
Bicycling (any type)	42.9%	3,083,258
Boating (any type)	38.8%	2,789,632
Day hiking	38.3%	2,751,542
Visit a wilderness or primitive area	35.2%	2,532,350
View/photograph birds	33.3%	2,392,019
Snow/ice activities (any type)	32.1%	2,307,625
Visit a farm or agricultural setting	30.5%	2,194,107
Gather mushrooms, berries, etc.	29.9%	2,150,416
Visit other waterside (besides beach)	29.1%	2,092,235
Freshwater fishing	25.2%	1,809,067
Visit prehistoric/archeological sites	25.2%	1,810,139
Mountain biking	25.1%	1,800,834
Motorboating	22.2%	1,592,503
View/photograph fish	22.1%	1,591,664
Developed camping	21.9%	1,571,514
Warmwater fishing	19.5%	1,399,697
Drive off-road	19.2%	1,379,365
Coldwater fishing	14.1%	1,009,775
Primitive camping	13.3%	959,277
Saltwater fishing	11.6%	831,240
Hunting (any type)	11.5%	827,106
Canoeing	11.3%	809,605
Backpacking	10.9%	781,897
Downhill skiing	10.5%	754,489
Rafting	10.3%	743,500
Big game hunting	10.1%	728,982
Horseback riding (any type)	9.5%	682,560
Sailing	8.5%	609,380
Use personal watercraft	8.1%	584,063
Horseback riding on trails	7.9%	569,578
Small game hunting	7.8%	561,735

Source: 2000-2004 National Survey on Recreation and the Environment. USDA Forest Service. Southern Research Station. Athens, Georgia. \*George Washington NF local area: 131 counties, 16 and older population (2004 Census estimate).

The Resources Planning Act (RPA) Assessment reports on the status and trends of the Nation’s renewable resources on all forest and rangelands, as required by the Forest and Rangeland Renewable Resources Planning Act of 1974. The RPA mandates periodic assessments of the condition and trends of the Nation’s renewable resources including recreation, fish, wildlife, biodiversity, forest and range resources as well as land use change, climate change and urban forestry. Consistent with this Act, the U.S. Forest Service Southern Research Station and the University of Georgia, Athens, develop and present outdoor recreation participation projections for specific recreation activities or recreation composites for regions of the United States. Future renewable resource conditions are influenced by changes in population, economic growth, and land uses. Using these major drivers, three equally likely scenarios were used by the 4<sup>th</sup> Assessment by the Intergovernmental Panel on Climate Change (IPCC 2007) and are adopted by the U.S. Forest Service and University of Georgia in developing projections for participation in outdoor recreation.

Table C1.4 provides national projections in public participation in outdoor recreation activities. This list of individual activities or activity composites was derived from the National Survey on Recreation and the Environment. An individual is said to have participated in an outdoor recreation activity if he reported engaging in that activity at least once in the preceding 12 months.

**Table C1.4 Fifty Year Projected Activities in Outdoor Recreation on GWNF (in thousands)**

Recreation Activity	2010	2020	2030	2040	2050	2060
<b>Camping</b>						
Developed Camping	105.16	117.44	130.13	140.87	151.81	163.68
Resorts, Cabins	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL FOR GROUP	105.16	117.44	130.13	140.87	151.81	163.68
<b>Driving</b>						
Driving For Pleasure	47.77	53.38	59.19	64.06	68.98	74.36
Other Motorized Travel	0.83	0.93	1.03	1.12	1.20	1.30
Motorized Water Travel	24.42	27.23	29.74	32.29	35.36	38.78
TOTAL FOR GROUP	73.02	81.55	89.96	97.47	105.54	114.45
<b>Fishing</b>						
Fishing	189.82	208.12	224.94	238.62	253.22	268.93
<b>General</b>						
General Relaxing	74.05	82.75	91.75	99.30	106.93	115.28
Swimming	57.19	64.51	71.78	78.49	85.70	93.63
TOTAL FOR GROUP	131.24	147.27	163.53	177.79	192.63	208.91
<b>Hiking</b>						
Hiking/Walking	210.56	237.34	265.76	291.31	318.09	347.74
<b>Hunting</b>						
Hunting	99.49	104.57	108.09	110.14	112.29	114.34
<b>Nature</b>						
Visiting Historical Sites	0.00	0.00	0.00	0.00	0.00	0.00
Visiting Nature Centers, VIS	1.23	1.38	1.54	1.69	1.83	1.99
Gathering Berries, Natural Products	10.92	12.31	13.74	15.00	16.31	17.75
Nature Study	0.00	0.00	0.00	0.00	0.00	0.00

Recreation Activity	2010	2020	2030	2040	2050	2060
<b>TOTAL FOR GROUP</b>	12.15	13.69	15.28	16.68	18.14	19.74
<b>Off-Highway Vehicles</b>						
Off-Highway Vehicles	8.34	9.03	9.56	10.15	10.88	11.65
<b>Primitive Camping</b>						
Primitive Camping	5.01	5.52	6.00	6.44	6.91	7.42
Backpacking, Camp in Unroaded Areas	3.34	3.68	4.00	4.29	4.61	4.95
<b>TOTAL FOR GROUP</b>	8.35	9.20	10.01	10.73	11.52	12.36
<b>Picnicking</b>						
Picnicking	7.36	8.22	9.11	9.86	10.63	11.46
<b>Trails</b>						
Bicycling	15.13	17.05	18.88	20.79	22.99	25.46
Horseback Riding	2.52	2.82	3.08	3.37	3.73	4.13
Non-Motorized Water Travel	1.67	1.82	1.93	2.07	2.24	2.42
<b>TOTAL FOR GROUP</b>	19.32	21.69	23.90	26.23	28.96	32.02
<b>Viewing</b>						
Viewing Scenery	117.33	131.12	145.38	157.35	169.43	182.66
Viewing Wildlife, Birds, Fish	72.95	82.47	92.70	100.67	108.36	116.76
<b>TOTAL FOR GROUP</b>	190.28	213.60	238.08	258.02	277.80	299.42
<b>Wilderness</b>						
Wilderness	11.48	12.64	13.75	14.75	15.83	16.99
<b>TOTAL FOR ALL GROUPS</b>	1,066.56	1,184.35	1,302.08	1,402.63	1,507.33	1,621.68

Data Source: Bowker, J. M., and Askew, Ashley (forthcoming). Outdoor Recreation Participation Projections 2010 to 2060. In: Outdoor Recreation Trends and Futures: Technical Document Supporting the Forest Service 2010 RPA Assessment. GTR-SRS-XXX. Asheville, North Carolina: U.S. Department of Agriculture, Southern Research Station. The data for three projections scenarios were averaged by Paul Arndt, Regional Planner, U.S. Forest Service Southern Region. Omitted from the list are various winter sports, which are not relevant to projections for the Southern Region.

The activities with the most projected per capita participation by year 2060, nationally, are hiking/walking, fishing, viewing scenery, developed camping, viewing wildlife and general relaxing. The activities with the greatest percent of growth in participation from 2010 to 2060 are bicycling, hiking/walking, horseback riding, swimming, visiting nature centers, gathering forest products such as berries, viewing wildlife and motorized water sports.

Demographic information collected for the 2001 Recreation Realignment report within the market area revealed trends that were popular across a variety of demographic groups (age, gender, number of people per household, race and ethnic strata). At the time of the Recreation Realignment effort, these were primarily those that do not require specialized skills or equipment and that can engage multi-generations together. The ten most popular activities on the George Washington National Forest, according to the Recreation Realignment Report, were viewing/photographing wildlife and birds, viewing/photographing features and scenery, swimming, hiking or walking for pleasure, visiting a Wilderness, gathering forest products, fishing, camping in a developed site, and ATV/OHV use.

## RECREATION SUPPLY

For planning purposes, recreation supply is defined as the opportunity to participate in a desired recreation activity in a preferred setting to realize desired and expected experiences. Recreationists choose a setting and activity to create a desired experience. Three components of supply are settings, activities and facilities. The US Forest Service manages a supply of settings and facilities.

The Recreation Opportunity Spectrum (ROS) is a planning tool used to identify and evaluate the supply of recreation settings on national forests. Four ROS classes were inventoried on the George Washington National Forest. These settings include Semi-Primitive Non-Motorized (SPNM), Semi-Primitive Motorized (SPM), Roaded Natural (RN), and Rural (R).

Primitive (P) is the most remote, undeveloped recreation setting. These settings are generally unmodified, natural environments located at least three miles from any open road and are 5,000 acres in size or larger. Interaction between users is very low and motorized use within this area is not permitted. The area is managed so that it is essentially free of evidence of on-site controls and restrictions. There were no areas on the George Washington National Forest that met the inventory criteria for Primitive.

Semi-Primitive Non-Motorized (SPNM) areas are predominated by a natural or natural appearing environment. Interaction between visitors is low, but there may be evidence of other users. They are managed to achieve a sense of remoteness, although SPNM areas can be as small as 2,500 acres in size and only a half-mile or greater from any open road. These areas are managed to minimize the presence of on-site controls and restrictions. These settings accommodate dispersed, non-motorized recreation.

Semi-Primitive Motorized (SPM) areas are natural or natural appearing. Interaction between visitors is low, but there often is evidence of other users. Motorized use is permitted. SPM accounts for areas on the National Forest that either buffer SPNM areas or stand alone as tracts of land 1,500 acres or larger with a low road density of 1.5 miles of road/1,000 acres.

Roaded Natural (RN) settings are natural appearing with moderate evidence of sights and sounds of humans. Interaction between visitors may be low to moderate, but evidence of other users is prevalent. Conventional motorized access is accommodated. RN areas are located within a half mile of a road and usually provide higher levels of development such as campgrounds, picnic areas and river access points.

Rural settings are substantially modified natural environments. Sights and sounds of other humans are readily evident and interaction between users may be moderate to high. Facilities for concentrated motorized use and parking are provided. Rural settings represent the most highly modified natural settings on the forest and include only highly developed recreation sites. They are so small that they are represented with a point, rather than a polygon, in our Geographic Information System. Acreage in the Rural ROS class is negligible.

**Table C1.5 Current Distributions of ROS Classes as Inventoried on the George Washington National Forest**

Recreation Opportunity Spectrum (ROS) Class	Current ROS Inventory Acres on the GWNF (approximate acres)	Current Percentage of each ROS Class on the GWNF
Semi-Primitive Non-Motorized - SPNM	198,281	18.6%
Semi-Primitive Motorized - SPM	210,992	19.8%
Roaded Natural - RN	656,596	61.6%
<b>Total</b>	<b>1,065,872</b>	<b>100%</b>

Source: GWNF Geographic Information System (GIS inventory data)

There are no lands on the GWNF that meet the inventory requirements for Primitive ROS setting (due to proximity to roads). However, the GWNF manages all designated Wilderness (42,674 acres) as Primitive ROS setting.

*The Southern Appalachian Assessment: Social, Cultural, Economic Technical Report (SAA)*<sup>1</sup> provides data about landscape settings in 10 ecological sections of the Southern Appalachians. The report includes settings on both public and private lands. It states that about 5% of the region is developed into urban settings and 12% is developed into suburban or transitional settings. Approximately 45% of the landscape is in rural settings, 2% are covered in large rivers and lakes and 3% could not be determined using satellite imagery. About 8% of the area in the study provides Primitive or Semi-Primitive settings, with 100% of the Primitive settings being provided on public lands.

## **DEVELOPED RECREATION**

A developed site is characterized by a built environment containing a concentration of facilities and services used to provide recreation opportunities to the public. They typically represent a significant investment in facilities and management under the direction of an administration unit in the National Forest System. Recreation sites are developed within different outdoor settings to facilitate desired recreational use. Developed recreation sites include such facilities as campgrounds, picnic areas, shooting ranges, swimming beaches, interpretive sites, visitor centers and historic sites. Developed recreation sites provide different levels of user comfort and convenience based on the assigned Recreation Opportunity Spectrum (ROS) setting. The development scale for recreation sites range from 1 to 5, with the lower end of the scale representing the most primitive, natural settings. Site amenities are provided only if needed for the protection of resources. The upper end of the scale represents the highest level of development and facilities for the comfort and enjoyment of the visitor.

The George Washington National Forest has three development scale 5 recreation areas: Bolar Mountain, Sherando Lake and Trout Pond. Each is a recreation complex offering amenities and services for the comfort of users. They offer multiple types of camping facilities (family and group) and campsites with utility hookups. The campground roads and walkways are paved, bathhouses have flush toilets and warm water showers, campsites are numbered and delineated, and each complex offers a highly developed day use area. There is an entrance station and on-site staff and volunteers. A percentage of the campsites are available by reservation.

Brandywine Lake, Cave Mountain Lake and Morris Hill are three examples of development scale 4 campgrounds. They also offer many facilities for the comfort of users including bathhouses with flush toilets and showers and have day use areas. However they are smaller in scale than the development scale 5 sites and they do not offer utility hookups. Volunteer campground hosts are on-site during the peak use season.

Hidden Valley and North Creek are examples of development scale 3 campgrounds. They have gravel roads, numbered campsites, restroom facilities that may have vaults rather than flush toilets and no showers. There is typically, but not always, an on-site volunteer campground host during peak season weekends.

Development scale 2 sites include campgrounds like Greenwood Point, McClintic Point and Little Fort. These provide facilities for the protection of resources rather than for visitor comfort. These are smaller areas offering vault toilet buildings, gravel roads (except Greenwood Point that is accessed only by boat or hiking trail), campsites typically are no numbered or delineated, and rarely, if ever, is there an on-site volunteer host. Some do not offer drinking water or trash collection – users pack in drinking water and pack out trash. Mowing is done infrequently or not at all.

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<sup>1</sup> Southern Appalachian Man and the Biosphere (SAMAB). 1996. The Southern Appalachian Assessment Social/Cultural/Economic Technical Report. Report 4 of 5. Atlanta: U.S. Department of Agriculture, Forest Service, Southern Region.

**SUPPLY OF DEVELOPED RECREATION SITES**

The Forest Service defines the capacity of developed recreation sites in terms of “people at one time” that a site can support, called PAOTs. Currently, there are 59 developed sites managed by the George Washington National Forest to accommodate different recreation activities. Tables C1.6 and C1.7 illustrate the different types of facilities provided across the forest and their current capacity in PAOTs.

**Table C1.6 Current Supply of Day-Use Developed Areas on George Washington NF**

Site Type	Number of Sites	Total Capacity (PAOTs)
Motorized Boating Sites*	2	350
Campgrounds & Complexes**	21	6,740
Horse Campgrounds	1	25
Interpretive Sites	10	815
Observation Sites	4	485
Picnic Sites	10	730
Swimming Sites*	7	945
Target Ranges	4	120
Grand Total	59	10,210

Source: INFRA-Recreation Sites Report. INFRA is a Forest Service database that contains all developed recreation sites inventory data.

\*Coles Point offers both a swimming area and a boat ramp. The entire capacity of Coles Point is listed with the swimming site.

\*\* All of the level 5 campgrounds and three of the level 4 campgrounds have day lakes with sand swimming beaches. The capacity of these day use areas is included with the Campgrounds & Complexes.

Several development scale 2 campgrounds on the George Washington National Forest developed over time in response to riparian resource degradation and sanitation concerns in concentrated use areas along popular river and stream corridors. Facilities installed to protect resources have included vault toilets, designated parking areas and hardened impact areas for camping. A couple of examples where developed facilities are provided to protect resources from the impacts of what were originally dispersed recreational uses are Oronoco and North River campgrounds. The supply of the lower development scale facilities provided by the George Washington National Forest currently exceeds demand. Occupancy is typically low at the majority of the development scale 2 and low 3 recreation sites, with seasonal variability. For most of the lower development scale sites, occupancy increases during spring and fall hunting seasons, but rarely to full capacity at most sites.

At the upper end of the development scale, the public demand for campsites is greater than the demand for lower development scale sites. However, demand rarely exceeds supply, except during the summer holiday weekends. The exception to this is Sherando Lake family campground, which routinely fills to capacity throughout the summer. Across the George Washington National Forest, demand for campsites with utility hookups exceeds supply. The Forest has not installed additional utility hookups in recent years due to the cost of installation and ongoing maintenance, desires to reduce the carbon footprint, and in keeping with our Forest’s recreation niche which is primarily trails and dispersed recreation. State parks and privately owned campgrounds meet some of the public demand for sites with utility hookups and other amenities for visitor comfort. State parks and private sector campgrounds are typically more highly developed than Forest Service campgrounds.

## DISPERSED RECREATION

**Developed Sites That Support Dispersed Recreation Uses:** Dispersed recreation is defined as those activities that occur outside of developed recreation sites such as boating, hunting, fishing, hiking and biking. Parking is also provided at two hang gliding sites, although those sites have received little use and little maintenance in recent years. There are 58 developed recreation sites that support dispersed use of the forest such as trailheads, trail shelters and boat ramps. Table C1.7 provides a summary of the developed areas used to access dispersed recreation opportunities on the national forest.

**Table C1.7 Developed Access Points for Dispersed Recreation on the George Washington NF**

Site Type	Number of Sites	Total Capacity (PAOTs)
River and Lake Boating Access	9	325
Fishing Sites	7	701
Observation Sites	3	96
Hang Gliding Sites	4	70
Trail Shelters	13	109
Trailheads	20	1,307
Grand Total	56	2,608

Source: INFRA-Recreation Sites Report, 08/20/2010. INFRA is a Forest Service database that contains all developed recreation sites inventory data.

**Trails:** The George Washington National Forest offers approximately 1,078 miles of trails. The majority are for non-motorized, multiple uses and are shared by hikers, equestrians and bicyclists. Notable exceptions are the Appalachian National Scenic Trail and several short interpretive trails that are open to hikers only and trails in designated Wilderness where bicycles are prohibited. Also excluded from multiple uses are some trails within developed recreation areas. Approximately 65 miles on three trail systems provide motorized use opportunities. All three trails are open to all-terrain vehicles and motorbikes, and one of the three trails has portions open to off-road or four-wheel drive trucks.

Table C1.8 gives a breakdown of the miles of trail that are managed for various types of uses. The total trail miles do not add up to the total National Forest System Trail miles because of the overlap in uses allowed.

**Table C1.8 Approximate Miles of Trail Offered on the George Washington NF**

Type of Trail	Miles	Comment
Wilderness	68	
Non-Wilderness	1,010	
Trail miles that allow hikers	1,078	
Trail miles that allow equestrians	811	All except Appalachian Trail, interpretive trails, and trails within developed recreation areas including angler trails
Trail miles that allow bicyclists	794	All except Appalachian Trail, trails in designated Wilderness, interpretive trails and certain trails within developed recreation areas including angler trails
Trail miles that allow ATVs and OHVs	65	Allowed on designated motorized trails only

Source: INFRA-Trails Report, 08/30/2010

Demand for long-distance trails for special recreation events, such as long-distance mountain bicycling, equestrian endurance rides and runner marathons, has increased in recent years. The demand is greatest among the equestrian and mountain biking communities. Events are not permitted in designated Wilderness and neither of these user groups is permitted on the Appalachian National Scenic Trail. Concern has been expressed among some in these user groups that any additional Wilderness designations exclude, to the extent possible, trails that currently are used, or that by their connectivity to other trails could be used, for long-distance trail riding opportunities and special recreation events.

There is more demand than supply for motorized trail opportunities. There is a goal in the current George Washington National Forest Land and Resources Management Plan to add a new motorized trail in the area of Archer Run. However, the Archer Run area does not meet the environmental criteria for establishing a new ATV trail. Furthermore, due to concerns with resource damage on and off trail, the Patterson Mountain all-terrain vehicle trail on the north end of the Jefferson National Forest is temporarily closed and potentially could be closed permanently, putting more stress on the motorized trails of the George Washington National Forest. Public concern was expressed during at least one public meeting about losing local economic benefits of motorized trail users who travel to West Virginia to find an adequate supply of this type of recreation opportunity.

The ability of the national forest to provide such a significant trails program is largely dependent on the volunteer workforce that helps with maintenance of trails. In fiscal year 2010, volunteers contributed 50,928 hours to the dispersed recreation program, equivalent to 28 full time employees. The motorized trail program relies heavily on grants from the Virginia Recreational Trails Fund program. While support from volunteers and the grant programs have been consistent, a decline in either of these programs will have negative implications for the sustainability of the dispersed recreation program.

Hunting and fishing are traditional and popular dispersed recreational uses of the George Washington National Forest. The Forest Service manages the habitats that sustain populations of small and big game species as well as cold and warm water fisheries. The Virginia Department of Game and Inland Fisheries and the West Virginia Department of Natural Resources stock certain streams and lakes. Table C1.9 provides acres currently managed for fish and wildlife habitat emphasis.

**Table C1.9 Acres of Current Fish and Wildlife Habitat Emphasis Areas**

Type of Fish & Wildlife Habitat Emphasis	Unit of Measure
General Big & Small Game Habitat	315,801 Acres
Early Successional Habitats	33,442 Acres
Stocked (Put & Take) Streams	67 Miles of Streams
Stocked (Put & Take) Reservoirs	2,830 Acres

Sources: Data for game and early successional habitats – spreadsheet titled “ROS\_Acres\_AltsComparison\_10.21.2010.xlsx” provided by GIS Specialist; this table include acres for prescription areas 8 and 13 only, which emphasize wildlife habitat management. Data for stocked streams and reservoirs was obtained from the Virginia Department of Game and Inland Fisheries website at <http://www.dgif.virginia.gov/fishing/stocking/> and West Virginia Department of Natural Resources at <http://www.wvdnr.gov/Fishing/Regs10/TroutStocking.pdf>.

## **DIRECT, INDIRECT EFFECTS AND CUMULATIVE EFFECTS**

Existing recreation demand is expected to grow for a variety of activities including dispersed and developed recreation. Existing uses of the National Forest will increase as recreation demand and population grows over the next ten years.

General themes were developed for each alternative that emphasize different resource management objectives. Alternative A is the current management alternative and it provides the baseline for evaluating

other alternatives. Each alternative theme and its allocation of prescription areas provide the parameters for redefining the current distribution of the Recreation Opportunity Spectrum (ROS) which has implications for both developed and dispersed recreation settings, facilities development and potentially for road management. The suitability of road construction was a factor in determining the effects of each alternative to recreation. National Forest management could affect recreation by constructing or removing recreation facilities and improvements, changing their development level, restricting, prohibiting or encouraging use, altering the land to make it suitable or unsuitable for use, and changing the landscape setting. Evaluation of potential recreation effects requires that these elements be considered: activities, setting, and experiences.

Refer to other sections of the DEIS for additional environmental consequences related to Scenery, Wild & Scenic Rivers, Wilderness, Potential Wilderness Areas, Special Areas and Cultural resources.

## RECREATION OPPORTUNITY SPECTRUM (ROS)

Table C1.10 provides a comparison by alternative of the percent of acres in the current ROS inventory that could potentially change because they are allocated to prescription areas with an emphasis that may be inconsistent with that setting. Specifically, prescription areas where construction of permanent roads is allowed are inconsistent with semi-primitive non-motorized (SPNM) and semi-primitive motorized (SPM) ROS settings. The construction of low level temporary roads is consistent with SPM, but not with SPNM. Allocations to the Recommended Wilderness prescription area might result in the closing of roads, which is not consistent with the Roded Natural ROS setting.

Under the current management plan that has been in place since 1993, about 123,000 acres of inventoried SPM and SPNM (about 30% of total SP acres) are in management areas that allow road building. About 188,000 acres of inventoried RN areas (also about 30% of total RN acres) have been allocated to areas managed to provide settings that lean to the semi-primitive end of the spectrum. While it is important to analyze the potential consequences of allocating lands to prescriptions that may be inconsistent with their inventoried ROS status, it should also be noted that the allocations of areas to management prescriptions that allow or prohibit road building have not resulted in a significant change in the ROS inventory since 1993.

**Table C1.10 Percent of Acres in Prescription Areas with Emphasis That May Not Be Consistent With Current Inventoried ROS Classification**

ROS Class	ALT A	ALT B	ALT C	ALT D	ALT E	ALT F	ALT G
<b>SPNM*</b> <b>198,281 acres</b>	10-15%	15-20%	<1%	15-20%	10-15%	5-10%	10-15%
<b>SPM*</b> <b>210,995 acres</b>	45-50%	60-65%	5-10%	40-45%	45-50%	45-50%	50-55%
<b>RN**</b> <b>656,596 acres</b>	25-30%	35-30%	55-60%	25-30%	30-35%	25-30%	30-35%

\*The first two rows for SPNM and SPM indicate the potential percent of acres that could move toward the RN end of the spectrum. The SP inventory status will not change unless new roads are constructed of the development level and distance to the current ROS boundary that would result in an inventory change, whether the road is inside or outside of the national forest.

\*\*The last row, for RN, indicates the percent of inventoried RN acres that would be allocated to prescriptions that are managed more consistently with semi-primitive settings. The RN inventory status will not change unless roads are permanently closed that would make a difference in that RN inventory.

The Alternative that would bring about the least change to the SPNM and SPM inventoried acres is Alternative C. Alternative F also fundamentally provides for the protection of SPNM recreation settings. The alternatives in the middle of the pack for protecting SPNM are Alternatives A, E and G. The alternatives that would result in the most potential change to the SPNM inventory are B and D.

Areas of SPM occur in multiple prescription areas that would allow the construction of permanent roads, including utility corridors, ATV use areas, dispersed recreation, range, Wild and Scenic Rivers (recreation classification), mix of successional habitats (suitable and unsuitable), early successional habitat (suitable and unsuitable), timber production, mosaics of wildlife (suitable and unsuitable), source water watersheds, and Indiana bat-secondary. Alternative B provides the potential for the greatest number of inventoried SPM acres to change. This is followed by Alternative G and then Alternatives E and F, then finally D. Alternative G has an objective to maintain 85% of the inventoried SPM areas in their SPM settings. Alternative G also includes a strategy to close newly constructed roads in SPM areas as soon as the immediate access need is met. With this objective and strategy the actual amount of existing SPM areas that may not be consistent with the current inventory should be near zero. Alternative C substantially protects the SPM recreation settings.

The Alternatives that provide for management of the RN areas most consistently with the RN end of the spectrum are A, D and F, followed by E, G and then B with percent of area that would be managed more toward the SP end of the spectrum. Alternative C manages the highest percent of RN acres as being on the SP end of the spectrum.

Under Alternative C, and to a lesser extent Alternative F, effects of changes in ROS settings will be positive for those visitors seeking a more remote experience, and less positive or potentially negative for those visitors who prefer a more developed experience. Under Alternatives B and D, the effects of change in settings will be positive for those visitors seeking increased access and a more developed recreation setting, and less positive or potentially negative for those visitors who prefer a more remote experience. In Alternatives A, E and G, the changes in the recreation settings will result in less affects but changes will favor increasing RN and decreasing SP.

Increasing remote settings may be associated with road closures in some areas, both seasonal and permanent. Closing roads increases the satisfaction of visitors that prefer solitude and fewer disturbances by motorized vehicles. Road closure often reduces wildlife poaching, litter and the development of unauthorized trails.

Increasing developed settings may be associated with construction of new permanent roads whether they are constructed primarily for management or recreational purposes. Increased motorized access to more areas of the national forest increases the satisfaction of visitors who hunt, fish, photograph scenery, birdwatch, pick berries, and disperse camp. The roads themselves are often enjoyed by people with limited mobility and/or limited time to recreate on the national forest.

## **DEVELOPED RECREATION**

Developed recreation is not a significant issue and it does not vary significantly by alternative. Alternatives A, B, and D would maintain a developed recreation program similar to the current level, except Alternatives D and F might see increased amenities or expansion in existing recreation sites. Under Alternatives C and E there would be closure of some recreation sites. No new developed recreation sites are included in any of the alternatives. Table C1.11 displays allocation of capacity in terms of People At One Time (PAOT) by alternative to existing developed recreation capacity.

**Table C1.11 Estimated Capacity (PAOTs) of Developed Recreation Areas by Alternative**

Site Type	Alt A Capacity (Baseline)	Alt B Increase 0- 5%	Alt C Decrease 5-15%	Alt D No change	Alt E Decrease 5-15%	Alt F Increase 5-15%	Alt G Increase 0- 5%
Water Based Recreation: Swimming, boating, developed fishing	1,295	1,295-1,360	1,230-1,490	1,295	1,230-1,490	1,360-1,500	1,295-1,360
Overnight Use: Family, Equestrian, Group Campgrounds	6,765	6,765-7,100	6,425-7,780	6,765	6,425-7,780	7,105-7,775	6,765-7,100
Interpretive and Observation Day Use Sites*	1,300	1,300-1,365	1,300	1,300	1,300	1,365-1,495	1,300-1,365
Day Use Picnic Sites	730	730-765	570	730	570	765-840	730-765
Target Ranges	120	120-125	120	120	120	130-160	120-125
Grand Total	10,210	10,720	9,185	10,210	9,185	10,725-11,770	10,720

\*Interpretive and observation sites would likely not see the same percent of decrease as other site types due to the benefits that public awareness and education through interpretation of resources can have in achieving the desired conditions, goals and objectives for the national forest.

In all alternatives there will be an emphasis to upgrade the accessibility of existing and expanded sites, which are considered high priority improvements. Effects include a greater satisfaction for users of all abilities as more sites become accessible. Families of all ages and ability levels can share the same facilities and site furnishings, and visitors will find their choices have broadened in selecting campsites, picnic sites, shooting range lanes, and other types of developed recreation sites.

None of the alternatives will meet the local market demand for developed recreation. The effects of unmet demand will be greatest with Alternatives C and E, followed closely by Alternatives A, B, D and G. Alternative F meets more of the developed recreation demand than the others, but this will diminish with time as the population increases while the amount of public lands offering these opportunities remain fairly static. Some sites will become increasingly overused and crowded. Initially this may occur only at peak times such as holidays and weekends; but over time this could extend to much of the primary recreation season from Memorial Day to Labor Day. This will result in lower satisfaction levels and some visitors will have unmet expectations. Some will seek the supply of developed recreation on state, county and private lands.

Hotspots of developed recreation are sites that are consistently at or over their design capacity. On the George Washington National Forest these include areas such as Sherando Lake throughout most of the summer as well as Bolar Mountain and Trout Pond Recreation Areas on most weekends and holidays. Hotspots of use for developed recreation will broaden over time to other recreation areas and into the shoulder use seasons. Upgrades of facilities, putting sites on the national reservation service, and implementing visitor use controls should help alleviate problems of overuse at these sites.

Some management actions will affect developed recreation and effects will depend on the proximity and magnitude of the activity. These activities include construction, reconstruction and maintenance of roads and trails, insect and disease control, prescribed burning and pesticide use. Some activities have short term effects such as prescribed burning or pesticide use that decrease the satisfaction of the visitors in the area for a short time. Other activities such as road construction or major repairs to facilities may influence satisfaction

on a longer basis, perhaps up to a year. Other natural causes such as wildfires or tornadoes can greatly affect developed recreation areas long-term or permanently.

Roads are needed to access developed recreation areas. Because no new developed recreation areas are proposed under any alternative, the degree to which new roads are constructed is not a significant factor for developed recreation. The degree to which roads might be closed could potentially be a factor, if it would result in closing vehicular access to an existing developed recreation area. Alternative C provides for the most potential miles of road decommissioning. Alternatives A and D provide for the least miles of road to be decommissioned.

Natural causes such as wildfires can greatly affect developed recreation areas long-term or permanently. The use of prescribed burning in the vicinity of developed recreation areas results in the reduction of fuels for wildfires. Alternative E provides the largest prescribed burning program, while Alternative C provides for the least.

## DISPERSED RECREATION

The George Washington National Forest currently has over one thousand miles of trails. Agency trail managers have struggled to meet targets related to maintaining existing trails to standard and question the ability of the national forest to continue to sustain the current level of trail miles. However, user groups that enjoy both non-motorized and motorized trails, including active volunteer organizations that help accomplish trail maintenance, would like to see the trail miles on the national forest increased.

**Non-Motorized Trails:** With the exception of the Appalachian National Scenic Trail, trails in Wilderness and some paved interpretive trails, this national forest allows and encourages multiple uses of its non-motorized trails. The biggest changes between the alternatives is with the miles of trail currently open to mountain bicycles that would be closed to that use if Recommended Wilderness Study areas are designated by Congress as Wilderness. The second influential factor in trail miles is the provision in some alternatives that an increase in trail miles can occur but with no net increase in the amount of trail maintenance that would be required. This would be accomplished through relocating or decommissioning unsustainable trails, adding new trails or trail connectors in appropriate locations, and constructing trails using design standards that result in minimal maintenance needs and maximum sustainability. The following table indicates the proposed change from current miles of trail as proposed in each Alternative.

**Table C1.12 Estimated Changes in Non-Motorized Trail Miles Open to Various User Types**

Type of Trail	ALT A	ALT B	ALT C	ALT D	ALT E	ALT F	ALT G
Hiking, Pack-and-Saddle, Mountain Bicycling	Increase 0-3% <30 miles	No net change	Increase <3% <30 miles	Increase 5-10% 50-100 miles	No net change	Increase <3% <30 miles	Increase <3% <30 miles
Affect of Wilderness Designation on Mountain Bicycling*	No change	Loss of 9 miles of trail	Loss of 434 miles of trail	Loss of 1 mile of trail	Loss of 11 miles of trail	Loss of 70 miles of trail	Loss of 9 miles of trail

\* The allocation of land to Recommended Wilderness will not affect mountain bike use in those areas. However, if Recommended Wilderness Areas are designated as Wilderness by Congress, then all mechanical and motorized transport forms of recreation, such as mountain bicycling, will be prohibited according to the Wilderness Act of 1964.

**Motorized Trails and Roads for OHV Use:** Mixed comments were received regarding the level of motorized trail opportunities that should be provided. Some comments suggested eliminating or decreasing opportunities for off-highway (OHV) and all-terrain vehicles (ATV). Most of the comments related to motorized recreation referenced high-clearance 4x4 trails and roads for OHV use. Some people desiring this type of opportunity requested that OHV routes be specifically identified and managed for that use.

Some comments received requested that the current level of ATV trails provided be maintained or increased. The site requirements for constructing new motorized trails are difficult to meet. The proposed Archer Run ATV Trail in the 1993 Forest Plan did not meet site requirements. The following table indicates the proposed change from current miles of motorized trails and featured OHV routes by Alternative.

**Table C1.13 Estimated Change from Existing Miles of Motorized Trails by Alternative**

Type(s) of Motorized Use Allowed	ALT A	ALT B	ALT C	ALT D	ALT E	ALT F	ALT G
ATVs* and motor-cycles	increase 10-25% or 6-16 miles	No change	No change	Increase 25-60%; or 16-40 miles	No change	Increase up to 10% or 6 miles.	Increase 5-10% or 3-6 miles
OHVs**	Increase 0-25 miles; roads are featured for OHVs.	No featured OHV roads; current level of high clearance roads	No roads managed for OHVs	Increase 20-40 miles; roads are featured for OHVs	No roads managed for OHVs	No featured OHV roads; current level of high clearance roads	No featured OHV roads; current level of high clearance roads

\*ATV = Unlicensed four-wheeled vehicle, 50" wide or less, controlled by handle bar (not steering wheel), and has a seat that is straddled.

\*\*OHV = Street legal, 4-wheel drive, high clearance vehicle.

Allocations of land to prescription areas for ATV/OHV trail riding opportunities will increase noise disturbance and may lessen the experience of other recreation participants such as hikers, hunters, fishermen, campers, and those seeking solitude.

Alternative A increases trail construction of both motorized and non-motorized trails and identifies featured OHV roads. Under Alternative A or D, the improved and expanded trail systems will reduce some of the unauthorized off-trail use.

Alternatives B and E include no significant increase or decrease in the current motorized or non-motorized miles of trail. Specific OHV roads are not featured in Alternative B, but high clearance roads will continue to be provided for OHV use at the current level. Under Alternative E, no roads are managed for OHVs. Other than this distinction in the OHV program, both Alternatives have an emphasis on maintaining the current dispersed recreation trails program.

Alternative C has the greatest potential for decreased miles of trail available to mountain bicycling users in the future. Mountain bikes will continue to be allowed in Recommended Wilderness areas, but are prohibited by law when Congress designates an area as Wilderness. Alternative C provides for increased miles of non-motorized trail, as long as there is no increase in trail maintenance costs. Alternative C makes maintenance of the trail system more challenging, as hand tools must be used rather than power tools in areas designated as Wilderness. Alternative C would reduce opportunities for recreation special events on the Forest if Recommended Wilderness areas are designated by Congress as Wilderness. This would include several annual recreation events such as long-distance pack and saddle enduros and running marathons. Alternative C includes no management for OHV roads, but does allow that existing ATV/OHV trails remain open.

The alternative with the most emphasis on expanding the existing overall trails program is Alternative D. It provides the greatest increases in the dispersed recreation trail systems, including hiking, mountain biking, horseback riding, ATV, OHV and interpretive trails. Alternative D increases dispersed recreation access points such as boat ramps and trailheads the greatest. This will result in greater user satisfaction, increased use of trails and easier access to different parts of the forest for some users. Alternative D also provides for increased interpretive trails that will enhance experiences for most visitors. Also, sharing information with users about ecosystems, history and resource management through interpretation often results in good partners in management.

However, with improved trails and increased access, some people may experience user conflicts as visitor levels on trails increase. Increases in the trail system could also have effects of more litter, safety concerns, law enforcement needs, search and rescue needs, and increased risk of wildland fires. The sustainability of this expanded dispersed recreation program is not addressed in Alternative D.

Alternative F focuses on improving the existing miles of non-motorized trails and improves and expands the existing ATV/OHV trail systems. It promotes a sustainable trails program that allows for expansion only when the resulting level of maintenance will be equivalent to or less than the existing maintenance needs. The improved trail system will increase user satisfaction and sustainability, and will decrease soil movement and sedimentation.

Alternative G provides for increased motorized and non-motorized trail miles when it is beneficial for the resources (such as relocations off of steep slopes and wet areas) and the extra miles result in no net increase in maintenance. Alternative G does not identify featured OHV routes, but provides for the current level of high clearance roads to be maintained for OHV use.

Scoping comments indicated a need to evaluate the closure of all existing ATV/OHV trail systems. This option was not included in any alternative due to its effects on current uses. If all of the current ATV/OHV trail systems were closed, the following effects could be expected:

- Loss of all legal recreation opportunities for ATV operators
- Loss of revenue to local communities from ATV users
- Increase in illegal use of ATVs on the forest
- Small decrease in sedimentation in streams draining the existing trail systems
- Reduction in noise in the vicinity of the existing trail systems on the Forest and adjacent private land
- Additional funding available to maintain other trails

All of the alternatives include a prescribed fire program. The preparation and execution of a prescribed burn can temporarily close trails, which may result in short-term dissatisfaction by trail users who need to postpone a recreation trip or find an alternative trail. Trails are sometimes used as control lines during a prescribed burn which can result in physical damage to the trail tread and/or trail profile. Fire lines that use trails and then veer off may appear to trail users to be a new trail. Standards will require the trails be repaired and any fire lines that merge into trail be rehabilitated following a prescribed fire, but the full restoration may require vegetative growth that takes time. The physical impacts to the trail environment can negatively impact the trail user's experience. Alternative E would have the largest prescribed burning program and therefore has the most potential for causing temporary closures to trails and temporary disturbances to the physical condition of trails. Alternative C, which would have a very limited prescribed burning program, has the least potential for negative impacts to trails.

The construction and presence of roads in close proximity to trails, and particularly when they physically cross trails, decreases trail user satisfaction due to noise, dust, safety concerns, and an interrupted trail use experience. Maintenance of the road may also result in damage to the trail at that intersection. Water runoff from the road could damage the trail tread and lead to increased maintenance needs. The alternatives that would have the most impacts on trails are A and D, as they allow for the most miles of new road construction and the least miles of road decommissioning. The alternatives that would have the least impacts, and potential for enhancing trails, are D and F because they provide for the least amount of new miles of road construction and the most miles of road decommissioning.

Many trails traverse ridge tops or have a ridge top viewpoint or rock outcrop as a destination. Industrial wind development would negatively impact trails and trail users' experience if access roads are in close proximity to or cross trails (for the same reasons cited above). The location of wind tower pads and turbines could displace trails and trail destinations on ridge tops. Alternatives C and E would provide the most protection to trails, as they do not allow for any wind development. Pertaining to industrial wind development, Alternative D has the

potential for the most impacts to trails, as it makes the entire Forest available for proposals for wind development. Alternative A is silent on direction for wind development.

**Hunting and Fishing:** The national forests are the largest provider of hunting and fishing opportunities in Virginia. Table C1.14 provides the approximate acreages by alternative for habitats conducive for big and small game hunting.

**Table C1.14 Estimated Total Acres of Big & Small Game Emphasis Areas by Alternative (in thousands)**

Type of Game Habitat (Management Prescription Area)	Rx Area	ALT A	ALT B	ALT C	ALT D	ALT E	ALT F	ALT G
Mix of Successional Habitats	8A1 8A1U	258 69.7	0 0	0 0	316.9 0	0 0	0 0	0 0
Early Successional Habitat	8B 8BU	38.9 0.8	0 0	0 0	34.0 0	0 0	0 0	0 0
Bear/Remote Habitat	8C 8CU	74.4 61.2	0 0	0 0	124.8 0	0 0	0 0	0 0
Mosaic of Habitats	13 13U	0 0	568.9 0	0 245.7	0 0	491.8 3.3	350.4 108.8	507.0 0
Suitable Acres Unsuitable Acres		371.3 131.7	568.9 0	0 245.7	475.7 0	491.8 3.3	350.4 108.8	507.0 0
<b>TOTAL ACRES</b> % of GWNF (approx.)		503.0 47%	568.9 53%	245.7 23%	475.7 45%	495.1 46%	459.3 43%	507.0 48%

Alternatives that allocate additional acres to big and small game emphasis areas will increase and enhance the hunting and wildlife viewing opportunities on the national forest. Alternatives A and D allocate acres to prescription areas specific to the type of habitat being emphasized, including early successional, mixed successional, and bear/remote habitat. Alternatives B, C, E, F and G allocate acres to a single prescription area with emphasis on providing mosaics of habitats for a variety of terrestrial species, including both game and non-game species.

Alternative B provides the greatest total acres of the forest with an emphasis on providing wildlife habitat. Alternative B provides the most opportunities for hunting and hunter satisfaction, with 53% of the national forest allocated to the mosaics of habitat prescription area. Alternatives G, A and E are next with the most acres allocated specifically to wildlife habitat management prescriptions, at 48%, 47% and 46% respectively.

Under Alternative D, acres of habitat management for big and small game hunting decreases only slightly from the current Forest Plan (Alternative A), but an emphasis on tourism and increased public access points will result in improved hunting and wildlife viewing opportunities.

Alternative C provides the least acres to prescription areas that emphasize habitat management, and provides the least variety of big and small game hunting opportunities. This alternative allocates about 23% of the national forest into the mosaics of habitat prescription area. The emphasis in this alternative is to slowly progress toward late successional forest habitats. The affects of this reduced variety of habitats is that some

forest users who enjoy hunting species that require early to mid successional habitats will find their opportunities decreasing as time passes. This results in lower user satisfaction among those hunters. On the other hand, people who prefer hunting for species found in late successional forest habitats will have increased opportunities and increased satisfaction.

Some areas may become easier to access under Alternatives B, G and E and some areas may become more difficult to access under Alternative C.

Some specific areas on the forest will not be managed for game species that were in the past; this will affect hunters more negatively by decreasing the places or the success ratio. Some areas will be managed differently than in the past and hunter satisfaction may increase in those areas. Hunting decreases the satisfaction of some other users, especially some trail users, due to safety concerns. Effects may include a decrease in use on certain trails during the hunting season. Hunting is not allowed on Sundays during the hunting season and use in the general forest area, including trails could be higher during those days.

The quantity of stocked (put and take) streams and reservoirs are not expected to change over alternatives.

## **C2 – NATIONAL WILD AND SCENIC RIVERS**

The Wild and Scenic Rivers Act (Public Law 90-542: 16 USC 1271-1287, October 2, 1968) and its amendments provide for the protection of selected rivers and their immediate environments. To be eligible for designation rivers must possess one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Designation preserves rivers in free-flowing condition, protects water quality and protects their immediate environments for the benefit and enjoyment of present and future generations.

### **AFFECTED ENVIRONMENT**

The 1993 Forest Plan Revision identified 12 streams that were eligible for inclusion in the National Wild and Scenic River System. The 12 eligible rivers or river segments traverse 12 counties in Virginia and West Virginia and have a combined length of 253.55 miles. A summary of the rivers determined to be eligible is Appendix D.

Rivers found eligible need further study to determine if they meet suitability criteria and should be recommended to Congress for addition to the Wild and Scenic River system. Until a final determination is made as to suitability or nonsuitability, the Forest Service is obligated to protect those qualities that made the rivers eligible.

### **DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

In all alternatives, protection is provided within a one-quarter mile corridor on each side of an eligible river (one-half mile total). Management activities allowed within this corridor are designed to meet the minimum protection requirements, given the river's potential classification.

## **C3– CULTURAL RESOURCES**

### **AFFECTED ENVIRONMENT**

The George Washington National Forest contains a multitude of sites representing past human events. Beginning with Native American occupations dating as early as 8000 B.C., the variety of cultural resources is impressive. Prehistoric sites include multi-use base camps, transient camps, hunting and gathering stations, quarries, lithic reduction stations, and rock-shelter occupations. The most common site type is often referred to as a lithic scatter and represents a short-term occupation where stone tools were made and/or sharpened and may be associated with a plethora of ancillary activities.

The earliest sites date to the Archaic Period and span the time from 8000 B.C. to 1000 B. C. Throughout this period, small bands of hunters and gatherers occupied both the mountains and the lower elevations exploiting a wide variety of forest resources. As the Archaic period came to an end, exploitation patterns began to focus on the riverine resources with more sedentary sites found along the rivers. This trend continued through the Woodland Period from about 1000 B.C. to A.D. 1650 where the rich alluvial soils were utilized in an intensification of gardening. The raising of horticulture foods, such as corn, beans, and squash, coupled with increased sedentism, led to an increase in population. Hunting and gathering remained important aspects of the economy and the higher elevations continued to be exploited. Native American sites are found throughout the Forest for all time periods with the exception of the Ice Age Paleo-Indian. Unknown Paleo-Indian sites may exist on the Forest but have yet to be located.

With the advent of the European occupation of the New World, Native American sites decreased in numbers with a concomitant increase in Euro-American sites. The area that is now the George Washington National Forest was first explored by the Europeans in the 17th century and intensive settlement began in the first and second quarters of the 18th century. Welsh, Scotch-Irish, Swedish, and German immigrants traveled down the Great Valley into the area that is now western and southwestern Virginia. The first historic site types were home and farmsteads closely followed by mills. As extractive industries developed through the 19th century, western Virginia and eastern West Virginia became a high producer of iron and timber. Historic sites for this period include log cabins and outbuildings associated with agriculture, cemeteries, mills, schools, iron furnace complexes, mines, colliers pits, logging camps, turnpikes and railroad features. The George Washington National Forest contains a large number of these historic features as well as later sites relating to the Civilian Conservation Corps that attempted to counter some of the environmental damage brought about by over-exploitation.

Standing structures are also important aspects of the historic era and require proactive management. Examples of significant structures on the George Washington National Forest include the Warwick house, Sherando Lake pavilion, Mount Torry Furnace, and Woodstock Tower.

Cultural resources are important resources that require inventory, evaluation, protection, and interpretation. Cultural resource management was previously viewed as a support function for timber management; currently, the trend is toward a resource treatment that recognizes the value of cultural resources in their own right. In order to manage these resources, complete inventories need to be implemented across the Forest. At that point, management alternatives can be developed and National Register of Historic Places nominations completed based on a full regional perspective.

Interpreting cultural resources for the public is an important aspect of cultural resource management. Standing structures readily lend themselves to public education and opportunities exist at the iron furnaces, Confederate Breastworks, and recreation areas originally constructed by the Civilian Conservation Corps. Archaeological sites, because of their fragility, are better interpreted off-site. Forest Service visitor information centers, local museums, historical societies, and traveling exhibits offer opportunities for education. The Forest also needs to recognize its responsibility to address research questions and share information with the lay and professional publics.

**DIRECT AND INDIRECT EFFECTS**

Direct and indirect affects to historic or cultural resources could result from both natural and human-caused events. These vary depending upon the type of resource, the fragility of the resource, and the type of disturbance, but could include soil disturbance to varying depths, wildland fire and prescribed fire, vegetation removal, erection of new structures, looting or vandalism, and land use changes.

Accordingly, five types of ground disturbing land management activities that vary in magnitude (acres or miles) have the greatest potential to affect cultural resources. These include: timber management, road construction, fire management, mineral management, and recreation use. To a lesser degree, other forms of land management, such as landownership adjustment (land exchange), special use permits, structures management, and wildlife management can also affect cultural resources.

Timber harvests may directly affect unknown significant cultural resources when soil is significantly disturbed by heavy machinery and vehicles, when trees are felled on historic ruins or cemeteries, when logs are skidded across sites, or indirectly when erosion is caused by removal or disruption of vegetation cover or increased surface soil exposure. In general terms, even-aged harvesting may create moderate to heavy disturbance for significant properties located on the ground surface or at shallow depths, and such disturbance may occur over most of the stand or area being harvested. An uneven-aged harvest or single tree selection would similarly disturb the properties located on the surface and in the upper soil matrix, but disturbed areas would be dispersed within the harvest area.

**Table C3.1 Estimated Harvest Acres and Allowable Sale Quantity for Timber Management Activities by Alternative, First Decade**

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Acres harvest, in thousands, first decade	30	30	0	49	18	10	30
Allowable Sale Quantity, in million cubic feet, first decade	47	54.3	0	101	31.1	20.4	54.3

Alternative D potentially affects the greatest number of acres through timber harvesting and Alternatives C and F the least. With any timber harvest method, the skid trails, log landings, and other areas where vehicle use is concentrated would receive the greatest depth of disturbance and thus provide the most significant direct effects to significant cultural properties. Indirect affects could include deterioration of sites and artifacts from subsequent erosion and increased site vandalism from increased access and surface exposure of historic sites.

Compliance-related inventories or Phase I inventory surveys would be conducted prior to timber harvest under any timber management program.

New road construction may directly affect unknown sites, given variables specific to each portion of construction. Disturbance within a construction corridor may remove soil containing cultural deposits, depending on the local situation. In cases where fill is added, cultural resources may be buried deeper. This may protect the site from compaction or rutting, while at the same time essentially precluding additional scientific study using conventional technology. Maintenance or reconstruction of existing roads presents less potential for direct effects to intact archeological sites because the majority of damage to an unknown site probably occurred during the original construction. Access to cultural resources provided by roads, however, may result in indirect effects to significant properties by facilitating increased vandalism. Indirect effects also may include erosion of cultural resources subsequent to road construction. Also, artifact exposure during construction could promote site vandalism.

**Table C3.2 Miles of Road Construction per Year by Alternative**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Road Construction, miles	2.9	1.5	0	4.1	1	0.5	1.5

Alternatives A and D potentially has the greatest adverse affects on cultural resources, while Alternatives C and F would have the least adverse affects.

Cultural resources may be directly and indirectly affected by heat damage to artifacts and sites and erosion of sites resulting from wild fires or prescribed fires. High-temperature wildland fire could pose direct effects to cultural resources by damaging surface or shallow archeological sites, standing structures, and cemetery markers. Sites of the historic period are most subject to direct effects from these events because many of these properties are more likely to exhibit surface artifacts. Studies show that wildfire, and in some cases higher temperature prescribed burns, may alter the character and condition of surface artifacts such as melting glass, “crazing” lithic and ceramic artifacts, and burning wood structures.

Prescribed fire could also similarly directly affect surface sites or very shallow site deposits and artifacts, but because of reduced temperature, to a much lesser degree than those fires resulting from wildland fire. However, wooden structures and cemetery markers could still be damaged, as could surface artifacts.

Fire lines installed with tractor-plow units, whether for wildfires or prescribed burns, could directly affect cultural resources by physically displacing artifacts located at shallow levels or on the ground. The nature of displacement is primarily laterally, as the plow folds soil and artifacts to each side of the fire line. When multiple parallel fire lines are used for wildland fire control, it would be possible to disturb a large portion of a small site. Fire lines established using a disc harrow would have less impact than those made with a tractor plow. In these cases lateral soil displacement would be minimal, but some fragile surface artifacts or artifacts located in shallow deposits may be broken.

Fires lines installed for prescribed burns are less likely to directly or indirectly affect historic resources since proposed fire plow lines in areas of prescribed burns are inventoried and field surveyed for the presence of cultural resources prior to project implementation. Under normal conditions, however, cultural surveys do not precede emergency fire line construction. Thus, there is a high potential for unknown properties to be affected by wildfire suppression. Indirect effects following the installation of fire lines and burning may include erosion losses due to the removal or burning of vegetation cover or further deterioration of artifact or feature condition following damage by high temperatures.

**Table C3.3 Acres of Prescribed Fire per Year and Use of Unplanned Ignitions**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Prescribed Fire, acres per year	3,000	12,000-20,000	Limited	5,000-12,000	20,000	12,000-20,000	12,000-20,000
Unplanned Ignitions	Allowed to achieve forest goals	Use to attain ecological objectives for bio-diversity	Allow to burn as much as possible	Use to attain ecological objectives for bio-diversity	Use to attain ecological objectives	Use to attain ecological objectives for bio-diversity	Use to attain ecological objectives for bio-diversity

Alternative E potentially affects the greatest number of acres through prescribed fire and Alternative C the least. Alternatives B, F and G follow Alternative E for having the most potential adverse affects on cultural resources.

Recreation management may be categorized as consisting of three types: concentrated developed recreation areas, dispersed recreation areas, and trails (off road vehicle trails, horse trails, and foot trails). In general, direct effects to significant cultural resources can result from installation of recreation facilities and expansion of recreation facilities and recreation use areas. Indirect effects could include soil erosion and compaction of cultural resources due to visitor use, and access to given locales could result in archeological site vandalism. These indirect effects could especially occur with illegal expansions off of established off road vehicle trails.

The incidence of vandalism and illicit collection is very much influenced by visitor use. Greater visitor use to some areas will lead to the increase of vandalism, illicit collection, littering and disturbance to cultural sites under all alternatives. Opening areas to timber production and timber manipulation, recreation use, and roads and trails will result in an increase in site disturbance and vandalism in inaccessible areas that previously were naturally protected from direct, indirect, and cumulative effects. While cultural properties situated in recreation areas and along designated trails and road corridors can be signed, monitored, patrolled and protected, the impacts outside of these areas are largely uncontrolled and the extent of impact unknown. However, the Forest Service does have the authority to close a specific road, trail or area that has considerable adverse effects to cultural resources (36 CFR 295.5, 36 CFR 800.9, and 43 CFR 8342) and prosecute, under 36 CFR 296.4 and other laws, those who willfully destroy or loot significant historic properties.

**Table C3.4 Percent Change in Developed Recreation Capacity and Dispersed Recreation Trail Miles by Alternative**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Developed Recreation, capacity	No change	Increase 0-5%	Decrease 5-15%	No change	Decrease 5-15%	Increase 5-15%	Increase 0-5%
Trails, miles	Increase 0-3%	No net change	Increase <3%	Increase 5-10%	No net change	Increase <3%	Increase <3%

No new developed recreation areas are planned under any of the Alternatives. Increases in capacity will be achieved by expanding existing recreation areas. The majority of this is expected to occur within already disturbed area. The greatest impacts to archaeological resources, related to recreation, will likely come from construction of new miles of trail. Alternative D affects the greatest number of acres through trail construction, and Alternative E the least.

Even though special use permits involve decreased federal jurisdiction of an area, the potential direct effect to significant cultural resources located in special use areas would be low, in most cases. This is partially due to the small acreages involved in special use areas and the limitations imposed upon special uses for the purposes of resource protection. Indirect effects to significant cultural properties located in special use areas, however, can occur through erosion and vandalism of cultural resources resulting from increased access and use of permit areas.

Analysis of effects to significant cultural resources located on lands placed under special use permit is performed programmatically in compliance with existing laws and regulations (36 CFR 296, 800, and the PMOA with the Tennessee SHPO) and occurs on a case-by-case basis apart from alternatives. As such, effects to cultural resources resulting from special use permits are not affected by alternative.

Exploration and development of leasable minerals, oil, gas, and mineral materials may impact cultural resources through access road construction, pipeline construction, well pad placement, and actual removal and displacement of minerals and soil. Mineral extraction may produce severe, albeit localized, direct effects to significant cultural resources as the overburden containing historic resources are removed. Indirect effects could include damage to significant cultural resources located outside the area of immediate mining resulting from erosion, the installation of road accesses and equipment staging areas, and vandalism and looting resulting from increased access to these historic properties.

Analysis of effects of minerals management to significant cultural resources is performed programmatically in compliance with existing laws and regulations (e.g., 36 CFR 296, 800, and the PA with the Virginia SHPO) and occurs on a case-by-case basis separate from alternatives. Therefore, effects to cultural resources resulting from minerals management are not affected by alternative.

Structures located on the George Washington National Forest that are determined to be historically significant are protected and maintained under the terms and conditions of existing federal laws and guidelines. The construction of new facilities could directly affect an unknown significant prehistoric or historic property. In most cases of concrete slab or footing construction, disturbance may extend into or below soil strata containing archeological deposits. Lighter facilities, such as boardwalks, piers, or structures located on pier foundations, would present less potential for damage although the potential remains.

The construction of new structures, or alteration or removal of historic structures could also directly affect significant cultural resources. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Construction of a new structure can introduce a visual effect that conflicts with or diminishes the historic setting and context of a property. Indirect effects could include erosion or vandalism of significant cultural resources facilitated by public access following construction of structures in the immediate vicinity.

Analysis of effects to significant historic structures and the effects of the construction of structures to cultural resources is performed programmatically in compliance with existing laws and regulations (e.g., 36 CFR 296, 800, and the PA with the Virginia SHPO) and occurs apart from alternatives. As such, effects to cultural resources resulting from land exchange from federal jurisdiction are not affected by alternative.

## **CUMULATIVE EFFECTS**

Apart from these common effects, potential maximum direct, indirect and cumulative effects to cultural resources can be assessed according to the maximum extent within which ground-disturbing activities can potentially occur for each alternative. The principal proposed ground-disturbing activities include: timber, road construction, fire management and recreation. As articulated above, direct ground disturbing effects are estimated to be least in Alternative C and greatest in Alternative D.

Cumulatively, the repeated implementation of these project activities could, over time, result in the degradation of sites, a potential reduction in the number of intact historic properties, and increased site vandalism. However, the standards common to all alternatives are designed to inventory, evaluate, and preserve significant cultural resource values through avoiding, minimizing, or mitigating negative effects of these management activities.

## **C4- WILDERNESS AND INVENTORIED ROADLESS AREAS**

### **AFFECTED ENVIRONMENT**

#### **WILDERNESS**

The GWNF currently has six designated Wildernesses: Ramseys Draft, Rich Hole, Rough Mountain, St. Mary's, Three Ridges, and the Priest totaling about 40,000 acres or roughly 4% of the forest's area. One area, St. Mary's addition, totaling about 1,500 acres, was recommended for designation in the 1993 Forest Plan, but has not been designated. It continues to be managed to retain its wilderness attributes pending Congressional action on whether to designate or have the agency study it further.

The Desired Condition is to protect and perpetuate the wilderness character and values of these areas as directed in the Wilderness Act and subsequent Wilderness designating legislation including providing opportunities for solitude, education, physical and mental challenge, inspiration, scientific study and primitive recreation. Wilderness ecosystems are the result of natural succession and natural processes with as little human intervention as possible while retaining wilderness character. There should be little evidence of visitor use and low interaction among users. The few trails and associated facilities present are retained primarily to protect the wilderness resources. No motorized use is permitted. The plan provides specific standards for management of the various resources and activities that are or could potentially occur in the wildernesses including, recreation, fire, lands, minerals, fish and wildlife, insects and disease, research, search and rescue, special uses, and hydrology.

#### **NATIONAL SCENIC AREAS**

National Scenic Areas are also designated by Congress. Unlike Wilderness, there is no national direction for managing National Scenic Areas. The direction for a National Scenic Area is identified in the designating legislation. The GWNF has one National Scenic Area, Mt. Pleasant. The Mt. Pleasant National Scenic Area is about 7,700 acres in size. It is managed to: 1) ensure appropriate protection and preservation of the area's scenic quality, water quality, natural characteristics, and water resources; 2) Protect and manage vegetation to provide wildlife and fish habitat consistent with item 1; 3) provide areas that may develop characteristics of old-growth forests; and 4) provide a variety of recreation opportunities that are consistent with the preceding purposes.

#### **POTENTIAL WILDERNESS AREAS**

The first step in the evaluation of potential wilderness is to identify and inventory all areas within the National Forest System that satisfy the definition of wilderness. For areas in the Eastern United States (east of the 100th Meridian), the agency's evaluation yields one of the two following options: a) Manage the area for multiple uses other than wilderness; or b) Administratively recommend the area as a Wilderness Study Area to the United States Congress. Congress would then determine whether they want the agency to study any area further.

Final agency guidance (Forest Service Handbook (FSH) 1909.12 Chapter 70) on identifying potential areas was released on January 31, 2007. The methodology used to identify the Potential Wilderness Areas is described in *Guidance on How to Conduct the "Potential Wilderness Area Inventory" for the George Washington National Forest Plan*.

The Forest identified the following 37 areas as Potential Wilderness Areas (Table C4.1). Appendix C contains an evaluation of each of these areas in relation to their availability, capability, and the need to be recommended for designation as wilderness

**Table C4.1 Potential Wilderness Areas**

Potential Wilderness Name	Total GWNF Acres
Adams Peak	8,226
Archer Knob	7,110
Beards Mountain	10,152
Beech Lick Knob	14,087
Big Schloss	28,347
Crawford Knob	14,851
Dolly Ann	9,524
Duncan Knob	5,973
Elliott Knob	11,070
Galford Gap	6,689
Gum Run	14,547
High Knob	18,447
Jerkentight	27,314
Kelley Mountain	12,892
Laurel Fork	10,236
Little Alleghany	15,395
Little Mare Mountain	11,918
Little River	30,227
Massanutten North	16,530
Oak Knob - Hone Quarry Ridge	16,343
Oliver Mountain	13,049
Paddy Knob	5,987
Potts Mountain	7,863
Ramseys Draft Addition	19,072
Rich Hole Addition	12,165
Rich Patch	5,625
Rough Mountain Addition	2,063
Saint Mary's North	3,006
Saint Mary's South	1,651
Saint Mary's West	278
Shaws Ridge	7,268
Shawvers Run Addition	84
Three Ridges Addition North	83
Three Ridges Addition South	187

Potential Wilderness Name	Total GWNF Acres
Three Ridges Addition Southwest	9
Three Ridges Addition West	90
Three Sisters	9,871
TOTAL ACRES	372,631

## INVENTORIED ROADLESS AREAS

During the revision of the Forest Plan completed in 1993, the Forest completed a similar inventory and identified the areas as Inventoried Roadless Areas. In the late 1990's the Forest Service decided to develop consistent guidance for managing all of the Inventoried Roadless Areas on all National Forests. These Inventoried Roadless Areas became part of the national Roadless Area Conservation Rule in 2001. This rule has since been the subject of numerous lawsuits and its status is still to be determined in court. Due to the interest in these areas and the lack of resolution of the litigation, this analysis will address the management options for each of the Inventoried Roadless Areas in addition to the analysis of the Potential Wilderness Areas. The 1993 GW Plan EIS evaluated 27 inventoried roadless areas totaling more than 260,000 acres. The Plan allocated the roadless areas among the various Management Areas. Three areas, totaling about 12,000 acres were recommended for wilderness study: St. Mary's Addition, Three Ridges, and the Priest. The vast majority of the remaining acreage was allocated to Remote Highlands (121,000 acres), Special Management Areas (60,000 acres), and Special Interest Areas (32,000 acres). The Special Management Areas included Big Schloss, Little River, Laurel Fork, and Mt. Pleasant, each with its own Desired Future Condition and standards. According to the Plan, 89% of the roadless acreage is allocated to management areas which would preserve the roadless character. On the remaining 11%, approved projects could alter the roadless nature of a given area.

Two areas (Southern Massanutten and The Friar) from the 1993 roadless area inventory were not included in the Potential Wilderness Area inventory. The Friar is too small in size (2,051 acres) and Southern Massanutten has about 70 percent of the area underlain by privately owned minerals.

The Inventoried Roadless Areas and their relation to the Potential Wilderness Areas are displayed in Table C4.2.

**Table C4.2 Potential Wilderness Areas and Inventoried Roadless Areas**

Potential Wilderness Name	Potential Wilderness Area Acres	Inventoried Roadless Area Acres
Adams Peak	8,226	7,282
Archer Knob	7,110	
Beards Mountain	10,152	7,504
Beech Lick Knob	14,087	
Big Schloss	28,347	20,811
Crawford Knob	14,851	9,852
Dolly Ann	9,524	7,866
Duncan Knob	5,973	
Elliott Knob	11,070	9,391

Potential Wilderness Name	Potential Wilderness Area Acres	Inventoried Roadless Area Acres
Galford Gap	6,689	
Gum Run	14,547	12,620
High Knob	18,447	12,871
Jerkentight	27,314	16,849
Kelley Mountain	12,892	7,742
Laurel Fork	10,236	10,053
Little Alleghany	15,395	10,207
Little Mare Mountain	11,918	
Little River	30,227	27,180
Massanutten North	16,530	9,459
Oak Knob - Hone Quarry Ridge	16,343	10,852
Oliver Mountain	13,049	13,089
Paddy Knob	5,987	
Potts Mountain	7,019	
Ramseys Draft Addition	19,072	12,814
Rich Hole Addition	12,165	10,919
Rich Patch	871	
Rough Mountain Add	2,063	1,154
Saint Mary's North	3,006	
Saint Mary's South	1,651	1,478
Saint Mary's West	278	
Shaws Ridge	7,268	
Shawvers Run Addition	84	
Southern Massanutten		12,080
The Friars		2,051
Three Ridges Add North	83	
Three Ridges Add South	187	
Three Ridges Add SW	9	
Three Ridges Add West	90	
Three Sisters	9,871	8,154
<b>TOTAL GWNF ACRES</b>	<b>372,631</b>	<b>242,278</b>

## **DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

### **WILDERNESS**

Wilderness has many positive effects. As stated above, wilderness preserves natural systems and provides places of solitude for visitors. However, there are environmental effects within wilderness from many sources. Recreational use can have negative impacts to the quality, character and integrity of the wilderness resource due to overuse. Some of these negative impacts include soil compaction; vegetation loss due to disturbance and/or replacement by non-native species such as noxious weeds on trails and campsites caused by heavy recreation use; crowding and loss of solitude; deterioration of water quality from improper disposal of human waste and waste water; and loss of or threats to biological/ecological processes and biodiversity, through human disturbance.

Other environmental effects which impact the integrity of the natural systems in wilderness include air pollution from outside sources, interruption of natural functioning ecosystems by fire suppression, and threats to native plant species from the spread of noxious weeds from sources outside wilderness.

No significant new management direction is being proposed for any of the existing six designated wilderness areas on the forest under any of the alternatives so there are no significant direct, indirect, or cumulative effects to the existing wilderness resource. Additions to existing wildernesses are proposed under some alternatives by allocating adjacent lands to proposed wilderness study areas. See the potential wilderness area discussion below.

### **NATIONAL SCENIC AREAS**

Identification of recommended National Scenic Areas is not a requirement of forest planning. However, several areas were identified during scoping for recommendation.

In Alternative D the 8,000 acre Adams Peak area is recommended as an NSA. This would change the area from its current management as Remote Highlands. A small portion of the area that is suitable for timber harvest is excluded from the NSA, so no suitable land is affected by the recommendation.

Since the actual management of any NSA would be determined by the legislation, it is assumed for this analysis that the legislation would be similar to that used to designate other NSAs in Virginia.

Designation as a National Scenic Area would likely prevent the construction of roads, the harvest of timber, the development of minerals, and construction associated with special use permits. Non-motorized recreation would continue, including bicycle use and hunting. The use of prescribed fire would be allowed. Designation would likely require survey and posting of the boundary. It would highlight the area and potentially increase use and income to the local community. Any desired future changes in management of the area would require legislation rather than a plan amendment.

In Alternative F National Scenic Area recommendations include the Virginia portion of Shenandoah Mountain between Highway 33 and Highway 250, Kelley Mountain, and Adams Peak for a total of 130,000 acres.

### **POTENTIAL WILDERNESS AREAS**

Decisions on the Potential Wilderness Areas have environmental consequences, regardless of whether or not they are recommended for wilderness study areas. The magnitude of the effects varies by alternative depending upon the management prescription area to which each area is assigned.

Table C4.3 summarizes all Potential Wilderness Area allocations by category across the alternatives. Three categories are used to summarize how each Potential Wilderness Area is allocated in the alternatives. These categories are: 1) Recommended Wilderness Study; 2) Remote Character (includes Remote Backcountry, Recommended National Scenic Area, Shenandoah Mountain Crest - Cow Knob Salamander Area, Special

Biological Areas and Wild and Scenic River Corridors); and 3) Other (management prescription areas not designed to maintain the remote character of the area).

**Table C4.3 Management Prescription Area Allocations within Potential Wilderness Areas and Inventoried Roadless Areas**

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT A			ALT B			ALT C		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Adams Peak (PWA, IRA)	8,200		900			900		900		900		
		7,300			7,200	100		7,300		7,300		
Archer Knob (PWA)	7,100		7,100			7,100			7,100	7,100		
Beards Mountain (PWA, IRA)	10,100		2,600			2,600		2,600		2,600		
		7,500			7,200	300		7,500		7,500		
Beech Lick Knob (PWA)	14,100		14,100			14,100		5,600	8,500	14,100		
Big Schloss (PWA, IRA)	28,300		7,600			7,600			7,600	7,600		
		20,800			20,800			20,800		20,800		
Crawford Knob (PWA, IRA)	14,800		5,000			5,000			5,000	5,000		
		9,900			8,500	1,400		8,600	1,300	9,900		
Dolly Ann (PWA, IRA)	9,500		1,700			1,700			1,700	1,700		
		7,900			4,900	3,000		7,100	800	7,900		
Duncan Knob (PWA)	6,000		6,000			6,000			6,000	6,000		
Elliott Knob (PWA, IRA)	11,100		1,700			1,700			1,700	1,700		
		9,400			8,700	700		9,200	200	9,400		
Galford Gap (PWA)	6,700		6,700			6,700			6,700	6,700		
Gum Run (PWA, IRA)	14,500		1,900			1,900			1,900	1,900		
		12,600			12,500	100		12,600		12,600		
High Knob (PWA, IRA)	18,400		5,600			5,600			5,600	5,600		
- Dry Run (IRA)		7,200			3,500	3,700		6,700	500	7,200		
- Skidmore (IRA)		5,600			5,600			5,600		5,600		
Jerkentight (PWA, IRA)	27,300		10,500			10,500			10,500	10,500		
		16,800			16,000	900		16,000	800	16,800		
Kelley Mountain (PWA, IRA)	12,900		5,200			5,200			5,200	5,200		
		7,700			7,700			7,700		7,700		
Laurel Fork (PWA, IRA)	10,200		200			200			200	200		
		10,000			10,000			10,000		10,000		

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT A			ALT B			ALT C		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Little Alleghany (PWA, IRA)	15,400		5,200			5,200			5,200	5,200		
		10,200			7,200	3,000		9,500	700	10,200		
Little Mare Mountain (PWA)	11,900		11,900			11,900			11,900	11,900		
Little River (PWA, IRA)	30,200		3,000			3,000			3,000	3,000		
		27,200			26,100	1,000	12,600	13,500	1,000	27,100		
Massanutten North (PWA, IRA)	16,500		7,100			7,100			7,100	7,100		
		9,500			9,300	200		9,500		9,500		
Oak Knob-Hone Quarry Ridge (PWA, IRA)	16,300		5,500			5,500			5,500	5,500		
		10,800			9,400	1,400		10,000	800	10,800		
Oliver Mountain (PWA, IRA)	13,100											
		13,100			13,100			13,100		13,100		
Paddy Knob (PWA)	6,000		6,000			6,000			6,000	6,000		
Potts Mountain (PWA)	7,000		7,000			7,000			7,000	7,000		
Ramseys Draft Add. (PWA, IRA)	19,100		6,300			6,300			6,300	6,300		
		12,800			12,700	100	3,100	9,700	0	12,800		
Rich Hole Addition (PWA, IRA)	12,200		1,200			1,200			1,200	1,200		
		10,900			7,600	3,300	4,700	4,700	1,500	10,900		
Rich Patch (PWA)	900		900			900			900	900		
Rough Mountain Add. (PWA, IRA)	2,100		900			900			900	900		
		1,200				1,100		1,100		1,100		
St Mary's North (PWA)	3,000		3,000			3,000			3,000	3,000		
St Mary's South (PWA, IRA)	1,700		200			200			200	200		
		1,500		1,500				1,500		1,500		
St Mary's West (PWA)	300		300			300	300		300			
Shaws Ridge (PWA)	7,300		7,300			7,300			7,300	7,300		

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT A			ALT B			ALT C		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Shawvers Run Add (PWA)	100		100			100			100	100		
Three Ridges Add North (PWA)	100		100			100			100	100		
Three Ridges Add South (PWA)	200		200			200			200	200		
Three Ridges Add SW (PWA)	9		9			9			9	9		
Three Ridges Add West (PWA)	100		100			100			100	100		
Three Sisters (PWA, IRA)	9,900		1,700			1,700			1,700	1,700		
		8,200			8,200			8,200	0	8,200		
Southern Massanutten (IRA)		12,100			12,100			12,100		12,100		
The Friars (IRA)		2,000			2,000			2,000		2,000		
Whites Peak			4,200		4,200						4,200	
<b>TOTAL ACRES IN ALL AREAS</b>	<b>372,609</b>	<b>242,200</b>	<b>149,009</b>	<b>1,500</b>	<b>224,500</b>	<b>165,109</b>	<b>20,700</b>	<b>223,100</b>	<b>143,009</b>	<b>386,809</b>	<b>4,200</b>	<b>0</b>

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT D			ALT E			ALT F		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Adams Peak (PWA, IRA)	8,200		900		900			100	800		900	
		7,300			7,300			7,300			7,300	
Archer Knob (PWA)	7,100		7,100		0	7,100		7,100			0	7,100
Beards Mountain (PWA, IRA)	10,100		2,600		800	1,800		2,600			800	1,800
		7,500			7,500			7,500			7,500	
Beech Lick Knob (PWA)	14,100		14,100		5,600	8,500		14,100		11,600	2,500	
Big Schloss (PWA, IRA)	28,300		7,600		200	7,400		200	7,400		7,600	
		20,800			20,800			20,800		7,200	13,600	
Crawford Knob (PWA, IRA)	14,800		5,000			5,000		2,500	2,500		2,500	2,500
		9,900			8,500	1,400		9,900			9,900	
Dolly Ann (PWA, IRA)	9,500		1,700			1,700		500	1,200		400	1,200
		7,900			7,300	500		7,900			7,900	
Duncan Knob (PWA)	6,000		6,000		100	5,900		3,700	2,300		4,700	1,300
Elliott Knob (PWA, IRA)	11,100		1,700			1,700			1,700		1,700	
		9,400			9,400			9,400	0		9,400	
Galford Gap (PWA)	6,700		6,700			6,700			6,700		6,700	
Gum Run (PWA, IRA)	14,500		1,900		500	1,400		1,900			1,900	
		12,600			12,600			12,600			12,600	
High Knob (PWA, IRA) - Dry Run (IRA) - Skidmore (IRA)	18,400		5,600		300	5,300		5,600			5,600	
		7,200			7,200			7,200			7,200	
		5,600			5,600			5,600		5,600		
Jerkentight (PWA, IRA)	27,300		10,500		100	10,400		6,200	4,300		6,200	4,300
		16,800			16,100	800		16,800			16,800	
Kelley Mountain (PWA, IRA)	12,900		5,200		4,900	300		4,900	300		4,900	300
		7,700			7,700			7,700			7,700	
Laurel Fork (PWA, IRA)	10,200		200		200			200		200		
		10,000			10,000			10,000		10,000		

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT D			ALT E			ALT F		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Little Alleghany (PWA, IRA)	15,400		5,200			5,200			5,200	5,200		
		10,200			9,200	1,100		9,100	1,100	10,200		
Little Mare Mountain (PWA)	11,900		11,900	200	11,700		11,900			6,500	5,400	
Little River (PWA, IRA)	30,200		3,000	641	2,400		3,000			600	2,400	
		27,200			27,200		12,700	14,500		12,700	14,500	
Massanutten North (PWA, IRA)	16,500		7,100	2,000	5,000		2,000	5,000		2,000	5,000	
		9,500			9,500		9,500			9,500		
Oak Knob-Hone Quarry Ridge (PWA, IRA)	16,300		5,500	1,100	4,400		5,500			5,500		
		10,800			9,600	1,200		10,800		10,800		
Oliver Mountain (PWA, IRA)	13,100											
		13,100			13,100			13,100		8,700	4,400	
Paddy Knob (PWA)	6,000		6,000	900	5,100		900	5,100		6,000		
Potts Mountain (PWA)	7,000		7,000	100	7,000		7,000		4,200	2,800		
Ramseys Draft Add. (PWA, IRA)	19,100		6,300	800	5,400		1,600	4,700		6,200		
		12,800			12,800		3,100	9,700		12,400	400	
Rich Hole Addition (PWA, IRA)	12,200		1,200		1,200			1,200	200	1,000		
		10,900		4,700	4,700	1,500	4,700	4,700	1,500	10,900		
Rich Patch (PWA)	900		900	900			900			900		
Rough Mountain Add. (PWA, IRA)	2,100		900	100	800		900			900		
		1,200			1,200		1,200			1,200		
St Mary's North (PWA)	3,000		3,000	3,000			3,000			3,000		
St Mary's South (PWA, IRA)	1,700		200	200			200			200		
		1,500			1,500		1,500			1,500		
St Mary's West (PWA)	300		300	200	100		200	100		200	100	
Shaws Ridge (PWA)	7,300		7,300	100	7,200		7,300			7,300		

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT D			ALT E			ALT F		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Shawvers Run Add (PWA)	100		100		100			100			100	
Three Ridges Add North (PWA)	100		100		100			100		100		
Three Ridges Add South (PWA)	200		200		200			200		200		
Three Ridges Add SW (PWA)	9		9		9			9		9		
Three Ridges Add West (PWA)	100		100		100			100		100		
Three Sisters (PWA, IRA)	9,900		1,700		600	1,100		200	1,500		1,700	
		8,200		5,500	2,600			8,200		5,500	2,600	
Southern Massanutten (IRA)		12,100			12,100			12,100			12,100	
The Friars (IRA)		2,000			2,000			2,000			2,000	
Whites Peak			4,200	4,200				4,200		4,200		
<b>TOTAL ACRES IN ALL AREAS</b>	<b>372,609</b>	<b>242,200</b>	<b>149,009</b>	<b>14,600</b>	<b>250,350</b>	<b>126,200</b>	<b>24,500</b>	<b>314,109</b>	<b>52,500</b>	<b>113,209</b>	<b>246,300</b>	<b>31,300</b>

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT G		
				Recomm Wild Ac	Remote Ac	Other Ac
Adams Peak (PWA, IRA)	8,200		900		100	800
		7,300			7,300	
Archer Knob (PWA)	7,100		7,100		4,900	2,200
Beards Mountain (PWA, IRA)	10,100		2,600		800	1,800
		7,500			7,500	
Beech Lick Knob (PWA)	14,100		14,100		8,300	5,800
Big Schloss (PWA, IRA)	28,300		7,600		200	7,400
		20,800			20,800	
Crawford Knob (PWA, IRA)	14,800		5,000			5,000
		9,900			8,600	1,300
Dolly Ann (PWA, IRA)	9,500		1,700		500	1,200
		7,900			7,900	
Duncan Knob (PWA)	6,000		6,000		3,400	2,600
Elliott Knob (PWA, IRA)	11,100		1,700			1,700
		9,400			9,400	0
Galford Gap (PWA)	6,700		6,700			6,700
Gum Run (PWA, IRA)	14,500		1,900		1,900	
		12,600			12,600	
High Knob (PWA, IRA)	18,400		5,600		1,500	4,100
- Dry Run (IRA)		7,200			7,200	
- Skidmore (IRA)		5,600			5,600	
Jerkentight (PWA, IRA)	27,300		10,500		6,800	3,600
		16,800			16,800	
Kelley Mountain (PWA, IRA)	12,900		5,200		2,400	2,800
		7,700			7,700	
Laurel Fork (PWA, IRA)	10,200		200		200	
		10,000			10,000	

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT G		
				Recomm Wild Ac	Remote Ac	Other Ac
Little Alleghany (PWA, IRA)	15,400		5,200		100	5,000
		10,200			10,200	
Little Mare Mountain (PWA)	11,900		11,900		4,500	7,400
Little River (PWA, IRA)	30,200		3,000		1,600	1,500
		27,200		9,300	17,800	
Massanutten North (PWA, IRA)	16,500		7,100		2,000	5,000
		9,500			9,500	
Oak Knob-Hone Quarry Ridge (PWA, IRA)	16,300		5,500		5,500	
		10,800			10,800	
Oliver Mountain (PWA, IRA)	13,100					
		13,100			13,100	
Paddy Knob (PWA)	6,000		6,000		900	5,100
Potts Mountain (PWA)	7,000		7,000			7,000
Ramseys Draft Add. (PWA, IRA)	19,100		6,300		2,900	3,400
		12,800		6,100	6,700	
Rich Hole Addition (PWA, IRA)	12,200		1,200		200	1,000
		10,900		4,700	6,200	
Rich Patch (PWA)	900		900		900	
Rough Mountain Add. (PWA, IRA)	2,100		900			900
		1,200			1,200	
St Mary's North (PWA)	3,000		3,000		3,000	
St Mary's South (PWA, IRA)	1,700		200			200
		1,500			1,500	
St Mary's West (PWA)	300		300			
				300		
Shaws Ridge (PWA)	7,300		7,300		7,300	

Potential Wilderness Name	PWA Acres	IRA Acres	PWA-IRA Acres	ALT G		
				Recomm Wild Ac	Remote Ac	Other Ac
Shawvers Run Add (PWA)	100		100			100
Three Ridges Add North (PWA)	100		100		100	
Three Ridges Add South (PWA)	200		200		200	
Three Ridges Add SW (PWA)	9		9		9	
Three Ridges Add West (PWA)	100		100		100	
Three Sisters (PWA, IRA)	9,900		1,700		200	1,500
		8,200			8,100	
Southern Massanutten (IRA)		12,100			12,100	
The Friars (IRA)		2,000			2,000	
Whites Peak			4,200		4,200	
TOTAL ACRES IN ALL AREAS	372,609	242,200	149,009	20,400	285,309	85,100

**Potential Wilderness Areas that are Recommended for Wilderness Study**

Allocation of Potential Wilderness Areas, or portions of these areas, to Recommended Wilderness Study would increase the number of areas managed to allow natural processes to occur, provide for solitude and primitive recreation, and minimize the impacts of man and his activities on the land. Like wilderness, these are areas where the naturalness, undeveloped conditions, and representative ecosystems would be preserved. The highest priority for management would be to preserve the characteristics of the area that resulted in its consideration for wilderness study, pending actual wilderness designation. Recommended Wilderness Study Areas are not available for activities such as vegetative management or road construction. Pending actual wilderness designation, existing roads and trails and wildlife openings can be maintained using motorized equipment and bicycles can continue to use trails in these areas.

The remainder of this section describes the effects that would occur if the areas were designated as wilderness by Congress. Potential Wilderness Areas and Inventoried Roadless Areas recommended for wilderness study are displayed by alternative in Table C4.4. Alternative C recommends all of the Potential Wilderness Areas and Southern Massanutten and the Friars Inventoried Roadless Areas for wilderness study. This would result in about 40 percent of the GWNF in wilderness. The largest wilderness would be Little River at about 30,000 acres in size. Little River would be separated by a Forest Service Road from Ramseys Draft (about 25,000 acres). Four other wilderness areas (Shaws Ridge, Gum Run, Oak Knob/Hone Quarry Ridge, and High Knob) are also adjacent to Ramseys Draft or Little River and are separated by Forest Service Roads. The total complex of these areas would be about 110,000 acres in size. Alternative C would also recommend 5 areas on the northern end of the Forest, where there are currently no wilderness areas. These wilderness areas would be closer to the population in the Washington metro area.

**Table C4.4 Numbers of Areas and Acres Allocated to Recommended Wilderness Study by Alternative**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Adams Peak			8,226				
Archer Knob			7,110				
Beards Mountain			10,152				
Beech Lick Knob			14,087			11,600	
Big Schloss			28,347			7,218	
Crawford Knob			14,851				
Dolly Ann			9,524				
Duncan Knob			5,973				
Elliott Knob			11,070				
Galford Gap			6,689				
Gum Run			14,547				
High Knob			18,447			5,617	
Jerkentight			27,314				
Kelley Mountain			12,892				
Laurel Fork			10,236			10,236	
Little Alleghany			15,395			15,395	
Little Mare Mountain			11,918				
Little River		9,348	30,227		12,657	12,657	9,348
Massanutten North			16,530				
Oak Knob - Hone Quarry Ridge			16,343				
Oliver Mountain			13,049			8,712	
Paddy Knob			5,987				
Potts Mountain			7,019			4,183	
Ramseys Draft Addition		6,114	19,072		3,130	12,412	6,114

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Rich Hole Addition		4,703	12,165	4,703	4,703	11,169	4,714
Rich Patch			871				
Rough Mountain Add			2,063		2,063	2,063	
Saint Mary's North			3,006				
Saint Mary's South	1,478		1,651		1,651	1,654	
Saint Mary's West		278	278	179	178	179	278
Shaws Ridge			7,268				
Shawvers Run Addition			84				
Southern Massanutten			12,080				
The Friars			2,051				
Three Ridges Add North			83			83	
Three Ridges Add South			187			187	
Three Ridges Add SW			9			9	
Three Ridges Add West			90			90	
Three Sisters			9,871	5,549		5,549	
Whites Peak				4,255		4,255	
<b>Total</b>	<b>1,478</b>	<b>20,443</b>	<b>386,762</b>	<b>14,686</b>	<b>24,382</b>	<b>113,268</b>	<b>20,454</b>

Alternatives B, E, and G focus on recommending stand-alone wilderness areas and wilderness area additions that could result in wilderness areas of a size and scale where natural processes can begin to be the dominant influence on the areas.

Alternative F was based on recommendations from a number of wilderness advocacy groups. Many of the Potential Wilderness Area boundaries were adjusted to accommodate important bicycle trails, roads and other uses that would be excluded with wilderness designation. This alternative could result in about 14 percent of the GWNF in wilderness.

Table C4.5 displays the ecological subsections represented currently by designated wilderness on the forest as well as those that could potentially be added after wilderness studies are completed.

**Table C4.5 Ecological Sections/Subsections represented by Wilderness or Recommended Wilderness Study areas by Alternative, acres**

Ecological Section/Subsection	Existing Wilderness	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
M221Da - Blue Ridge Section/Northern Blue Ridge Subsection	111,215	1,478	278	38,344	9,983	1,829	12,006	278
M221Aa - Northern Ridge and Valley Section/ Ridge and Valley Subsection	86,090	0	20,490	283,226	4,703	22,553	83,329	20,490
M221Ab - Northern Ridge and Valley Section/Great Valley of Virginia	0	0	0	34,583	0	0	0	0
M221Bd - Allegheny Mountains Section/Eastern Allegheny Mountain and Valley	11,174	0	0	20,374	0	0	7,698	0

Ecological Section/Subsection	Existing Wilderness	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
M221Ba – Allegheny Mountains Section/Northern High Allegheny Mountain	56,913	0	0	10,236	0	0	10,236	0

Direct effects of managing wilderness study areas include maintaining soil, hydrologic and atmospheric conditions prevailing within the areas. Roads would be a priority for closure and rehabilitation or a return to a natural state. Water quality and air quality would remain high and the imprint of human influence would generally diminish over time.

If the recommended wilderness study areas become designated wilderness, opportunities for solitude and remoteness would increase as would the opportunity for primitive and unconfined recreation due to road closures and prohibiting motorized use. Non-motorized dispersed recreation activities such as hiking, horseback riding, camping, fishing, and hunting would continue and use levels would be expected to remain about the same as currently takes place. The total wilderness recreation carrying capacity would essentially increase, allowing enhanced opportunities for solitude, challenge, and primitive recreation experiences. However, road closures would result in decreased access for some activities. A decrease in opportunities for bicycling, off-highway vehicles and other forms of recreation requiring motorized transport or mechanized equipment would result. Bicycle and motorized use would be displaced to other areas.

Table C4.6 shows, by alternative, the miles of system trail that would be closed to bicycle and/or motorcycle use if the recommended wilderness study areas were designated as wilderness. Bicycle use is the most heavily affected across the alternatives.

**Table C4.6 Miles of Trails to be Closed to Bicycles and Motorcycles by Alternative if Recommended Wilderness Study Areas become Wilderness**

	A	B	C	D	E	F	G
Trails to be closed to bicycles	0	9	434	1	11	70	9

Bicycles are also allowed on closed roads across the GWNF, unless otherwise specified. Table C4.7 enumerates miles of road that would be decommissioned and thus closed to motorized and bicycle use. Alternative C would close the highest number of miles, in 16 separate areas.

**Table C4.7 Miles of Road to be Closed by Alternative if Recommended Wilderness Study Areas become Wilderness**

	A	B	C	D	E	F	G
Roads to be decommissioned	0	0	159	3	1	19	0

Maintenance of trails and facilities, including the Appalachian Trail and associated shelters sites would be done using hand tools only and access would be made using non-mechanized/non-motorized means. Access would be made using non-mechanized/non-motorized means. Currently competitive events are held on some of the trails on the GWNF. These would not be allowed on the sections of trail in designated wilderness. Current events would only be affected in Alternative C.

Research (Cordell 1999) indicates that additional wilderness would potentially increase National Forest visitation. This, in turn, would increase economic benefits resulting from tourism in the surrounding local communities. However, there would also be a reduction in economic benefits associated with the

management, harvesting, manufacturing and retail sale of timber products from these areas since timber management activities would not be allowed. The reduction of timber harvest opportunities would be greatest in Alternative C (Table C4.8). Alternative F is the only other alternative that would affect timber harvest, since the other alternatives only recommend areas that are currently unsuitable for timber production. There would be reduced opportunities to recover commercial minerals and mineral exploration and development will be hindered.

**Table C4.8 Effects of Wilderness Designation on Timber and Mineral Resources**

	A	B	C	D	E	F	G
	<b>Acres Recommended for Wilderness Study</b>						
Lands Tentatively Suitable for Timber Production	1,116	19,182	346,329	12,739	22,645	106,273	19,182
Lands Suitable for Timber Production in 1993 Forest Plan	0	1,202	78,278	1,485	2,688	20,350	1,202
Lands Underlain with Privately Owned Minerals	253	0	37,280	581	2,956	9,976	0

As shown in Table C4.8, Alternative C has the greatest amount of acreage and number of areas with privately owned subsurface mineral rights. Requests for access to these interests would be recognized and reasonable access granted. The potential for development of energy minerals and other leasable and common minerals is estimated to be low, but if gas deposits in the Marcellus shale on the GWNF are found to be sufficient for development, this could change. There are no existing federal oil or gas leases or other Federal mineral leases in effect in any of the areas recommended for wilderness study. These areas are administratively unavailable for federal oil and gas and other federal mineral leases, pending final Congressional action. These areas are not available for mineral materials for commercial purposes. Administrative use of mineral materials is allowed but use and impacts would be extremely low.

Wilderness areas that have extensive boundaries adjacent to private lands can cause management problems. This reduces access to the area for the general forest user and for Forest Service managers. Unauthorized uses, such as ATV trails, other trails, clearing and temporary or permanent structures can occur, with very limited opportunities to find or correct the problems. It can also exacerbate fire and rescue needs in the wilderness area. The areas recommended for wilderness study with the greatest boundary concerns are displayed in Table C4.9.

**Table C4.9 Private Land Boundaries (Miles and Percent of the Perimeter) on Recommended Wilderness Study by Alternative**

PWA Name	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F		Alt G		
	Miles	%													
Adams Peak					21.2	68%									
Archer Knob					6.2	22%									
Beards Mountain					26.3	70%									
Beech Lick Knob					19.5	51%					14.7	47%			
Big Schloss (Three High Heads in Alt F)					23.1	35%					1.2	6%			
Crawford Knob					20.0	58%									
Dolly Ann					11.8	54%									
Duncan Knob					9.2	44%									
Elliott Knob					2.7	9%									
Galford Gap					16.3	66%									
Gum Run					17.8	50%									
High Knob					14.2	28%					2.8	14%			
Jerkentight					14.9	21%									
Kelley Mountain					6.8	21%									
Laurel Fork					16.9	77%					16.9	77%			
Little Alleghany					39.0	75%					39.0	75%			
Little Mare Mountain					12.2	33%									
Little River			0	0%	8.1	21%	1.2	6%	1.2	6%	1.2	6%	0%	0%	
Massanutten North					48.6	69%									
Oak Knob - Hone Quarry					4.7	15%									
Oliver Mountain					34.3	77%					27.3	79%			
Paddy Knob					9.8	50%									
Potts Mountain					11.0	32%					2.1	14%			
Ramseys Draft Add.			0	0%	10.2	19%				0%	0%	6.5	34%	0%	0%
Rich Hole Addition			3.8	29%	12.9	36%	3.8	29%	3.8	29%	12.9	35%	3.8	29%	
Rich Patch					9.1	37%									
Rough Mountain Add.					5.4	54%				5.4	54%	5.4	54%		
Saint Mary's North					0.7	6%									
Saint Mary's South	2.0	19%			5.9	56%				5.9	56%	5.9	56%		
Saint Mary's West			0.5	19%	0.5	19%	0.5	19%	0.5	19%	0.5	19%	0.5	19%	

PWA Name	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F		Alt G	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
Shaws Ridge					26.4	87%								
Shawvers Run Add.					0.6	32%								
Southern Massanutten														
The Friars														
Three Ridges Add. N					0.8	33%					0.8	33%		
Three Ridges Add. S					1.6	51%					1.6	51%		
Three Ridges Add. SW					0.3	40%					0.3	40%		
Three Ridges Add. W					1.1	65%					1.1	65%		
Three Sisters					5.7	30%	5.0	29%			5.0	29%		
Whites Peak							9.4	58%			9.4	58%		

The naturalness, uniqueness, and representative ecosystems of the designated areas would be maintained. Natural ecological processes would continue, including plant succession. Larger blocks of undeveloped land and reduction in open road density in areas recommended for wilderness study will favor area sensitive and disturbance sensitive species. Existing old fields, wildlife openings and other habitat improvements for fish and wildlife would not be maintained in prescriptions areas recommended for wilderness study. These early successional habitat areas will succeed to forest. New permanent wildlife openings would not be created. These factors would reduce habitat for early successional species. Fish stocking in areas recommended for wilderness study would be restricted to reestablishment or maintenance of indigenous, threatened, endangered, or sensitive species with Forest Supervisor authorization. Rare communities and threatened and endangered species would be managed within the limitation of activities allowed within wilderness study areas.

Many of the areas contain wildlife openings managed by mowing, constructed wildlife ponds or special habitat management areas. These openings would no longer be maintained.

Some of the areas contain TES species, rare plants or rare communities. The significance of the effects on these resources depends upon the number of areas and the kinds and intensity of activities in the areas. Wilderness designation can have mixed effects on these resources. Designation prevents many types of activities (such as road construction, habitat manipulation, mineral developments, special use development) that could adversely affect the resources. Designation can also prevent, or significantly increase the cost and efficacy of management activities that could enhance habitat conditions for these resources. Many rare communities need, or are enhanced by, fire. The use of prescribed fire in wilderness is difficult, so species that need fire would likely only be enhanced by wildfires. In addition, several of the areas contain acidified streams. Treating acidified streams in wilderness, is possible, but difficult. See Table C4.10.

**Table C4.10 Effects on Wildlife and Vegetation Communities by Alternative if Recommended Wilderness Study Areas become Wilderness**

Alternative	Area Supporting Table Mountain Pine, (Acres)	Presence of TESLR species, that DO NOT need active management	Area contains TES and/or FS sensitive species or habitat enhanced by human intervention or disturbance	Presence of Acidified streams	Special Biological Areas (Acres)
A	0	None	None	No	0
B	473	Cow Knob Salamander, Swamp pink	Barrens tiger beetle, Sword leaved phlox, Turkey beard, Mtn paper birch, coal skink; Big Levels salamander	Yes, 2 areas	7,379
C	14,234	Cow Knob Salamander, Swamp pink, Waterfan lichen, Va northern flying squirrel, Southern water shrew, NE bulrush, McGraw Gap xystodesmid, Rock skullcap, Roughhead shiner, Virginia sneezeweed, Bald eagle, Southern water shrew, Southern rock vole;	Barrens tiger beetle, Sword leaved phlox, Turkey beard, coal skink; Big Levels salamander, Millboro leatherflower, Pearly everlasting, Ground juniper, Phlox buckleyi, App grizzled skipper, Smooth coneflower, Shale barren rockcress; Sand grape, Phlox buckleyi, Plains forstweed, N. bristly sarsaparilla, Least trillium, Slender wheatgrass, Mountain paper birch, Wild chess, Variable sedge, Bristly black currant, Morning Warbler, Pirate bush,	Yes, 14 areas	64,595
D	22	Swamp pink	Big Levels salamander	Yes, 1 area	101

Alternative	Area Supporting Table Mountain Pine, (Acres)	Presence of TESLR species, that DO NOT need active management	Area contains TES and/or FS sensitive species or habitat enhanced by human intervention or disturbance	Presence of Acidified streams	Special Biological Areas (Acres)
E	796	Cow Knob Salamander, Swamp pink	Barrens tiger beetle, Sword leaved phlox, Turkey beard, Mtn paper birch, coal skink; Big Levels salamander, Millboro leatherflower	Yes, 2 areas	4,312
F	3,964	Cow Knob Salamander, Swamp pink, NE bulrush, Waterfan lichen, Va northern flying squirrel, Southern water shrew; McGraw Gap xystodesmid, Rock skullcap,	Barrens tiger beetle, Sword leaved phlox, Turkey beard, Mtn paper birch, coal skink, Big Levels salamander; Millboro leatherflower; Pearly everlasting, Ground juniper, Phlox buckleyi, App grizzled skipper, Smooth coneflower, Shale barren rockcress;	Yes, 6 areas	18,412
G	473	Cow Knob Salamander, Swamp pink	Barrens tiger beetle, Sword leaved phlox, Turkey beard, Mtn paper birch, coal skink; Big Levels salamander	Yes, 2 areas	7,379

Educational opportunities for the scientific study of natural ecological processes would increase.

Fire management may be affected by designation of additional wilderness areas. Under emergency situations, mechanized equipment and motorized transport, use of helicopters, air tankers, and other aircraft may be approved by Forest Supervisors and/or Regional Forester. These actions would impact wilderness character and visitor experiences and leave evidence of man, although rehabilitation could help to reduce those impacts afterward.

Lightning-ignited fires, if allowed to burn, enhance the natural systems that are fire-dependant. It would benefit recreation by opening up the forest, reducing fuel loading to acceptable levels, and maintaining the vegetation. There would be a short-term negative impact to air quality, visual aesthetics and possibly water quality.

Several of the areas have a history of wildland fire, either naturally ignited or human-caused. All or a portion of the acres in each of these areas would be included in the Forest’s planned prescribed burning program. A Recommended Wilderness Study designation would likely limit this management activity.

Additional human-caused effects to wilderness study areas are similar to those found in wilderness such as soil compaction; vegetation loss or disturbance; non-native species introduction; crowding and loss of solitude; deterioration of water quality from improper disposal of human waste and waste water; and loss of or threats to biological/ecological processes and biodiversity, through human disturbance.

**Potential Wilderness Areas Managed to Retain Their Remote Character**

In the alternatives, some of the Potential Wilderness Areas, or portions of these areas, are allocated to management prescription areas that will retain the characteristics of the area that made it qualify as a Potential Wilderness Area. Due to management direction in the Forest Plan, these remote areas would still qualify for placement on the Potential Wilderness Area Inventory according to final agency guidance ([Forest Service Handbook \(FSH\) 1909.12 Chapter 70](#)) on identifying potential areas when the GWNF Forest Plan is revised in ten to fifteen years. In other words, future options for recommending these areas as wilderness

study will not be forgone. Alternative prescriptions that would maintain the remote character of these areas include Backcountry Recreation (12D), Recommended National Scenic Area, Research Natural Area (4B), Shenandoah Mountain Crest (8E7), and large blocks of Special Biological Areas (4D), like Kelley Mountain. These areas are all unsuitable for timber production.

In Alternative A, the Backcountry Recreation prescription prohibits road construction with some exceptions to provide for site-specific needs. Examples of these exceptions where new road construction could be allowed include: (1) to access approved mineral activities; (2) where the new road is the only prudent alternative to serve resource needs in adjacent management areas and it will minimally impact this management area; (3) to relocate existing roads; (4) to provide access to trailheads; or (5) to provide access to private land if no other route is feasible.

In Alternatives B, C, D, E, F, and G, roads may not be constructed or reconstructed in the Backcountry Recreation prescription areas unless:

- (1) A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property;
- (2) A road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to conduct a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act;
- (3) A road is needed pursuant to reserved or outstanding rights, or as provided for by statute or treaty;
- (4) Road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a system road that cannot be mitigated by road maintenance. Road realignment may occur under this paragraph only if the road is deemed essential for public or private access, natural resource management, or public health and safety;
- (5) Road reconstruction is needed to implement a road safety improvement project on a system road determined to be hazardous on the basis of accident experience or accident potential on that road;
- (6) The Secretary of Agriculture determines that a Federal Aid Highway project, authorized pursuant to Title 23 of the United States Code, is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists; or
- (7) A road is needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease or for a new lease issued immediately upon expiration of an existing lease. Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner.

In Alternatives B, C, D, E, F, and G, timber harvest is restricted in the Backcountry Recreation prescription areas as follows:

Timber may not be cut, sold, or removed, except as provided in (a).

(a) Timber may be cut, sold, or removed if one of the following circumstances exists. The cutting, sale, or removal of timber in these areas is expected to be infrequent.

- (1) The cutting, sale, or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the remote area characteristics;
  - (i) To improve threatened, endangered, proposed, or sensitive species habitat; or

(ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period;

(2) The cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited; or

(3) The cutting, sale, or removal of timber is needed and appropriate for personal or administrative use.

In Alternatives B and D, one additional exception where timber harvest would be allowed in the Backcountry Recreation prescription area is as follows:

Or (4) Salvage of dead and dying trees is needed and the remote character of the area is not impaired by the harvest activity.

In Alternative D the remote backcountry portion of Beech Lick Knob is not identified as unsuitable for wind development. A proposal for wind energy development in that area could be accepted for analysis. If approved, wind turbines, associated transmission lines and access roads could be constructed. This is an exception to the above prohibitions on management.

Areas managed for their remote character would provide opportunities for solitude and remoteness. Non-motorized dispersed recreation activities such as hiking, horseback riding, camping, mountain biking, fishing, and hunting would continue and use levels would be expected to remain about the same as currently takes place. Maintenance of trails and facilities, including the Appalachian Trail and associated shelters sites would be done using current mechanized and non-mechanized means. Current competitive events would continue.

Mineral leasing would be constrained with No Surface Use stipulations.

Existing access would continue to provide for fire and rescue needs, law enforcement needs, other resource management needs and public access.

Natural ecological processes would continue including plant succession. Larger blocks of undeveloped land and existing low open road density will favor area sensitive and disturbance sensitive species. However, prescribed fire and maintenance of existing old fields, wildlife openings and other habitat improvements for fish and wildlife will continue to provide some habitat for early successional species and species that need open woodland conditions. Habitat improvements for TES species, rare plants or rare communities can be completed.

### **Potential Wilderness Areas Managed for Other Resources**

In the alternatives, allocation of some of the Potential Wilderness Areas, or portions of these areas, are made to other management prescription areas. These management prescription areas may allow timber harvesting, mineral development that involves surface occupancy, changes in land ownership pattern, or construction of improvements like buildings, fences, roads, transmission lines, communication installations, and/or campgrounds. In other words, future options for recommending these areas as wilderness study may be forgone. Management prescription allocations in a Forest Plan do not necessarily commit an area to development. Before a decision is made to actually conduct one of these activities (for example: build road or harvest timber in a Potential Wilderness Area, a site-specific analysis must be conducted)

The remote character in these areas may be diminished over time. The naturalness of these areas may be reduced by the interruption of natural ecological processes. Vegetation composition and structure may be manipulated resulting in a greater diversity of age-classes among forest types. Opportunities for solitude and remoteness may decrease. Sights and sounds of human activities may be more obvious. Additional roads and trails may be constructed. Noise levels and soil erosion may increase and air and water quality may decrease but water quality will meet State and Federal standards.

Alternative G includes an objective to assure that management activities in Potential Wilderness Areas (including areas allocated to these “Other Resource” management prescription areas) will only be done if they will not affect the Potential Wilderness Area to the point that it would no longer meet the definition of a Potential Wilderness Area.

## **INVENTORIED ROADLESS AREAS**

The Inventoried Roadless Areas, like the Potential Wilderness Areas, are allocated to different sets of management prescription areas in various alternatives. The Inventoried Roadless Areas recommended for wilderness study are discussed in the above section on Potential Wilderness Areas.

Alternative A does not have direction that requires that all inventoried roadless areas retain their roadless characteristics, yet the management prescribed for the areas accomplishes nearly the same result. Ninety-five percent of the roadless areas are classified as unsuitable for timber production. There are very limited provisions for the harvest of dead or dying trees along the perimeters of some of these areas. In the George Washington Plan, road construction is prohibited on 88 percent of the areas with some exceptions to provide for site-specific needs. Examples of these exceptions where new road construction could be allowed include: 1) to access approved mineral activities; (2) where the new road is the only prudent alternative to serve resource needs in adjacent management areas and it will minimally impact this management area; (3) to relocate existing roads; (4) to provide access to trailheads or (5) to provide access to private land if no other route is feasible.

In Alternative C, all of the Inventoried Roadless Areas are recommended for wilderness study.

In Alternatives F and G all of the Inventoried Roadless Areas that are not recommended for wilderness study have direction to maintain their roadless character. For the recommended National Scenic Areas, direction is dependent upon the authorizing legislation, but it is assumed that this direction will maintain the roadless character of the Inventoried Roadless Areas. For areas not recommended for wilderness study, the following management direction will apply to all Inventoried Roadless Areas in Alternatives F and G (direction similar to the 2001 Roadless Area Conservation Rule):

*Roads may not be constructed or reconstructed unless:*

*(1) A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property;*

*(2) A road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to conduct a natural resource restoration action under CERCLA, Section 311 of the Clean Water Act, or the Oil Pollution Act;*

*(3) A road is needed pursuant to reserved or outstanding rights, or as provided for by statute or treaty;*

*(4) Road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a system road that cannot be mitigated by road maintenance. Road realignment may occur under this paragraph only if the road is deemed essential for public or private access, natural resource management, or public health and safety;*

*(5) Road reconstruction is needed to implement a road safety improvement project on a system road determined to be hazardous on the basis of accident experience or accident potential on that road;*

*(6) The Secretary of Agriculture determines that a Federal Aid Highway project, authorized pursuant to Title 23 of the United States Code, is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists; or*

*(7) A road is needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease or for a new lease issued immediately upon expiration of an existing lease.*

*Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner.*

Timber may not be cut, sold, or removed, except as provided in (a).

(a) Timber may be cut, sold, or removed if one of the following circumstances exists. The cutting, sale, or removal of timber in these areas is expected to be infrequent.

(1) The cutting, sale, or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the remote area characteristics;

(i) To improve threatened, endangered, proposed, or sensitive species habitat; or

(ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period;

(2) The cutting, sale, or removal of timber is incidental to the implementation of a management activity not otherwise prohibited; or

(3) The cutting, sale, or removal of timber is needed and appropriate for personal or administrative use.

In Alternatives B, D and E, most of the Inventoried Roadless Areas that are not recommended for wilderness study have the same direction as described for Alternatives F and G. However, in a few of the areas (nine in Alternative B, six in Alternative D and two in Alternative E) active management (including road construction and timber harvest) would be allowed where active management has occurred along existing roads regularly over the past forty years. These areas are identified in Table C4.11. All other areas of Inventoried Roadless Areas would be managed under direction similar to the terms of the 2001 Roadless Area Conservation Rule. In addition, Alternatives B and D allow salvage harvest from existing roads with no new road construction in any of the Inventoried Roadless Areas. Given the past experience with gypsy moth and expectation of continued mortality from this and other invasive pests, this option allows for the removal of dead trees with little impact on the remote character of the Inventoried Roadless Areas.

**Table C4.11 Portions of Inventoried Roadless Areas where Roadless Character Would Not be Retained**

Inventoried Roadless Area	Total Acres	Portion of Area Without Requirement to Maintain Roadless Character (Acres)						
		Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Crawford Mountain	9,852	N/A	1,200		1,400			
Dolly Ann	7,866	N/A	800		600			
Dry River (WV)	7,254	N/A	500					
Elliott Knob	9,391	N/A	200					
Jerkentight	16,849	N/A	800		800			
Little Alleghany	10,207	N/A	700		1,000	1,000		
Little River	27,180	N/A	1000					
Mill Mountain/Rich Hole Addition	10,919	N/A	1,500		1,500	1,500		
Oak Knob	10,852	N/A	800		1,200			

In Alternative D the following Inventoried Roadless Areas are not identified as unsuitable for wind development: Little Alleghany, Oliver Mountain, Elliott Knob, Crawford Knob, and Northern Massanutten. A proposal for wind energy development in these areas could be accepted for analysis. If approved, wind turbines, associated transmission lines and access roads could be constructed. This is an exception to the above prohibitions on management in Inventoried Roadless Areas.

## **C5- SCENERY**

### **AFFECTED ENVIRONMENT**

The majority of the George Washington National Forest can be seen from adjacent or interior roads, trails or waterways largely due to the mountainous terrain and the supply of roads and trails. The more scenic landscapes (those inventoried as High or Moderate under the Scenery Management System (SMS)) are generally associated with or occur adjacent to high use roads, the Appalachian National Scenic Trail, National Recreation Trails, high use trails, lakes, rivers and streams, state and Forest Service designated scenic byways, and highly developed recreation areas.

The George Washington National Forest is located within Central Appalachian Broadleaf-Coniferous Forest Meadow Province and within the Valley and Ridge, Northern Blue Ridge and Appalachian Plateau sections as described by Bailey and others (1994). The landscape is about 80% mature forest with closed canopy. Elevations in the GWNF range from high points over 4,000 feet to lower elevations of less than 1,000 feet along some rivers and streams. Views beyond the immediate foreground are influenced by the viewer's elevation, terrain surrounding the viewer, as well as vegetation type and density. The steep to rolling ridges and valleys characterizing the forest are covered with an almost-continuous canopy of soft- to medium-textured rounded tree forms, creating a natural-appearing landscape character. The exception to this is the cultural landscapes, such as developed recreation areas, historic furnaces, and pastoral areas. These are typically found at lower elevations, often along rivers or streams and always along roads.

Over the last two decades, gypsy moth and southern pine beetle infestations have contributed to or caused tree mortality in some oak and pine stands resulting in visible patches of dead trees and scattered openings in the forest canopy. Groups of tall, gray, defoliated stems, varying in size from less than an acre to more than 25 acres, eventually give way to an emerging deciduous and evergreen understory. This process is speeded by active salvage operations in areas where human health and safety is critical. Hemlock woolly adelgid have caused mortality to individual trees as well as patches of hemlock, primarily in drainages and other cool, moist sites.

Of the seven Land Use Themes described in the Southern Appalachian Assessment, the existing GWNF landscapes can be grouped predominantly into four: Natural Evolving, Natural Appearing, Rural-Forested and Rural-Pastoral/Agricultural.

- Designated Wildernesses (42,674 acres) are lands where ecological processes predominate, are characteristically Natural Evolving landscapes.
- The vast majority of the Forest (about 1,000,000 acres) is characterized as Natural Appearing.
- Rural-Forested is a very small category that includes the Forest's most highly developed recreation areas.
- Rural-Pastoral/Agricultural is an equally limited category composed of open areas, often under special use permit for grazing, hay production or to perpetuate a pastoral scene.

Historically, the landscape character of Natural Evolving that dominated lands that now comprise the George Washington National Forest included open woodlands. This component of the landscape character declined dramatically since the turn of the previous century, mainly due to fire suppression. Characterized by an open mature tree canopy and a stable understory of native grasses, forbs and shrubs, open woodlands generally retained a natural, forested appearance interspersed with a mosaic of natural openings. The landscape featured structurally diverse forest communities, ranging from rich cove and mesic hardwood/pine forests, with predominantly closed canopies, to xeric pine/hardwood open woodlands, with a mosaic of grass/forb/shrub understories. A mid- to late-successional forest dominated the landscape. That historic, naturally evolving landscape contained both visual diversity and harmony. Alternatives B, C, E, F and G provide for acres allocated to mosaic of wildlife habitats including the restoration (to varying degrees) of the historic role of fire in the ecosystem and on scenery in terms of influencing landscape character.

## EXISTING VISUAL QUALITY

The scenic resources of the George Washington National Forest are currently managed in accordance with the George Washington Forest Plan. The scenic resource management direction in the Forest Plan is the Visual Quality Objective (VQO), which were determined by the Visual Management System (VMS). The scenic resource inventory has been updated to comply with the Scenery Management System (SMS), which replaced the VMS in 1995. Under SMS, Forest Plans establish Scenic Integrity Objectives (SIOs).<sup>2</sup> Table C5.1 provides a crosswalk between VQOs used in the current George Washington Forest Plan, and SIOs to be used in the Revised Forest Plan.

**Table C5.1 Crosswalk Between VQOs and SIOs**

Visual Quality Objective (VQO)	Scenic Integrity Objective (SIO)
Preservation (P)	Very High (VH)
Retention (R)	High (H)
Partial Retention (PR)	Moderate (M)
Modification (M)	Low (L)
Maximum Modification (MM)	Very Low (VL)

For planning purposes, Scenic Integrity Objectives (SIOs) were established for each prescription. These range from Very High (VH unaltered) to Low (L moderately altered). The SIOs define the different levels of alteration affecting the visual resource that is acceptable.

**Table C5.2 SMS Inventory**

Scenic Integrity Objectives	Acres	% of GWNF Land
Very High	45,763	4.3%
High	349,805	32.8%
Medium	203,363	19.1%
Low	466,681	43.8%

## DIRECT, INDIRECT AND CUMULATIVE EFFECTS

The scenic resource is affected by management activities altering the appearance of what is seen in the landscape. Short-term scenic effects are usually considered in terms of degree of visual contrast with existing or adjacent conditions that result from management activity. The scenic landscape can be changed over the long term or cumulatively by the alteration of the visual character. Management activities, which result in visual alterations inconsistent with the assigned SIO and landscape character goal, even with mitigation, affect scenery. Management activities that have the greatest potential for affecting scenery are road construction,

<sup>2</sup> See *Landscape Aesthetics, A Handbook for Scenery Management, Agricultural Handbook Number 701* for description of the SMS system and cross-walk between the SMS-SIOs and the VMS-VQOs. The SMS inventory of George Washington National Forest lands identify Scenic Classes from 1 (highest level) to 7 within each prescription area. Each Scenic Class is assigned a Scenic Integrity Objective of Very High, High, Moderate or Low.

timber production, insect and disease control, special use utility rights-of-way, and mineral extraction. Other management activities that also can affect the scenic resource at a lesser degree are habitat management, prescribed burning, fire suppression, land exchange, old growth forest management, recreation, administrative site facility construction, and wildlife management. Natural processes can also affect scenery, such as wildland fires, insect and disease infestations, and the spread of non-native invasive vegetation.

In all Alternatives, the following prescription areas are assigned a Scenic Integrity Objective (SIO) of Very High across all scenic classes: designated Wilderness and Little Laurel Run Research Natural Area. In Alternative A, recommended Wilderness is also assigned a SIO of Very High.

In all Alternatives, the following prescription areas are assigned a SIO of High across all scenic classes: Appalachian Trail corridor, eligible Wild and Scenic Rivers (scenic classification), geologic areas, riparian corridors and remote backcountry. In Alternatives B through G, recommended Wilderness is assigned a SIO of High across all scenic classes.

In Alternative A, the following prescription areas are assigned a SIO of Low across all scenic classes: administrative sites, communications sites and utility corridors. In Alternatives B through G, there are no prescription areas assigned a SIO of Low across all scenic classes.

Table C5.3 below provides the distribution of SIOs across all alternatives.

**Table C5.3 Scenic Integrity Objectives (SIOs) by Alternative (Acres)**

SIO	Alt A*	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
VH	45,763	45,028	44,972	44,972	44,972	44,970	44,971
H	349,805	374,408	594,472	379,210	450,269	499,890	432,963
M	203,363	199,216	237,678	196,132	178,843	160,927	182,157
L	466,681	446,776	188,343	445,151	391,381	359,676	405,374

\*No Action Alternative

Alternatives that receive the highest acreage to Very High and High SIOs would result in more protection and enhancement to the scenic resources than alternatives having fewer acres assigned to the higher SIOs. Alternative A assigns the most acres to both the Very High SIO and the Low SIO. Alternatives C through G all provide for more acres in the High SIO than Alternative A. Alternative C shifts the most acres of modification VQO/low SIO to High SIO. The Alternatives that offer the least protection for the scenic resource are A and B and D.

All alternatives propose prescribed burning, as detailed in Table C5.4 below. Drifting smoke, blackened rock outcrops and charred tree trunks would be the main negative visual effect. Visual contrast from fireline construction could also be evident. The contrast levels and duration vary with fire intensity. Blackened vegetation usually last a short time but charring of trees may be evident for many years. Repetitive burning reduces overall visual diversity. It often results in loss of valued mid- and understory species such as flowering dogwood, but tends to promote herbaceous flowering species. Prescribed fire repeated over time produces stands with open understories allowing views farther into the landscape.

**Table C5.4 Planned Prescribed Burning Program by Alternative, acres per year**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Prescribed Burns, acres per year	3,000	12,000 - 20,000		5,000 - 12,000	20,000	12,000 - 20,000	12,000- 20,000

Alternative E has the most acres in the prescribed burning program, and therefore the greatest potential for altered scenery, while Alternative C has the least.

Alternatives B, E, F and G, assign acres to prescription area 13, Mosaics of Wildlife Habitat. This prescription emphasizes, among other projects, restoring open woodlands that once existed as part of the natural evolving landscape. This would be achieved primarily through an expanded program of controlled burns to restore the historic role of wildland fires in the ecosystem. The openings created by these fires benefitted many species of wildlife, grass forbs, and understory and mid-story species, including many flowering shrubs and edge-loving trees. These openings and the diversity of vegetative and wildlife species found in them influenced the landscape character.

Prescribed fires planned in Alternatives B, D, E, and G would be larger and hotter than prescribed fires conducted under the current Forest Plan. These fires, several thousand acres in size, would result in blackened and charred trees, including large patches of dead trees, that could be visible for several years. However, within a year, vegetation will grow in these natural appearing openings and with time would dominate the characteristic landscape. These openings are anticipated to provide added diversity to both the visual and biologic resources.

Project analysis would take into account the desired condition of a landscape character theme that contains these openings that appear to mimic natural wildfires. In scenic class 1 areas with a High SIO, any elements that visually appear to be human caused, such as roads, and that would be deemed not to meet that High SIO, would be avoided by implementing mitigation measures.

Insect infestations and diseases can cause strong, unattractive contrasts in the landscape. Management efforts to control insect infestations and diseases can minimize or reduce effects. However some control efforts, such as removal of infected trees, may appear to visitors to be similar to clearcutting; but this can be avoided by implementing mitigation measures. Forest Service managers have the least flexibility to treat or control insects and disease infestations in Alternative C if recommended Wildernesses are designated by Congress as Wilderness. Alternatives D, E, F and G provide the least potential affects to scenery due to insect and disease outbreaks. Under these alternatives, non-native and invasive species (NNIS) are treated aggressively, prevention and control in disturbed and/or high use areas is emphasized, Integrated Pest Management (IPM) techniques are used, and a priority is placed on preventing spread to adjacent private lands. Alternatives A and B have less potential impacts than Alternative C but more than Alternatives D, E, F and G. Alternative A focuses primarily on controlling gypsy moth and Alternative B increases recognition of non-native and invasive species. Both A and B make use of IPM techniques.

Utility rights-of-way (ROW) have a high potential of affecting the scenic resource for a long duration. Cleared ROWs, utility structures contrast and may be incongruent with existing landscape. Cleared ROWs contrast in form, line, color, and texture when compared to the natural appearing landscape.

Industrial wind development can have significant impacts on the scenic resource. Wind turbines hundreds of feet in length are erected on large concrete pads on ridgetops, visually breaking into the skyline when viewed from any angle except perhaps from an airplane. Roads are needed to access each wind turbine site, altering the form, line, color and texture of the natural landscape. Alternatives C and E would provide the most protection to the scenic resources, as they do not allow for any wind development. Alternative D has the potential for the most impacts to scenery, as it makes the entire Forest available for proposals for wind development. Alternatives B, F and G restrict wind development in the most visually, socially and environmentally sensitive areas, but do not protect all areas from the potential impacts of wind development on scenery. Alternative A is silent on wind development.

Mineral management and development activities can involve a range of alterations from small surface structures along existing roads to major landform alteration, as well as form, line, color, and texture contrasts, causing substantially adverse scenic impacts. Alternative C has the least potential for negative impacts due to oil and gas leasing, as it does not allow any acres for this use. Alternative A has the potential for the most impacts due to oil and gas leasing, making 960,000 acres (90% of the Forest) available for standard or controlled surface occupancy. It contains no direction related to the development of Marcellus shale.

Alternative D makes available 720,000 acres and Alternative B makes available 700,000 acres for leasing under standard or controlled surface occupancy stipulations. Both allow for the development of Marcellus shale, but specific standards would be used related to hydrofracking.

Road maintenance, especially rights-of-way maintenance, affects scenery. Mowing frequency and timing alters the appearance of the landscape. Road construction introduces unnatural visual elements into the landscape and causes form, line, color, and texture contrasts. Road management controls how much of the landscape is seen by having roads open or closed.

**Table C5.5 Miles of Road Construction per Year by Alternative**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Road Construction, miles per year	2.9	1.5	0	4.1	0.9	0.5	1.5

Related to roads, Alternatives C and F would have the least impacts to the scenic resource while Alternatives A and D would have the greatest potential for impacting scenery. Additionally, Alternative C would decommission 28 miles of road per year in the first decade of the Revised Forest Plan and Alternative F would decommission 18 miles. Alternative A does not provide for decommissioning of roads.

Vegetation management has the great potential to alter the landscape and impact the scenic resource. Timber harvest practices can cause long-term effects on scenery by altering landscape character through species conversion, reduction in species diversity, manipulation of the prominent age class, and alteration of opening sizes, locations, and frequencies. The potential effects may be positive or negative, depending on their consistency with the desired future condition of the landscape.

**Table C5.6 Estimated Harvest Acres and Allowable Sale Quantity for Timber Management Activities by Alternative, First Decade**

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Acres harvest, in thousands, first decade	23	30	0	42.5	18	10	30
Allowable Sale Quantity, in million cubic feet, first decade	47	54.3	0	101	31.1	20.4	54.3

Related to timber production, Alternative C would have the least adverse affect on the scenic resource and Alternative D would have the greatest potential for adverse affects to scenery. Of the alternatives that provide for an active timber program, Alternative F would have the least affect on the scenic resources of the Forest.

Of the management applications, even-aged management may be the most impacting. Among the even-aged regeneration methods, clearcutting and seed-tree harvest produces the highest visual contrasts because they remove the most forest canopy and create openings with visible roads and/or skid trails. These openings would vary in their effects on scenery depending on location, size, shape and distance from viewing platforms. Openings that repeat the size and general character of surrounding natural openings, with the least contrast in line, texture and shape, would impact scenery the least.

Single-tree selection and group selection harvest are normally less evident because they do not cause large openings in the canopy. Uneven-aged regeneration methods can affect scenery, causing contrasts in form, line, color, and texture from slash production. All impacts as a result of timber harvest are short-term because of rapid vegetation growth.

Site preparation activities affect scenery by exposing soil and killing other vegetation. These effects are generally short-term. Site preparation usually improves the appearance of the harvest area by removing the unmerchantable trees and most of the broken stems. Stand improvement work can affect scenery by browning the vegetation, reducing visual variety through elimination of target species. Table C5.6 provides the allowable sale quantity (ASQ) and annual harvest program by alternative.

Recreation facilities are deviations to the natural landscape. None of the alternatives provide for the development of new developed recreation sites. Alternatives B, F and G provide for expanding the capacity of some existing recreation sites. Forest Service recreation facilities are designed to blend into the landscape without major visual disruption. Alternatives C and E would result in closing and decommissioning some recreation areas. All man-made elements would be removed and the site put back to grade. Vegetation would eventually grow in and the casual observer would not be able to tell that a developed area had once existed there.

Designation of wilderness will generally cause positive effects to the scenery. Barring serious infestations by insects or disease, old-growth forest character will be created over time. What it lacks in visual variety, it makes up for with an intact, natural appearing landscape. Alternative C provides for the most recommended Wilderness at about 22% of the George Washington land base. Alternative F is next highest for recommended Wilderness acres, at about 9% of the Forest. Alternatives A, B and G provide for the least acres being allocated to recommended wilderness study areas.

## C6- TIMBER MANAGEMENT

### AFFECTED ENVIRONMENT

#### FORESTED AREA

The GWNF includes approximately 1,065,000 acres of National Forest System land in Virginia and West Virginia. Of this, approximately 1,059,000 acres are known to be forested. As indicated in Table C6.1, the majority of the land area within each county is forested with a considerable variance in the percentage of national forest land located within each county.

**Table C6.1 Percentage of Forested Land and GWNF Land by County**

County	% Forested	% GWNF
Alleghany, VA	60%	49%
Amherst, VA	76%	19%
Augusta, VA	52%	30%
Bath, VA	94%	51%
Botetourt, VA	66%	4%
Frederick, VA	61%	2%
Hampshire, WV	77%	1%
Hardy, WV	82%	14%
Highland, VA	82%	22%
Monroe, WV	57%	<1%
Nelson, VA	84%	7%
Page, VA	47%	13%
Pendleton, WV	75%	11%
Rockbridge, VA	68%	12%
Rockingham, VA	58%	25%
Shenandoah, VA	51%	23%
Warren, VA	55%	5%

#### FOREST LAND TENTATIVELY SUITABLE FOR TIMBER PRODUCTION

During forest land and resource management planning, the Forest Service is required to identify lands unsuited for timber production (16 USC 1604(k); 36 CFR 219.14). The initial stage (Stage I) identifies land tentatively suitable for timber production. Refer to Appendix B for detailed explanation of the three stages of land suitability determination. Table C6.2 displays lands eliminated in Stage I suitability analysis to determine acres tentatively suitable for timber production.

**Table C6.2 Stage I Acres Tentatively Suitable for Timber Production**

Category of Stage I Lands	Acres
<b>Total GWNF Acres</b>	<b>1,065,000</b>
Non-Forest Land	(7,000)
<b>Forest Land</b>	<b>1,058,000</b>
Withdrawn for Existing Wilderness	(43,000)
Withdrawn for Existing National Scenic Area	(8,000)
Withdrawn for Research Natural Areas	(3,000)
Irreversible Damage & Not Restockable	(29,000)
Incapable of Producing Industrial Wood	(65,000)
<b>Stage I Tentatively Suitable for Harvest</b>	<b>910,000</b>
<b>Stage I Unsuitable for Harvest</b>	<b>155,000</b>

### AGE CLASS DISTRIBUTION

Most of the timber on the GWNF is currently in the 90-130 year old age class as evidenced by Table C6.3 showing current age class distribution. A majority of the Forest is either at or beyond currently specified rotation ages. Meanwhile, the very small amounts of acres (1-3%) in the younger age classes result from the lower levels of management in the past on this Forest. The age class imbalance is dramatic and is indicative of non-regulated forest management.

**Table C6.3 Percentage of Forest by Age Class on the GWNF Base Year 2010.**

Age Class	Percent
1-10	1%
11-20	3%
21-30	2%
31-40	4%
41-50	1%
51-60	0%
61-70	1%
71-80	5%
81-90	13%
91-100	22%
101-110	18%
111-120	8%
121-130	7%
131-140	5%
141-150	4%
151+	6%
Total	100%

## COMMUNITY TYPES

As the forest ages, it will experience increasing insect and disease problems. Gypsy moth populations will continue to cycle up and down naturally. Varying amounts of mortality are expected in the two oak-associated communities types which dominate the GWNF; Northeastern Interior Dry-Mesic Oak Forest and Central and Southern Appalachian Montane Oak Forest. These community types comprise 36% and 41%, of the total forested acreage, respectively. With these oak-associated community types comprising about 77% of the total forested acreage, substantial periodic gypsy moth defoliations and oak decline events resulting in subsequent mortality is anticipated. No community type conversions were modeled in the plan. No reliable methodology is currently available to quantify the specific extent of future natural type conversions due to natural forest succession and/or gypsy moth/oak decline mortality.

Salvage operations will be continuing as we attempt to salvage the dying trees prior to the oak losing their capability to stump sprout and regenerate the next stand to a desirable oak component to meet desired future conditions.

## FOREST SERVICE HISTORIC IMPORTANCE

The Southern Appalachian Assessment (SAA, 1996) indicates that the USDA Forest Service is the area's largest single landholder. Thus, the action of the region's national forests can hold more sway over markets than those of any other single landowner. The supply behavior of the public sector is, however, exceedingly difficult to predict. Timber supply from the national forests is governed by laws, agency policy and regulations and a management approach that addresses multiple uses as well as ecological conditions (SAA.1996.Rpt 4-113).

The Southern Appalachian Assessment (SAA) indicates that the pattern of timber production from the national forests has changed considerably. Between 1977 and 1994, the national forests in the SAA averaged 36.6 million cubic feet (MMCF) or 183 million board feet per year. For the years 1983, 1986, 1989, and 1992, the national forests provided between 10-12 percent of total production in the SAA. Since national forests have 17 percent of the timberland, their share of total production reflects a less intensive management approach than on private land (SAA, 1996 Rpt 4:122).

Timber production on the GWNF has experienced a similar decline which has continued since 1993 to the present. The following Table C6.4 displays total sold volume in Hundred Cubic Feet (CCF) and Thousand Board Feet (MBF) on the GWNF from the first year of plan implementation (1993) through FY 2009. The most recent 3 year average volume sold (2007-2009) reflects an almost 300% drop as compared to the 3 year average of 1993-1995.

**Table C6.4 Total Timber Volume Sold**

FY	CCF	MBF
1993	61,925	34,059
1994	53,227	29,275
1995	47,384	26,061
1996	37,340	20,537
1997	34,942	19,218
1998	15,342	8,438
1999	27,351	15,043
2000	18,365	10,101
2001	22,624	12,443
2002	24,540	13,497
2003	22,009	12,105

FY	CCF	MBF
2004	33,468	18,407
2005	21,409	11,775
2006	22,047	11,024
2007	16,362	8,181
2008	22,416	11,208
2009	16,403	8,202

During the period from 1993-2009, the harvest cutting methods by acres displayed in Table C6.5 were utilized to implement the timber management program objectives from the first year of plan implementation. There has been a relatively steady decline in total acres harvested on the GWNF since 1993. A steady decline in the total acres harvested by clearcutting has occurred from 1993 to 2005 with a slight increase in more recent years. Clearcutting acres have averaged less than five percent of total annual harvested acres for the last ten years.

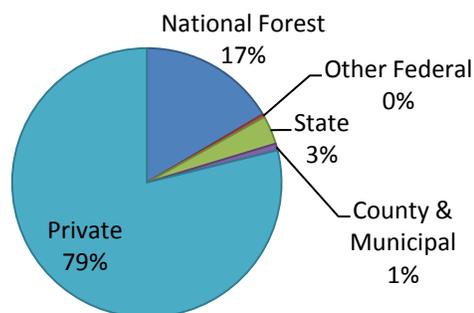
**Table C6.5 Acres by Harvest Cutting Method for Harvested Volume by Fiscal Year**

Fiscal Yr.	Clearcut	Shelterwood	Selection	Thinning	Salvage	Special	TOTAL
1993	890	938	644	212	587	0	3,271
1994	496	1,121	251	259	866	0	2,993
1995	277	1,281	55	262	832	0	2,707
1996	232	875	0	172	685	0	1,964
1997	209	1,103	0	64	1,839	0	3,215
1998	133	739	0	82	495	0	1,449
1999	41	436	1	92	714	0	1,284
2000	90	428	173	125	438	0	1,254
2001	67	668	97	244	86	0	1,162
2002	5	646	48	133	49	0	881
2003	0	579	57	49	104	0	789
2004	0	625	0	111	44	0	780
2005	0	962	29	104	81	0	1,176
2006	25	459	36	247	50	7	824
2007	22	364	6	340	0	0	732
2008	9	556	0	46	0	0	611
2009	70	344	0	345	74	0	833
10 yr. Av.	29	563	45	174	93	1	904
5 yr. Av.	25	537	14	216	41	1	835
3 yr. Av.	34	421	2	244	25	0	725

## FOREST SERVICE TIMBER INVENTORY

Information regarding the supply of timber was compiled using the most recent available Forest Inventory and Analysis (FIA) data. Of the 19.2 million acres in the wood product market area for the George Washington National Forest, 12.5 million acres are inventoried as timberland. Figure C6.1 provides the percentage of area of timberland within broad ownership classes. The two largest categories include privately held and National Forest Service (NFS) lands (including the entire George Washington National Forest and then portions of the Jefferson and Monongahela National Forests) accounting for 96% of the timberland in this market area. The George Washington National Forest comprises approximately 5.5% of the land within the market area.

**Figure C6.1: Percent Ownership of Timberland in the George Washington N.F. Market Area**



We estimate 7-8 bcf (Billion Cubic Feet) of timber supply on economically available timberland in the market area and considering landowner attitudes. We can expect this to grow by about 0.57 bcf per year. Annual demand is about .3 bcf per year; less than the net growth of all live timber, indicating a sustainable resource.

Approximately 2 bcf of live standing volume within the market area

is found on the GWNF. Of this total live volume, 1.8 bcf, or 86%, of this volume is in large diameter stands (>19 inches average DBH). Similarly, about 1.9 bcf, or 90%, of this volume is greater than 60 years old. Thus, a vast majority of the standing timber on the GWNF is of sawtimber size and mature in the timber production/economic sense. However, of the 2 bcf in live standing volume on the GWNF, we estimate only .51 bcf of that would be available on the GWNF after considering economic availability and current lands unsuitable for timber production.

Biomass fuels for the generation of energy are gaining interest and support in many parts of the south. The potential to supply biomass fuels from the GWNF is included in the aforementioned estimates. Of the .51 bcf available as supply, anywhere from 0 to .25 bcf could potentially be utilized as biomass fuel, or a maximum of 8.75 million tons forest-wide. The upper bound of this estimate is the small roundwood component usually utilized in paper production plus the traditionally non-merchantable material in branches and tops; we presume that no sawtimber would be utilized as biomass fuels. However, it is important to note that under current management the entire Forest only produces about 70,000 tons of wood, including sawtimber. This puts the almost 9 million ton figure identified as a maximum into perspective; it is probably not realistic.

The GWNF comprises a very small market share within this market area. We estimate that we control about .5 bcf of the total live volume available for supply. When we compare this to the 8 bcf estimated to be available in the entire market area, the GWNF comprises about 6% of the total live inventory. However, when we consider the variation in quality of supply and the demand for quality timber, the GWNF may have a slightly more significant role to play. Demand for high quality products is greater, we expect increased pressure on high quality timber, and the GWNF has a proportionally higher percentage of large diameter (equating to high quality) timber on NFS lands as compared to Non-Industrial Private Forest (NIPF) lands (albeit only slightly higher). So, while the primary producers of the timber industry within this market area do not depend on the

timber from the GWNF to any large extent, the GWJ can play a more significant role in the supply of high quality sawtimber. In terms of biomass fuels, the GWNF would likely comprise an even smaller share of the market, if such a market were to develop. Typically, energy production mills that utilize wood in part or in whole require a million or more tons of fiber annually. Realistic estimates, under current management, indicate that the GWNF could produce perhaps 30,000 tons annually within any given 50 mile radius around a mill location.

Although the scope of this analysis is very broad encompassing some 64 counties in 3 States, we believe it is also important to consider the role of NFS lands on a more local level. NFS lands occupy more than 30% of three of counties in the market area and a few more counties contain 20-30% NFS lands. Certainly the role that the timber supply from NFS lands play in these local economies is quite important and should not be lost or discounted when taking a larger view.

## DIRECT, INDIRECT EFFECTS AND CUMULATIVE EFFECTS

### SUITABILITY

As displayed in Table C6.2 above, approximately 85% (911,000 acres) of the Forest is “tentatively suitable” for timber harvest. Table C6.6 displays the acreage unsuitable for timber production and suitable for timber production for the seven alternatives considered. None of the alternatives used more than 48% of the lands tentatively suitable for timber production. Alternative D contains the most lands suitable for timber production. Suitable acres vary from 0 to 503,000 acres.

**Table C6.6 Determination of Lands Suitable for Timber Production from the Stage III Analysis**

Alternative	Acres Unsuitable for Production	Acres Suitable for Production	Percent Suitable for Production
A	715,000	350,000	33%
B	579,000	486,000	46%
C	1,065,000	0	0%
D	583,000	482,000	45%
E	699,000	366,000	34%
F	787,000	278,000	26%
G	626,000	439,000	41%

### ALLOWABLE SALE QUANTITY

Table C6.7 displays the allowable sale quantity (ASQ) for all products in million cubic feet (mmcf) and million board feet (mmbf) for each alternative considered in detail in the DEIS. ASQ is the maximum amount of timber that can be sold on lands suitable for timber production during the first decade of implementing any alternative.

Standard Region 8 conversion of 5.0 board feet per cubic foot was used in Table C6.7 calculations to convert from cubic feet to board feet.

These alternatives have ASQs ranging from 0 to 101 mmcf per decade. As Table C6.7 indicates the alternatives explore a wide range of volume outputs to achieve a wide variety of desired future conditions.

**Table C6.7 Allowable Sale Quantity for all Products (MMCF) by Decade**

Alternative	MMCF	MMBF
A*	47	235
B	54.3	271
C	0	0
D	101	505
E	31.1	155
F	20.4	102
G	54.3	271

\*The volume shown for Alternative A (current Forest Plan) uses the same Regional conversion factor as the other alternatives, which is different from the conversion factor shown in the 1993 Forest Plan.

Table C6.8 displays ASQ for each alternative by decade. Table C6.9 displays Long-Term Sustained Yield Capacity, Inventory Volume, and estimated acres treated by Alternative. The long-term sustained-yield capacity (LTSYC) is defined as "the highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives (USDA Forest Service 1982 CFR 219.3)". LTSYC is the potential average growth (mean increment) of the forest on acres allocated to timber production after the stand has reached a managed stand structure. It can be thought of as steady state timber output after the existing stands have been cut and each acre allocated to timber production has settled into a particular management intensity and rotation age. NFMA regulations require: "each sale schedule shall provide for a forest structure that will enable perpetual timber harvest which meets the principle of sustained yield and multiple-use objectives of the alternative (219.13(D))". The perpetual timber harvest constraint meets the NFMA requirement by ensuring that the forest contains as much timber inventory volume in the last period as a forest would have, on the average, under the management intensities selected in the analysis. All of the ASQs are well within current demand of 300 mmcf per year with reasonable likelihood of selling.

**Table C6.8 Allowable Sale Quantity for All Products by Decade (MMCF)**

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
A*	47	47	47	47	47
B	54.3	55.4	60.9	63.3	67.5
C	0	0	0	0	0
D	91.8	91.8	101.0	101.6	111.7
E	31.1	33.0	36.3	39.9	40.4
F	20.4	20.4	21.6	23.8	25.0
G	54.3	55.4	60.9	63.3	67.5

\*The volume shown for Alternative A (current Forest Plan) uses the same Regional conversion factor as the other alternatives, which is different from the conversion factor shown in the 1993 Forest Plan.

**Table C6.9 Long-Term Sustained Yield Capacity, Inventory Volume, Allowable Sale Quantity, and Acres Regenerated by Alternative**

Unit of Measure	Alternative						
	A	B	C	D	E	F	G
	MMCF/Year						
Long Term Sustained Yield Capacity	5.8	6.2	0	10.7	4.9	3.4	6.2
Inventory Volume, Decade 1	21.58	23.59	0	40.16	15.64	9.48	23.59
Allowable Sale Quantity	4.7	5.4	0	9.2	3.1	2.0	5.4
	Acres/Year						
Acres Regenerated, Decade 1	23,000	30,000	0	42,500	18,000	10,000	30,000

### TIMBER SALE PROGRAM QUANTITY

The Timber Sale Program Quantity (TSPQ) is the volume of timber planned for sale during the first 10 years. It includes the volume harvested from the suitable land base plus planned volume from unsuitable lands. For this analysis no harvest was planned on unsuitable lands under any alternative. Therefore the ASQ discussed previously equates to the TSPQ. The preceding tables also constitute the sale schedule by alternative.

### NET PRESENT REVENUES

The following Table C6.10 displays the average annual net present value in millions of dollars for the timber program using SPECTRUM costs and revenues. This table shows how the projected revenues of the timber program within each decade and each alternative compare to the costs of the timber program. The “net” value is how much average annual revenues exceed costs. For Alternative A, the Spectrum model solved for the objective function to maximize present net value. For Alternative D, Spectrum solved for the objective function to maximize volume. For Alternatives B, E, F and G, the model solved for the objective function to maximize early successional habitat. Since Alternative C does not have a timber program, there are no values shown. The variation within each alternative across the decades is reflective of the model choosing different combinations of harvest methods and wood product classes that vary in their costs and revenues.

**Table C6.10 Average Annual Net Present Value in Millions of Dollars for the Timber Program**

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
A	(2.00)	(1.35)	(0.91)	(0.62)	(0.42)
B	1.24	4.68	7.09	3.53	4.24
C	0	0	0	0	0
D	15.70	8.18	6.40	6.64	5.74
E	(0.24)	2.21	3.63	2.76	2.54
F	(1.06)	0.81	1.59	1.62	1.16
G	1.24	4.68	7.09	3.53	4.24

**DEMAND**

The process paper “George Washington National Forest Timber Supply and Demand Analysis” established The GWNF market area as generally being within a 50-mile radius around the Forest’s boundary. Approximately 217 sawmills, 3 paper/pulp mills, and 3 engineered wood product manufacturers are located within the GWNF market area with a combined consumption of 300 mmcf of roundwood annually. Approximately 30% of this material is used for the production pulp and paper. The remainder is used in the manufacture of sawtimber or engineered products.

The ownership distribution of the “economically available” timber supply mirrors the general pattern of timberland ownership in the market area, with approximately 80 percent of the supply on NIPF land, 17 percent on the National Forest (8.5 percent on the GWNF), and the remainder in Other Federal, State, and County/Municipal lands. If the GWNF were to satisfy the current demand within the market area of 300 mmcf/year, in the same proportion as the economically available resource supply, the estimated annual demand for products from the George Washington National Forest would be 25.5 mmcf (300 mmcf times 0.085 = 25.5 mmcf). This supply is well within the ASQ for Alternatives A, B, D, E, and G. The ASQ for Alternatives C and F would not meet this demand for timber products.

Currently, the demand for biomass fuels on the GWNF, other than traditional firewood, is negligible. There are 2 electrical cogeneration plants of any size within the market area; one located in Pittsylvania County and the other in Campbell County. Combined, these plants have the capacity to utilize approximately 1.25 million tons per year. There is an indication that one of these plants will soon be taken off-line, reducing the potential capacity to about 1 million tons per year. There no plants that produce fuel pellets from raw wood products. We do not have the technology at this time to economically produce bio-fuels (e.g. ethanol) from wood, although those processes are being researched and perfected. While we foresee an increase in demand for biomass fuels over the life of this analysis, it appears that there may actually be a decrease in such demand in the near future. We cannot reliably predict or quantify that demand at this time.

**SUPPLY AND DEMAND COMPARISON**

Table C6.11 displays the annual timber sale quantity as a percentage of the current demand. Demand from the forest is equal to 25.5 mmcf/year for the first 10 years of plan implementation.

**Table C6.11 Supply (ASQ) as a Percent of Current Annual Demand**

Alternative	MMCF	% of Demand
A	4.7	18
B	5.4	21
C	0	0
D	9.2	36
E	3.1	12
F	2.0	8
G	5.4	21

As displayed in the table above, no alternative meets or exceeds current market demand. Alternatives meet between 0% and 36% of current demand for timber products.

When the market is segmented into high, average, and low quality categories, the current demand for the high value category is estimated to be about 0.9 mmcf per year of high quality hardwood sawtimber for the GWNF, if the forest were to satisfy current demand in the same proportion as the economically available resource supply. As indicated in Table C6.11 Alternative D would provide the highest level of high value sawtimber. Other alternatives provide considerably less in descending order from Alternative B, G, A, E, F, and C.

Presumably the supply/demand relationship as it relates to biomass fuels under each alternative would roughly follow the same relationship displayed in Table C6.11 above. Since current demand is negligible and we cannot reliably predict future demand, even approximate figures for each alternative cannot be computed. Further, it is worth stressing that the Forest Service does not control how the raw material is utilized, other than restrictions on the removal of branches and tops that would result from whole tree harvesting. Alternatives A, C, E, F, and G would prohibit whole tree harvesting altogether and so would have less potential to supply a biomass raw material as compared to Alternatives B and D. However, all alternatives, except C, will supply some level of small roundwood. Whether this material is used to produce paper or biomass energy is solely related to local market conditions in the area at the time; we do not control that aspect. This factor further contributes to the inability to estimate our supply or role in biomass fuels markets in any meaningful way.

### AGE CLASS DISTRIBUTION

Table C6.12 displays expected age class distribution in 2030, by alternative, following 30 years of plan implementation.

As Table C6.12 indicates in 30 years, the majority of the forested acres in each alternative will be in stands with a stand age greater than 100 years. Projected levels of timber harvesting to create early, sapling/pole, and mid seral stage habitats in any alternative will not offset this further “aging” of the Forest. Alternatives C and F will have the highest percentage of stands 100 years and older with 85-88%. Alternatives E and G are grouped at about 82%, and Alternatives A, B, G, and D are the lowest at 79%. Conversely, Alternative D will have the greatest percentage of habitats less than forty years of age with 15%. Alternatives A, B, and G are grouped at about 10%. Alternative E is 7% followed by Alternative F and C at 4 and 1%, respectively.

**Table C6.12 Estimated Percentage of Forest by Age Class and Alternative on the GWNF Base Year 2040**

Age Class	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
1-10	3	3	0	5	2	1	3
11-20	3	3	0	5	2	1	3
21-30	3	3	0	4	2	1	3
31-40	1	1	1	1	1	1	1
41-50	3	3	3	3	3	3	3
51-60	2	2	2	2	2	2	2
61-70	4	4	4	3	4	4	4
71-80	1	1	1	1	1	1	1
81-90	0	0	0	0	0	0	0
91-100	0	1	1	1	1	1	1
101-110	3	4	5	4	4	4	4
111-120	11	11	14	11	11	13	11
121-130	20	19	22	19	20	21	19
131-140	17	17	18	18	18	18	17
141-150	8	8	8	8	8	8	8
151+	20	20	21	19	21	21	20
<b>Total</b>	100	100	100	100	100	100	100

## METHODS OF HARVEST

Table C6.13 displays the method of timber harvest by alternative for the first 10 years of plan implementation.

As Table C6.13 displays, the seven alternatives explore the use of a wide range of timber harvesting methods to meet a variety of desired future conditions. Uneven-aged harvest methods have generally been limited to lands that have a manageable individual area of at least 100 acres, with slopes less than 30 percent, and within ½ miles of existing roads for physical and economic reasons. All alternatives employ various amounts of group selection, except for Alternative C which employs none. The greatest amount of clearcutting is employed in Alternative D, followed in decreasing amounts by Alternatives A, B, E, G, F, and C. All alternatives employ various mixes of shelterwood harvesting, and significant thinning is employed in Alternatives B, E, and G.

**Table C6.13 Acres by Method of Harvest for the First 10 Years for all Harvest Methods**

Alternative	GS	CC	SWR	SW-2 Stage	Salvage	Thin	Total
A	8,000	3,000	16,000	3,000	930	1,740	32,670
B	500	900	21,300	7,300		4,000	34,000
C	0	0	0	0	0	0	0
D	500	8,500	6,900	26,600		2,000	44,500
E	500	900	14,600	2,000		4,000	22,000
F	500	500	4,500	4,500		2,000	12,000
G	500	900	21,300	7,300		4,000	34,000

GS = Uneven-aged Management using Group Selection. CC= Clearcut. All commercial trees are removed at initial regeneration harvest. SWR=Two aged shelterwood where 20-40 square feet of residual trees of commercial species 8-14 inch dbh are retained which may be removed at a later thinning of the new stand or at final rotation of the new stand. SW-2 Stage= True two step shelterwood. First entry leaves about 50 BA (1/2 of original stand) and occurs about 10-20 years before final harvest cut that completely removes overstory.

Table C6.14 displays the relative amount of even-aged, two-aged and uneven-aged silvicultural systems employed during the first 10 years of plan implementation by alternative.

**Table C6.14 Percentage of Regeneration Acres for Even-Aged, Two-Aged, and Uneven-Aged Silvicultural Systems by Alternative in the First 10 Years**

Alternative	Even-Aged	Two-Aged	Uneven Aged
A	22%	71%	7%
B	27%	71%	2%
C	0	0	0
D	83%	16%	1%
E	16%	81%	3%
F	50%	45%	5%
G	27%	71%	2%

## **C7- MINERALS MANAGEMENT**

### **AFFECTED ENVIRONMENT**

#### **FEDERAL LEASABLE MINERALS MANAGEMENT**

Management of the federal leasable mineral resources is a shared responsibility between the U.S. Department of Interior and the USDA, Forest Service. The Bureau of Land Management (BLM) has a major role in issuing and supervising operations on licenses, permits, and leases for federal leasable minerals. The BLM cooperates with the Forest Service to ensure that impacts upon surface resources are mitigated and that the land affected is reclaimed. The Forest Service is also involved in the federal issuing of licenses, permits, and leases and in administering on-the-ground operations on NFS lands. Over the past decades, Congress has expanded the role of the Forest Service in the federal leasable minerals process.

The Revised Forest Plan will make a leasing decision only on federal oil and gas. The Revised Forest Plan does not make a leasing decision on other federal leasable minerals, but does consider whether leasing other federal leasable minerals would be a suitable use for various management prescriptions.

#### **FEDERAL OIL AND GAS**

Through the passage of the 1920 Mineral Leasing Act, Congress established a program to provide for oil and gas development on federal lands, including the National Forests reserved from the public domain. This Act authorizes the Secretary of the Interior to issue leases for the disposal of certain minerals (including coal, oil, oil shale, and gas). The Mineral Leasing Act for Acquired Lands of August 7, 1947 extended the provisions of the mineral leasing laws to acquired National Forest System lands and requires the consent of the Secretary of Agriculture prior to leasing. The National Forest System lands on the George Washington National Forest are acquired lands. The purpose of the Act is “to promote the mining of coal, phosphate, sodium, potassium, oil, oil shale, gas, and sulphur on lands acquired by the United States.”

Minerals Policy Act of 1970 states: “The Congress declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in

(1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries,

(2) the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs...”

The Energy Security Act of June 30, 1980 directs the Secretary of Agriculture to process applications for leases and permits to explore, drill and develop resources on National Forest System lands, notwithstanding the current status of the Land and Resource Management Plan (Forest Plan). As part of the Federal Onshore Oil and Gas Leasing Reform Act of 1987, Congress again recognized the Forest Service’s role in the federal oil and gas leasing program, and provided additional authority for Forest Service in regard to leasing and administration of surface operations during oil and gas development. The implementing regulations for this Act (36 CFR 288E) provide the basis for the analysis of Alternatives and decisions on federal oil and gas leasing in the Revised Forest Plan.

Executive Order 13212 (Actions to Expedite Energy-Related Projects) of May 18, 2001 states “executive departments and agencies (agencies) shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.” The Executive Order 13212 requires that: “For energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections.”

The Energy Policy Act of 2005 required the Secretary of Interior and the Secretary of Agriculture to enter into a memorandum of understanding (MOU) to ensure timely processing of oil and gas lease applications and

surface use plans of operation, and eliminate duplication of effort by providing for coordination of planning and environmental compliance efforts. In 2006 the Forest Service and Bureau of Land Management signed the MOU establishing joint policies and procedures for timely environmental analysis of oil and gas leasing and operations on National Forest System (NFS) lands.

The federal oil and gas leasing program provides natural gas and other energy minerals needed by people, and provides a source of revenue to federal and local governments. Federal oil and gas leases are issued by competitive sale. A competitive sale may generate federal revenue from a bonus bid, as well as the annual rental fees for the lease acreage. If a lease is drilled and goes into production, the federal government receives a royalty on production. The revenue generated from the federal leases is shared with States and in turn with all the counties on the Forest. The federal government provides the States with 25 percent of the revenues from federal leasing (annual rental fees, production royalties, bonus bids) for distribution to the counties for schools and roads.

## **OTHER FEDERAL LEASABLE MINERALS**

Historically, iron mining and some coal mining occurred on the Forest. But there is no recent interest in these or other hardrock leasable minerals. Some geothermal leasing occurred on the Forest in the 1980s, but there has been no recent interest in geothermal leasing.

The Forest does not have any lands subject to mining claims under the Mining Law of 1872 (“locatable minerals”). Minerals, such as metallic minerals, that would be “locatable minerals” on public domain lands in the western U.S. are “leasable minerals” on acquired lands in the eastern U.S. As a result, leasable minerals on the Forest include not only oil, gas, coal, and geothermal, but also hardrock or “locatable minerals” such as iron, manganese, and gold.

Under the Revised Forest Plan, if a company were to apply for a leasable mineral other than oil and gas for some area on the Forest, then an environmental analysis including public involvement would be conducted by the Forest Service in cooperation with the BLM. Then the federal government would decide whether to issue a lease.

## **FEDERAL MINERAL MATERIALS**

Mineral materials include aggregate, landscaping rock, rip-rap, flagstone, and other rock or earth construction materials. Mineral materials are managed by the USDA Forest Service (36 CFR 288C), and are not federal leasable minerals. Mineral materials are essential to manage the Forest and provide public access. The Forest operates pits or quarries to supply mineral materials to support a wide range of management programs: to build and maintain trails, roads, campgrounds; to control erosion and sedimentation; to restore riparian and aquatic habitat; to prevent or repair flood damage; etc. The Forest also uses mineral materials extracted from mines off the Forest. Most of the mineral materials used by the Forest are extracted from mines off the Forest. The Forest also issues mineral material permits to the public. The Forest also can make mineral materials available as free use to governmental agencies, such state road departments.

A continuing supply of mineral materials is essential to manage the Forest and provide public access. As a result, all Alternatives require some level of continued mining to supply mineral materials required to implement the Alternative. Under all Alternatives, most of the mineral materials for Forest management would likely be supplied by mines off the Forest, with lesser amounts of mineral materials supplied by sources on the Forest. Private Mineral Rights (Reserved and Outstanding Mineral Rights)

Private mineral rights (reserved and outstanding mineral rights) underlie about 16 percent of the Forest (Figure D.1). These outstanding or reserved mineral rights (non-federal mineral rights) are partial or complete mineral interests. Reserved rights are those retained in part or in whole by the seller when the federal government acquired the tracts comprising the National Forest. Outstanding rights are mineral rights owned and retained by a third party when federal government acquired the tracts comprising the National Forest. Of the privately-owned mineral rights, about 76 percent are mineral rights outstanding to third parties, and 24 percent are mineral rights reserved by the grantor at the time of acquisition by the federal government.

The only active operation under private mineral rights is a shale mine in operation since the 1980s on the Pedlar Ranger District. Since 1993 reclamation of the previous shale mine has occurred, while additional mining has occurred in recent years. In 2005 the James River Ranger District received a proposal to exercise private mineral rights by mining. Forest Service requested additional information about the proposal, but has not received the information. To date, the proponent has not pursued the proposal with the Forest Service.

Just because mineral rights are privately owned does not automatically mean that the mineral rights will be exercised to explore and develop minerals. In fact, the exercise of private mineral rights on the George Washington National Forest going back for decades is rare. Mineral deposits suitable for mining are scarce on the Forest. For example, there has never been a private mineral rights oil and gas well developed on the George Washington National Forest. However, due to recent interest in natural gas in the Marcellus Shale, the future has the potential for an increase in exploration and development of private mineral rights on the Forest.

Private mineral rights are constitutionally protected property rights. Forest Plan regulations (36 CFR 219.22) require that outstanding and reserved mineral rights (private mineral rights on NFS lands) shall be recognized to the extent practicable in Forest planning.

A Comptroller General Report to Congress (GAO/RCED-84-101; July 26, 1984) found that the Forest Service in the eastern U.S. failed to provide Congress with information about private mineral rights and their potential effect on wilderness management. After designating many Wilderness areas in the eastern U.S., Congress was concerned about tens of millions of dollars that the Forest Service then said could be needed to acquire private mineral rights in several Wildernesses. The Forest Service was faced with management problems, litigation, and administrative costs, and was looking to Congress to purchase the private mineral rights. The GAO noted: "Recent attempts by the federal government to acquire private mineral rights and prevent development in eastern wilderness areas have caused considerable controversy and congressional debate primarily because of the high costs associated with these purchases."

The GAO recommendation to the Secretary of Agriculture was: "Because the Forest Service did not analyze the potential problems or costs associated with private mineral rights when it developed its 1979 wilderness recommendations, GAO recommends that the Secretary direct the Forest Service's southern and eastern regional offices to do this type of analysis when reevaluating its wilderness recommendations. This analysis should include for each area consideration of private mineral development potential, the government's ability to control mineral development if it occurs, the need to acquire private mineral rights, and a range of acquisition costs."

These problems (management conflicts, litigation, and high costs) apply not only to Wilderness, but to 1) any highly restrictive surface use designation that conflicts with exercise of private mineral rights on National Forest System lands, and 2) management area direction that impose severe restrictions on use of the surface or prohibit certain activities such as road construction or mining. Examples include Special Biological Areas, Appalachian Trail Locations/Relocations, Wild & Scenic River designations, Recommended Wilderness Study Areas, or Remote Backcountry prescriptions. In 1997, the Jefferson National Forest spent more than \$300,000 to acquire private minerals interests and lands to shut down a private sand mine deemed inappropriate near the Appalachian Trail in Smyth County.

The 5th Amendment to the U.S. Constitution provides that private property shall not be taken for public use without just compensation. In addition to designations or Plan direction that prohibit mining or are de facto prohibitions on mining, a "taking" can have other forms. For example, the time required to process private mineral activities under the Forest Plan's framework might result in unreasonable delays that amount to a "taking" of the mineral rights. Executive Order 12630 "Governmental Actions and Interference with Constitutionally Protected Property Rights" requires federal decision-makers to 1) evaluate carefully the effect of their administrative actions on private property rights, and 2) to show due regard to these 5th amendment rights and to reduce the risk of undue or inadvertent burdens on the federal treasury. Concern about government "takings" of private property rights is a national issue.

## **DIRECT AND INDIRECT EFFECTS**

For effects related to federal oil and gas leasing, refer to Section D of this Chapter.

The areas of suitable use for leasable minerals other than oil and gas vary by Alternative and depend on the mix of prescriptions with permissible suitable uses in each Alternative. Alternative A provides the most areas and Alternative C the least areas of suitable use for leasable minerals other than oil and gas; Alternatives F, B, E, G, and D provide intermediate levels of areas of suitable use for leasable minerals other than oil and gas.

In terms of potential effects from ground disturbing activities associated with leasable minerals other than oil and gas, Alternative A and D have the most potential and Alternative C has the least potential for effects; Alternatives F, B, E, and G have intermediate potential for effects. The potential for the Forest to receive a request for a leasable mineral other than oil and gas that would result in actual exploration or development activity in the next 15 years is estimated to be low.

The areas of suitable use to meet demand from the public and public agencies vary by Alternative and depend on the mix of prescriptions with permissible suitable uses in each Alternative. Alternative A provides the most areas and Alternative C the least areas of suitable use to meet public demand; Alternatives F, B, E, G, and D provide intermediate levels of areas of suitable use to meet public demand.

In terms of potential effects from ground disturbing activities associated with Forest administrative use and public use of mineral materials, Alternative A and D have the most potential and Alternative C has the least potential for effects; Alternatives F, B, E, and G have intermediate potential for effects.

There are two potential effects relating to outstanding and reserved mineral rights:

- The potential effects of outstanding and reserved mineral operations on federal surface management. The reasonably foreseeable development relates to exploration and development of Marcellus shale. These effects for each Alternative are considered as part of the cumulative effects in federal oil and gas leasing section.
- Potential effects of highly restrictive surface management direction on the exercise of outstanding and reserved mineral rights on the National Forest, such as the potential for “takings” of private mineral rights due to federal action or inaction that prevents or unreasonably delays private mineral operations in some areas. These potential effects are discussed below.

The federal government acquired about 16% of the Forest subject to private mineral rights (reserved or outstanding mineral rights). The exercise of private mineral rights to explore and develop minerals on NFS lands is a private decision, a constitutionally protected property right.

All Forest Plan Alternatives are subject to these existing private rights (outstanding and reserved mineral rights).

Failure to consider private mineral rights under the Forest when allocating management prescriptions and selecting an Alternative could produce incompatible and conflicting land uses, resulting in 1) unnecessary and preventable resource conflicts, 2) inability to achieve desired future conditions in some areas, 3) public controversies that could have been avoided, 4) situations ripe for “takings” of private mineral rights, 5) multi-million costs to federal government to avoid potential “takings”. The potential for conflict with the exercise of private mineral rights is particularly high where management activities are prohibitive or severely restrictive, such as in recommended wilderness study areas or inventoried roadless areas. The Alternatives vary in the extent to which they create potential conflicts with private mineral rights. An indicator of the potential for conflict is the degree of restrictions or prohibitions that the Alternatives place on federal oil and gas leasing availability. Ranging from least potential to most potential for conflict and potential “takings” of private mineral rights are Alternatives A, B, D, G, F, E, and C.

## **CUMULATIVE EFFECTS**

Past and present actions have had limited conflict with the exercise of private mineral rights on Forest. Future actions under Alternative A would result in similar cumulative effects. Alternative B, D, G, F, E, and C increase the potential for conflict with the exercise of private mineral rights on Forest, and so, increase the potential cumulative effects relating to conflicts.

## C8 - ROADS SYSTEM MANAGEMENT

### AFFECTED ENVIRONMENT

System roads of the George Washington National Forest currently total 1,823 miles and serve a variety of resource management and access needs. Over the past several years, the system has been fairly stable with regards to total mileage, Objective Maintenance Level (OML) breakdown, and type of resource management support. Projected road construction mileage varies by alternative.

There is an effort currently ongoing with regards to management of the Forest road system referenced as a Travel Analysis Process (TAP). This effort is aimed at the identification of the minimum road system necessary to meet management objectives and identify opportunities for increased resource protection, eliminating the backlog of deferred maintenance, optimal performance of maintenance, and better service to Forest users. Road recommendations based on the TAP are incorporated into the Forest Plan and must be further analyzed and implemented through project level NEPA by 2017.

The reasonable foreseeable development and decommissioning scenario is based on the TAP and the amount of acres harvested for each alternative and summarized in Table C8.1 below.

**Table C8.1 Road Construction and Decommissioning, miles**

	Alternative						
	A	B	C	D	E	F	G
Current Roads	1,823	1,823	1,823	1,823	1,823	1,823	1,823
Special Use Roads – Not part of Minimum Roads System	50	50	50	50	50	50	50
Potential Forest Highways – Not part of Minimum Roads System	107	107	107	107	107	107	107
Roads to be Decommissioned		160	160	80	160	160	160
Potential Additional Decommissioning from future wilderness designation	0	0	124	3	1	17	1
Acres Timber Harvested	3,000	3,000	0	4,250	1,800	1,000	3,000
Road Construction (miles during decade)	29	15	0	41	9	5	15
Minimum road system at end of 10 years	1,695	1,521	1,382	1,624	1,514	1,494	1,520

One strategy identified in the TAP includes identification of roads that would be better and more efficiently maintained as a Forest Highway with the primary maintainer being the Virginia Department of Transportation (VDOT). These include current Forest roads that have a primary function of other than Forest access and use. Examples include roads that primarily function as commuter routes for work and school or service private property. Currently, 804 miles of George Washington National Forest roads are Forest Highways. An additional 107 miles have been identified as possible candidates for addition to the Forest Highway system. It is anticipated that at least a portion of the 107 miles of road will be upgraded and converted to a Forest Highway within the current Plan period.

TAP shall be implemented through the extensive use of project level roads analysis for decisions regarding changes to the road system. These analyses will be conducted to provide managers with data to make informed decisions concerning road system changes, additions, and deletions. Analyses will be conducted in accordance with current Forest Service Guidelines. A completed analysis will inform future management decisions on the merits and risks of building new roads in previously unroaded areas; relocating, upgrading, or decommissioning existing roads; managing traffic; and enhancing, reducing, or discontinuing road maintenance (USDA Forest Service 1999).

**Table C8.2 Maintenance Levels of Current Road System and Transportation Analysis Objective, miles**

	Operational Maintenance Level - Current Condition	Objective Maintenance Level - TAP	Change from Current
Maint Level 1	245	155	(90)
Maint Level 2	1,008	1,013	5
Maint Level 3	465	301	(164)
Maint Level 4	97	33	(64)
Maint Level 5	8	5	(3)
Decommission	1	160	159
Special Use	-	50	50
Existing Forest Highways	810	810	-
Potential Forest Highways	-	107	107
Grand Total	2,634	2,634	
Minimum Road System	1,822	1,507	
% of High Clearance roads	69%	77%	9%
% of Passenger Car roads	31%	23%	-9%

Management of the Forest’s roads will also include intensive on-the-ground field condition surveys followed by clear and concise reporting of the existing condition. This process will include condition surveys on a random sample of the Forest’s Operational Maintenance Level (OML) 1, 2, 3, 4, and 5 roads each year. Maintenance levels are recommended in the TAP and summarized in table C8.3.

Special use permit roads are roads identified in the TAP as not needed for Forest Service management but provide access for a permitted or special use by an other than Forest Service entity. Maintenance responsibility for these routes will be borne by the permitted entity. Where these routes are no longer needed, used or not being maintained, they will be decommissioned.

**Table C8.3 Maintenance Levels and Road Status, miles**

	Alternative						
	A	B	C	D	E	F	G
Maintenance Level 1 - Closed in storage for future use	245	155	105	155	155	145	155
Maintenance Level 2 - High Clearance, seasonal or admin	1,037	1,042	943	1,119	1,029	1,015	1,029
Maintenance Level 3 - Passenger Car	465	301	297	313	301	302	301
Maintenance Level 4 - Passenger Car, collector	97	33	33	33	33	33	33
Maintenance Level 5 - Passenger Car, 2-lane, paved, arterial	8	5	5	5	5	5	5

**DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

As Table C8.1 indicates, the largest potential increases in road mileage over the Plan period are in the areas of timber management. In comparison, the potential contributions to road system mileage for Recreation and related activities is relatively small and would, under all the Alternatives, be offset by the planned rate of decommissioning. This Table indicates that the potential net mileage range from a low of 1,383 miles for Alternative C to a potential high of 1,695 miles for Alternative A over the plan period.

## C9 - LAND USE

### AFFECTED ENVIRONMENT

The proclamation boundary of the Forest encompasses almost 1.8 million acres, however only approximately 59% of those acres are National Forest system land, or land acquired by the National Park Service and administered by the Forest Service. National forest land is interspersed with land that remains in private ownership.

As of November 2010, the Forest property boundaries totaled over 1,832 miles. In an ongoing effort, 40% of these boundaries have been marked and can be readily identified by the general public. Generally, forest ownership consists of mountains and ridge tops, with the valleys remaining in private ownership. This results in an ownership pattern that is long and narrow and for that reason; there are few opportunities in a north/south direction to get from the west side of the forest to the east side without crossing national forest at some point.

**Table C9.1 Boundary Lines and Planned Level of Maintenance**

District	Boundary Miles	Range of Boundary Line Maintenance (Miles per Year)	
		Low	High
Lee Ranger District	310.85	17	26
North River Ranger District	550.33	30	45
Pedlar Ranger District	363.16	20	30
Warm Springs Ranger District	296.75	16	24
James River Ranger District	310.95	17	26
Total	1,832.03	100	150

The intermingled ownership pattern causes some Forest tracts to be inaccessible to the public and difficult to manage.

### DIRECT, INDIRECT AND CUMULATIVE EFFECTS

All alternatives have similar land adjustment programs aimed at consolidating national forest ownership, however each alternative has a different emphasis or priority. Lands are to be added through either acquisition or exchange.

## **C10 - SPECIAL USES**

### **AFFECTED ENVIRONMENT**

Special Use authorizations are issued for multiple purposes to individuals, corporations, and other government agencies. The predominant uses are for public roads, communication facilities, and utility rights-of-way. Water uses are the next major use category and private road access is the fifth major use category. The total number and acres of area under permit are summarized below, as of November 2010.

**Table C10.1 Special Use Permits**

<b>District</b>	<b>Permits</b>	<b>Acres</b>
Lee	85	351
North River	99	1,588
Pedlar	75	514
Warm Springs	72	713
James River	75	1,397
Totals	406	4,563

Special use authorizations for personal use are a minor land commitment such as private road easements and permits, well/springs, cultivation, etc.

There are no authorizations for recreation residences on the Forest.

Recreation special uses such as those for outfitter/guides and competitive recreation events provide recreation opportunities to the public that the Forest does not provide.

### **UTILITY CORRIDORS**

#### **AFFECTED ENVIRONMENT**

Rights-of-way 50 feet and greater in width located within designated utility corridors comprise linear rights-of-way under authorization, and are primarily electric lines in excess of 138,000 KV and natural gas transmission lines.

Facilities in utility corridors are authorized by special use authorization. When compatible, new uses are accommodated by widening existing corridors rather than designating new corridors.

#### **DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

All alternatives designate areas as unsuitable for new utility corridors in certain areas (i.e. Wilderness and special areas), with Alternative C having the most area designated as unsuitable. In addition to those areas where new corridors are unsuitable, all alternatives also discourage or somehow restrict development of new corridors in additional management prescription areas.

Although all alternatives have areas where new corridors are considered unsuitable and also restricted, there are opportunities under each alternative to cross national forest system lands with new utility corridors.

## COMMUNICATION SITES

### AFFECTED ENVIRONMENT

There are ten classified communications sites on Forest as summarized by District. Most have multiple users that conduct high powered broadcasts typically AM, FM radio, Television and cellular communications. Some are considered low power sites that use less than 1,000 watts of radiated power (ERP) for radio communications. The Forest Service also uses many of these sites for its own radio communications. Access is predominately by state highway to a Forest Service road to the site. Sites are summarized in Table C10.2:

Table C10.2 Communication Sites

District	Site	Year Approved	Use	FS Use	Use Type
Lee	Signal Knob	1978	Single	No	AM, FM, TV
Lee	Great North Mtn	1980	Multiple	Yes	AM, FM, TV, ERP
Lee	Big Mtn	1978	Multiple	Yes	AM, FM, TV, ERP
North River	Elliot Knob	1977	Multiple	Yes	AM, FM, TV, ERP
North River	White Grass Knob	1982	Single	No	ERP
North River	Reddish Knob	1991	Multiple	No	ERP
James River	North Mountain	1979	Multiple	No	ERP
James River	Fore Mountain	1994	Single	No	AM, FM, TV, ERP
Pedlar	Rocky Mountain	1977	Multiple	Yes	AM, FM, TV, ERP
Warm Springs	Duncan Knob	1977	Multiple	No	ERP

### DIRECT, INDIRECT AND CUMULATIVE EFFECTS

All alternatives designate areas as unsuitable for new communication sites in certain areas (i.e. Wilderness and special areas). In addition to those areas where new sites are unsuitable, all alternatives also discourage or somehow restrict development of new sites in additional management prescriptions, with Alternative C having the most and Alternative D being the least restrictive.

Although all alternatives have areas where new sites are considered unsuitable and also restricted, the effect on the establishment of a nationwide communication system is negligible. The major demand for new communication sites nationwide is to provide wireless coverage. Due to the interspersed ownership pattern of national forest system lands, with the mountain ridges being in Forest ownership and the valleys being held in private ownership, most wireless sites are best located on private land along major travel ways and not on ridge tops located well away from these roadways. As the wireless communication grid expands to more rural locations, the need for demand for new sites is anticipated to increase, however it is expected that for the most part, in the foreseeable future, this need will be able to be met by locating at existing sites, co-locating on electric transmission towers and other improvements, or by locating on private land.

## **C11 – RANGE**

### **AFFECTED ENVIRONMENT**

These lands include approximately 155 acres of improved pastures on three allotments, all on the Lee District. Livestock grazing of cattle is used primarily to help maintain these lands in an open grassland or grass/forb/shrub stage and to preserve the open, pastoral setting on selected portions of the Forest. While these areas provide forage for livestock and aid the local economy, they also to provide a variety of recreational opportunities such as maintaining scenic views, picnicking, and wildlife viewing. These early successional habitats along with their intermingled, isolated patches of woodlands also provide valuable habitat for a variety of wildlife species including deer, turkey, rabbits, voles, raptors, and a variety of migratory songbirds. Livestock grazing has a long history in this area. It is likely the earliest settlers capitalized on the open grassland conditions of the Great Valley and other significant open areas that were maintained for centuries by Native Americans and animals such as bison and elk.

Livestock grazing is managed through a site-specific Allotment Management Plan and Environmental Assessment supported by a thorough analysis of the range situation as directed by the 2200 section of the Forest Service Manual and pertinent handbooks. All grazing use is by permit only. Grazing of livestock on National Forest requires the development of a variety of range improvements and livestock control measures. These include structures such as fences, water developments, corrals, gates and cattleguards. Most of these improvements are typically constructed by the Forest Service and maintained annually to Forest Service standards by the grazing permittee. In most cases, funding from all available sources is insufficient to meet the needs of this program on all these lands.

Forage production appears good on most allotments and livestock numbers are adjusted as necessary to meet the carrying capacity and provide for wildlife needs. Even though the allotments are grazed to maintain the pastoral setting of these lands, impacts on soils and water are occurring. The Moody, Whitting, and Zepp Tannery allotments are currently being grazed with varying degrees of riparian protection or animal access to stream channels.

Although pastureland acreage has been significantly reduced over the last 50 years, pastures still comprise approximately 7 percent of the Southeastern United States (USDA Forest Service 2001). For Southern Appalachian Assessment Area, pastures comprise approximately 17 percent of the area, 99 percent of which is on private land (SAMAB 1996).

### **DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

Grazing is a small program on the GWNF. Grazing would likely continue at current permitted levels on the three current allotments under all alternatives except C. It would continue as long as it is useful in maintaining the desired habitat and not causing damage to other resources. Under Alternative C, grazing under permit would be discontinued. The current grazing allotments are part of the grassland/shrubland ecotype on the GWNF, an important habitat component for many high priority species, especially area sensitive grassland species. If these areas were not grazed, they would continue to be managed as grassland/shrublands, with the possible exception of those allotments located along the South Fork of the Shenandoah River, where bottomland hardwood restoration is a priority goal.

## **C12 – SOCIAL AND ECONOMIC IMPACT ANALYSIS**

An analysis of social values and economic conditions helps evaluate the complex interactions of the surrounding human environment with the biological and physical resources of the Forest. The social and economic influences of people can impact the condition of, and demand for, natural resources. Similarly, almost all National Forest management activities have the potential to directly or indirectly affect the social and economic environment, through people's values, beliefs and attitudes as well as the economic and social structures of communities. This section first characterizes and then evaluates potential impacts related to social factors (demographics, values, resource management concerns and opportunities); economic factors (jobs, income, payments in lieu of taxes, economic diversity and dependency of local communities); and the financial efficiency (present net values) of the agency's resource programs. More details on social and economic conditions can be found in Appendix E of the Analysis of the Management Situation for the GWNF.

### **AFFECTED ENVIRONMENT**

On a regional level, the George Washington National Forest (GWNF) is located at the northern end of the Southern Appalachian Mountains. The Southern Appalachian Mountains range from the Shenandoah Valley and extend southward from the Potomac River to northern Georgia and the northeastern corner of Alabama. The Southern Appalachian Mountains include seven states and 135 counties, covering approximately 37 million acres. On a more local level, the George Washington National Forest occupies approximately 1,065,000 acres, of which about 90% are in Virginia and 10% are in West Virginia. These acres occur in thirteen counties in Virginia and four counties in West Virginia and are in close proximity to Washington, DC, as well as several cities in central Virginia such as Richmond and Charlottesville. The region surrounding the Forest is a mix of ownerships, ranging from the Monongahela National Forest on the west, the Jefferson National Forest on the south, the Shenandoah National Park (USDI National Park Service) on the east, a number of state parks and forests, and an extensive intermingling of private lands. This highlights the unique niche that the GWNF fills in providing biological habitat and resources for ecological and species diversity and in providing social and economic opportunities for a large and growing population base.

For the counties containing GWNF lands, Bath and Alleghany Counties have about 50 percent of their acres comprised of national forest lands. Five additional counties (Amherst, Augusta, Highland, Rockingham, and Shenandoah) have from 20-25% of their acres comprised of national forest lands.

**Table C12.1 George Washington National Forest Boundary Lands**

County, State	County Square Miles	NF Area in Square Miles	GWNF Acres	% NF Area of County Area
Alleghany, VA	455	222	141,873	49%
Amherst, VA	479	90	57,877	19%
Augusta, VA	1,006	306	196,057	30%
Bath, VA	535	271	173,705	51%
Botetourt, VA	543	20	13,047	4%
Frederick, VA	425	8	4,885	2%
Highland, VA	416	91	58,267	22%
Nelson, VA	474	31	19,825	7%
Page, VA	314	42	27,082	13%
Rockbridge, VA	610	71	45,542	12%
Rockingham, VA	871	218	139,783	25%
Shenandoah, VA	513	119	76,057	23%
Warren, VA	216	10	6,290	5%
Hampshire, WV	642	5	3,518	1%
Hardy, WV	584	81	52,047	14%
Monroe, WV	474	1	428	<1%
Pendleton, WV	698	77	49,106	11%
VIRGINIA	287,148	1,500	960,290	1%
WEST VIRGINIA	162,684	164	105,099	0%
TOTAL	449,832	1,665	1,065,389	0%

Source: USDA Forest Service "Land Areas of the NF System", 2007, <http://www.fs.fed.us/land/staff/lar/2007/lar07index.html>

## **SOCIAL ENVIRONMENT**

Information about population characteristics helps describe the general nature of a community or area. An analysis of population trends can help determine if changes are occurring for specific groups defined by age, gender, education level, or ethnicity, thereby influencing the nature of social and economic relationships in the community.

### **POPULATION**

Virginia's population increased from 5.35 million in the 1980 Census to 7.08 million in the 2000 Census. The increase between 1980 and 1990 was a 15.7 percent and 14.4 percent between 1990 and 2000. Meanwhile West Virginia experienced a decrease from 1.95 million in 1980 to 1.81 million in 2000. Population decreased from 1980 to 1990 by 8.0 percent and increased from 1990 to 2000 by 0.8 percent. Much of this growth in Virginia was spurred by growth in the major cities in the state, especially in the northern Virginia-Washington, DC area. West Virginia, meanwhile, does not have many large cities to spur growth and the economy is relatively less diversified than that of Virginia.

The report “Virginia Demographic Profile 2009” from the Council on Virginia’s Future ([covf@virginia.edu](mailto:covf@virginia.edu)) estimated that Virginia’s population in 2008 was 7.77 million, which is a 10% increase from the 2000 Census, maintaining Virginia’s position as the 12<sup>th</sup> most populous state in the country. The Northern (Alexandria/Fairfax area), Central (Richmond/Charlottesville area) and Valley (Harrisonburg area) regions had the highest percentage gains in population in Virginia. The report identified three specific trends as shaping the future for Virginia:

- 1) **Selective decentralization will increase.** People are moving away from central cities and counties to surrounding suburbs and exurbs. Rural counties adjacent to metro areas are likely to grow in population as space and affordable housing become harder to obtain. Counties with significant quality-of-life advantages, those with access to urban amenities and those with a diversified, service-based economy are prone to rapid growth.
- 2) **The population will continue to age.** By 2030, nearly one in every five Virginians is projected to be 65 years or older.
- 3) **Racial and ethnic diversity will increase.** While non-Hispanic Whites will continue to be the majority of Virginia’s population in the next few decades, the proportion of Asians and Hispanics will grow.

The Council on Virginia’s Future report also estimated that Virginia’s 11 metropolitan areas contain about 86% of the state’s population. Almost 69% of all Virginians live in just three metropolitan areas: Northern Virginia, Richmond, and Virginia Beach, all of which are within a few hours’ drive from the George Washington National Forest.

Within the counties having GWNF lands, Table C12.2 shows the population trends for all GWNF counties combined. The trends show a growth of more than half the rate of Virginia between 1980 and 1990 (8.9 percent versus 15.7 percent) and slightly more than Virginia’s growth rate between 1990 and 2000 (15.7 percent versus 14.4 percent).

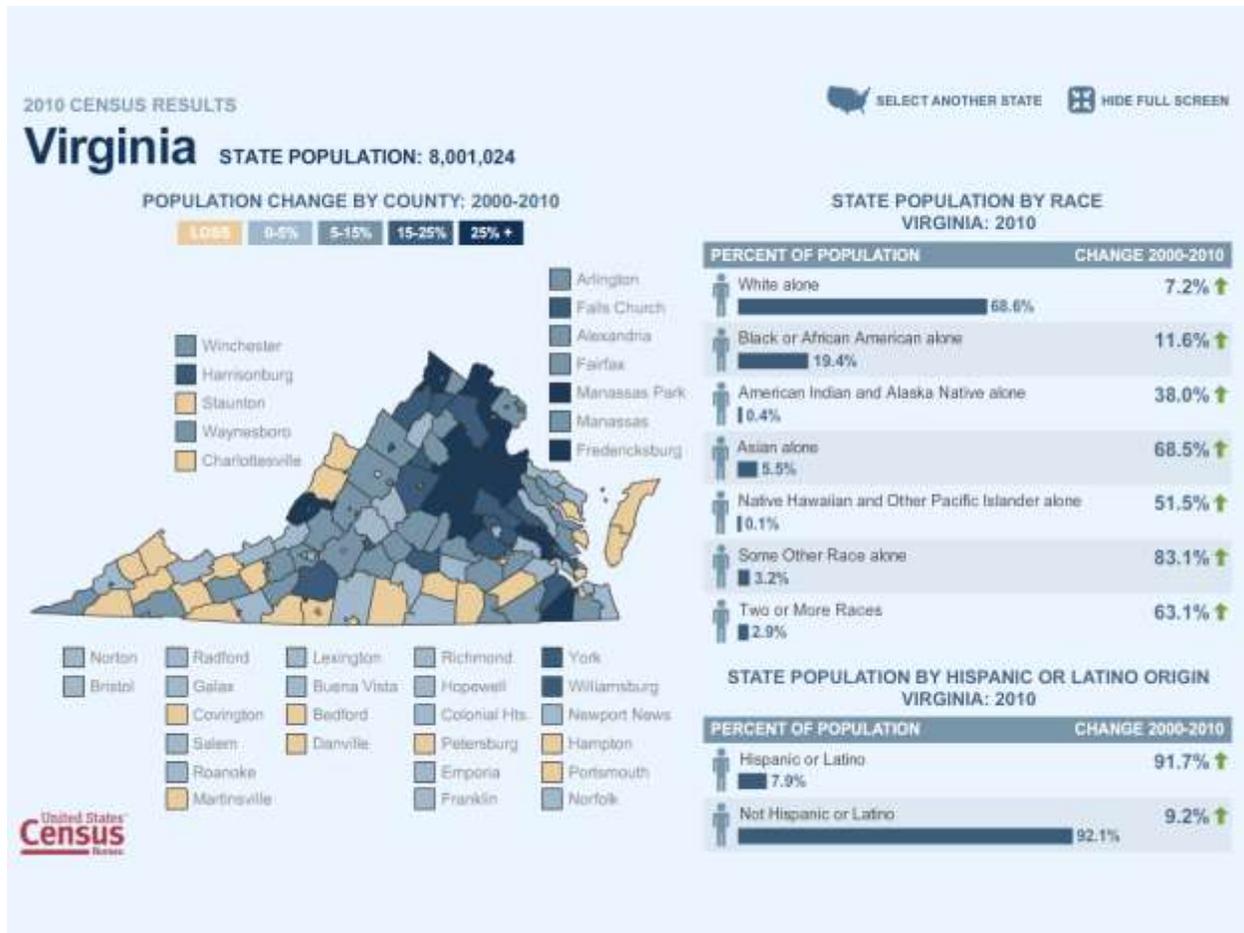
**Table C12.2 Population Change for Counties with GWNF Ownership**

1980	1990	2000	% Change 1980-1990	% Change 1990-2000
441,922	481,105	556,747	8.9%	15.7%

Source: U.S. Census Bureau from USDA NRIS HD Model

Population outside of counties with GWNF ownership is also important to consider from a recreation demand perspective. Research on recreation use of National Forests typically suggests that most national forest visits originate from within a 75-mile (1 ½ hour driving time) radius from the national forest border. Using this definition, the GWNF market area for recreation entails portions of Virginia, West Virginia, Pennsylvania, Maryland and the District of Columbia. The population living within the market area is about 9.2 million (Source: U. S. Census Bureau. July 1, 2004 estimate). The most populated counties in the market area are Fairfax, Virginia, and Montgomery and Prince George’s Counties, Maryland, followed by Washington, DC. Other large municipalities within the market area include Alexandria, Arlington, Blacksburg, Charlottesville, Fredericksburg, Harrisonburg, Lynchburg, Manassas, Staunton, Vienna, and Winchester, Virginia; Beckley, Bluefield, Elkins, Martinsburg and Princeton, West Virginia; and Frederick and Silver Spring, Maryland.

Although the results of the 2010 U.S. Census survey are not fully released yet, the following map shows county-level population changes in Virginia from 2000 to 2010 and illustrates the amount and location of growth in Virginia (West Virginia data is not available for the Draft EIS, but should be available for the Final EIS).



Source: U.S. Census Bureau website: <http://2010.census.gov/2010census/data/>, accessed March 8, 2011

## MINORITIES

Table C12.3 shows the population of the forest and Virginia and West Virginia by race for 1980, 1990, and 2000. In 2000, 92% of the population in the counties that contain NF land was White, as compared to 72% and 95% for Virginia and West Virginia, respectively. The trend for Hispanics in GWNF counties has gone from less than 1% to over 2%. The largest increases occurred in Rockingham and Shenandoah Counties. In these two counties the share of Hispanics increased from less than 1% in 1980 to over 5% in Rockingham and over 3% in Shenandoah by 2000. Most of the GWNF counties' share of the Black population has been less than one percent. Amherst and Nelson Counties had the highest share in 2000 with approximately 20% and 15%, respectively. According to the University of Virginia's Weldon Cooper Center for Public Service, in 2007 70.4% of Virginians were White, 19.6% were Black or African American, 4.8% were Asian and 6.5% were Hispanic.

**Table C12.3 Racial Composition of GWNF in Virginia and West Virginia\***

	Race	1980	1990	2000
<b>GWNF Counties</b>	Hispanic	0.6%	0.7%	2.3%
	Black	5.7%	5.5%	5.4%
	White	93.9%	93.7%	91.8%
<b>Virginia</b>	Hispanic	1.5%	2.5%	4.7%
	Black	18.9%	18.8%	19.6%
	White	79.1%	77.5%	72.3%
<b>West Virginia</b>	Hispanic	0.7%	0.4%	0.7%
	Black	3.3%	3.1%	3.2%
	White	96.2%	96.2%	95.0%

Source: U.S. Census Bureau from USDA NRIS HD Model

\*Percentages do not add to 100% because other ethnic categories are not included

## AGE

Table C12.4 shows the share of population as represented by youth (age 17 or less) and the elderly (age 62 or greater). The percentage of youth has fallen from 1980 to 2000. During 2000, the GWNF counties had a youth population share that was approximately 2% less than Virginia and about 0.5% more than West Virginia. The aging population, on the other hand, has grown in all three areas over the three census periods. During 2000, the GWNF counties had an elderly population share that was 3.4% more than Virginia and 1.3% less than West Virginia. According to the University of Virginia’s Weldon Cooper Center for Public Service, Virginia’s population of age 65 and older is expected to grow from 11.2% in 2000 to about 18.8% in 2030.

**Table C12.4 Population Age of GWNF Counties, Virginia, West Virginia**

	1980	1990	2000
<b>GWNF Counties</b>			
Age 17 or less	26.7%	23.1%	22.8%
Age 62 or greater	14.8%	16.5%	16.8%
<b>Virginia</b>			
Age 17 or less	27.6%	24.3%	24.6%
Age 62 or greater	11.8%	13.1%	13.4%
<b>West Virginia</b>			
Age 17 or less	28.7%	24.8%	22.3%
Age 62 or greater	15.0%	18.1%	18.1%

Source: U.S. Census Bureau from USDA NRIS HD Model

## POPULATION DENSITY

A rural area is defined as towns and areas with less than 2,500 persons. The rural nature of the area is contrasted with the states in the table below. The GWNF counties are becoming less rural over time. In 1980, 70% of these areas were considered rural. The land area has changed to about 58% rural in 2000. Compared with Virginia and West Virginia, the decrease in rural area was from 34 to 27% in Virginia and 64 to 54% of

land area in West Virginia from 1980 to 2000. Thus, urbanization has occurred at a faster pace on the forest than overall within either state.

**Table C12.5 Percentage of Population in Rural Areas**

	1980	1990	2000
<b>GWNF Counties</b>	70.3%	66.4%	57.6%
<b>Virginia</b>	34.0%	30.6%	27.0%
<b>West Virginia</b>	63.8%	63.9%	53.9%

Source: U.S. Census Bureau from USDA NRIS HD Model

Stein and others (2007) projected future housing density increases on private rural lands at three distances (0.5, 3, and 10 miles) from the external boundaries of all national forests and grasslands in a report entitled “National Forests on the Edge, Development Pressures on America’s National Forests and Grasslands.” This study ranked National Forest System lands according to the land area of adjacent private lands projected to experience increased housing density. Stein estimated that between 2000 and 2030, a substantial increase in housing density will occur on more than 21.7 million acres of rural private land (8 percent of all private land) located within 10 miles of national forests and grasslands across the conterminous United States. In the East, almost all national forests are projected to experience moderate or high increases in residential development. The GWNF was found to have the most acreage of increases in housing density of all national forests and grasslands, with projected changes on more than 1.4 million adjacent private rural acres by the year 2030. The authors identified several significant implications for the management and conservation of national forest resources, ecological services, and social and cultural amenities from this study, including: impacts on native fish and wildlife habitats and populations; impacts from invasive species, impacts on recreation access, management and quality of recreation experiences; impacts on fire management; impacts on water quality and hydrology; and impacts on law enforcement.

## **LIFESTYLES, ATTITUDES AND VALUES**

Since the beginning of the George Washington National Forest’s planning process, numerous public meetings were held to allow people an opportunity to express their wants, needs and demands for access to and use of national forest resources. Many of these divergent views were used to develop the range of alternatives considered in this analysis. Public meetings, however, typically represent only a portion of the public’s interests and do not always represent those who do not or cannot attend meetings.

In Virginia and West Virginia, each county periodically produces a County Comprehensive Plan that is typically a joint effort between the local planning commission, the county board of supervisors and the citizens of the county. The County Comprehensive Plans consider existing trends of development and probable future needs and identifies goals and objectives for the county. By reviewing these plans, the Forest can determine what opportunities it has to contribute to a county’s goals and objectives. All of these plans had a recurring theme throughout their plans that identified the importance of the natural environment in determining a county’s quality of life. The following goals and objectives were found in most of the plans:

- Preserve the relationship of the county to the surrounding forested and agricultural environment
- Increase economic development but maintain the rural and cultural character of the county
- Develop and promote tourism as it relates to the scenic and recreational resources of public lands in the county
- Wisely use natural resources and protect ground and surface waters, soils, scenery and air quality
- Several plans also identified the need to protect ridgelines and scenic viewsheds from development

## **ECONOMIC ENVIRONMENT**

The Virginia Outdoors Plan (2007) characterizes the economy surrounding the GWNF as being ‘driven by a diverse blend of industry, agriculture and tourism. Since the area was first settled, agriculture has been a mainstay of the Shenandoah Valley. During the Civil War, the valley was described as the breadbasket of the Confederacy, with more than 300 armed conflicts waged in the region. With the planning and construction of Interstates 66 and 81 beginning in the 1950s, manufacturing in the valley became more diverse. Second home developments and an extended tourist season led to increased use of the Shenandoah Valley, generating economic benefits and attracting new local residents based on a rural quality of life with access to the Northern Virginia-Washington, D.C. metropolitan area. Many of the region’s residents are now employed outside their home jurisdiction in the northern Virginia area. Increasingly, the Northern Shenandoah Valley’s mountain and valley open spaces are giving way to development that is cluttering historic landscapes and causing a loss of the distinctive qualities of the valley. Agriculture, forestry and tourism are the primary industries for the Central Shenandoah Valley. Some of the highest proceeds in the state from agriculture and forestry are received in this region.’

When giving an overview of the economic characteristics of an area, indicators such as per capita income, unemployment rates, poverty rates, transfer payments, and household composition are used to measure economic progress, viability and stability. Many of these indicators are displayed, by county and over time, in Appendix E of the Analysis of the Management Situation for the GWNF.

### **PER CAPITA INCOME**

Per capita income is a relative measure of the wealth of an area. It constitutes the personal income from all sources divided by the population of that area. According to the 2010 Statistical Abstract (US Census Bureau), the per capita income for Virginia is \$44,224 (7<sup>th</sup> in nation) and for West Virginia it is \$31,641 (49<sup>th</sup> in nation).

### **UNEMPLOYMENT AND POVERTY**

Other indicators of relative economic prosperity are the percent of the workforce out of work and percent in poverty. Unemployment rates vary dramatically over time, depending in large part on the national economy. Some areas, however, have protracted unemployment problems because of educational attainment and lack of skills. According to the 2010 Statistical Abstract (US Census Bureau), the 2008 unemployment rate for Virginia was 4.0% (42<sup>th</sup> in nation) and 4.3% (39<sup>th</sup> in nation) in West Virginia. In 2008, Virginia had 10.2% (39<sup>th</sup> in nation) of its population under the poverty rate and West Virginia had 17.0% (6<sup>th</sup> in nation).

### **HEADS OF HOUSEHOLDS**

Another factor indicating relative poverty and social disunity for an area is the percent of households headed by females. The greater the percentage is, the more likely that these households may be in a poverty status. A lower female head of household percent may indicate greater social cohesion from the extended family. For the GWNF county area, households headed by females with children increased from about 4.2% in 1990 to about 6% in 2000, which is similar to that in West Virginia. However, Virginia’s rate of female house-holders increased from nearly 6% to over 8%.

### **ECONOMIC DIVERSITY**

Analyzing the major economic sectors of an economy allows insight into the degree of economic diversity and what industries may be driving its growth. Tables C12.6 and C12.7 are derived from the IMPLAN model, which is an input-output economic modeling program that uses a database of economic statistics from major government sources such as the Regional Economic Information System (REIS), Bureau of Economic Analysis, Bureau of Labor Statistics and the US Census Bureau. The Manufacturing sector is the most significant part of the GWNF county area economy, followed by the Wholesale and Retail Trade sector and then the Services sector. Recreation associated with wildland use is hard to estimate because it is not a single sector of an economy but comprises several of the services and retail industries. Other than the slight decrease in importance of manufacturing, the composition of other sectors of the area economy has not changed greatly from 1990. Services increased from 20.7% to 24.2% in 2000 as measured by employment change, or a 3.6%

annual increase. Other sector share changes include Wholesale and Retail Sales' employment change of 2.6% per year (changing from a 19.5% to 20.5% share), and Government whose share decreased slightly from 14.0% to 12.9% over the decade.

**Table C12.6 Industrial and Service Sectors Contributions to Employment and Income within the GWNF County Area**

	1990 Employment % of Total Economy	2000 Employment % of Total Economy	% Average Annual Change 1990-2000	1990 Labor Income % of Total Economy	2000 Labor Income % of Total Economy	% Real Average Annual Change 1990-2000
<b>Total Manufactur ing</b>	20.3	19.4	1.6	29.9	27.1	2.3
<b>Wood Products</b>	1.5	1.5	2.4	1.7	1.8	3.6
<b>Wood Furniture &amp; Fixtures</b>	0.6	0.3	-4.3	0.7	0.4	-2.2
<b>Paper &amp; Pulp Products</b>	0.9	0.9	1.7	2.1	1.7	1.5
<b>Wild land Recreation</b>	NA	NA	NA	4.2	2.7	3.9
<b>Total Economy*</b>	264,778**	323,524**	2.0	\$6,626.8**	\$9,191.0**	3.9

Source: IMPLAN 1990 and 2000 Data

\*Real rates of change were determined by inflating 1990 & 2000 data to 2004 with the Gross National Product Price Index Deflator

\*\*Represents dollar totals for category

NA = Not Available

**Table C12.7 Aggregated Major Industrial Sectors for the GWNF Counties Local Economy – 1990 & 2000 Data**

Copyright MIG 2003 Industry	Total Value Added* 1990	Percentage of Total 1990	Total Value Added* 2000	Percentage of Total 2000	Percent Annual Change 1990-2000
<b>Other Agriculture</b>	\$581.6	6.3%	\$486.9	3.2%	-1.8%
<b>Range</b>	\$47.5	0.5%	\$65.8	0.4%	3.3%
<b>Total Agriculture</b>	\$629.1	6.8%	\$552.7	3.6%	-1.3%
<b>Minerals</b>	\$94.7	1.0%	\$59.6	0.4%	-4.5%
<b>Construction</b>	\$462.6	5.0%	\$940.5	6.2%	7.4%
<b>Other Manufacturing</b>	\$2,405.5	26.2%	\$2,824.1	18.6%	1.6%
<b>Wood Products</b>	\$71.3	0.8%	\$120.7	0.8%	5.4%
<b>Pulp &amp; Paper</b>	44.670	0.5%	\$79.3	0.5%	N/M
<b>Furniture &amp; Fixtures</b>	\$30.4	0.3%	\$9.9	0.1%	0.0%
<b>Total Wood Based Industries</b>	\$146.4	1.6%	\$209.9	1.4%	3.7%

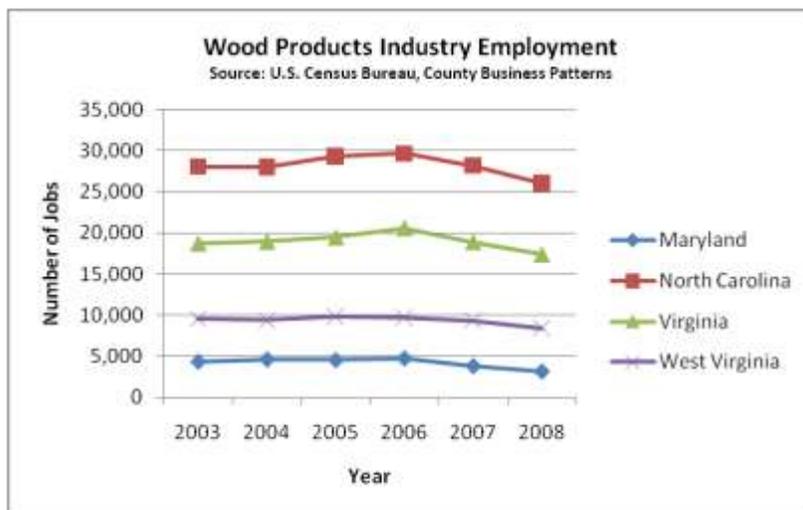
Copyright MIG 2003 Industry	Total Value Added* 1990	Percentage of Total 1990	Total Value Added* 2000	Percentage of Total 2000	Percent Annual Change 1990-2000
<b>Total Manufacturing</b>	\$2,551.9	27.8%	\$3,034.0	20.0%	1.7%
Transportation & Public Utilities	\$1,172.2	12.8%	\$1,524.0	10.0%	2.7%
Wholesale & Retail Trade	\$1,319.9	14.4%	\$3,390.4	22.3%	9.9%
Finance, Insurance, Real Estate	\$1,181.6	12.9%	\$2,150.7	14.1%	6.2%
Services	\$1,210.8	13.2%	\$2,097.6	13.8%	5.6%
Government	\$545.5	5.9%	\$1,443.9	9.5%	10.2%
Other Misc.	\$18.2	0.2%	\$9.8	0.1%	N/M
<b>Totals</b>	<b>\$9,186.5</b>	<b>100.0%</b>	<b>\$15,203.2</b>	<b>100.0%</b>	<b>5.2%</b>

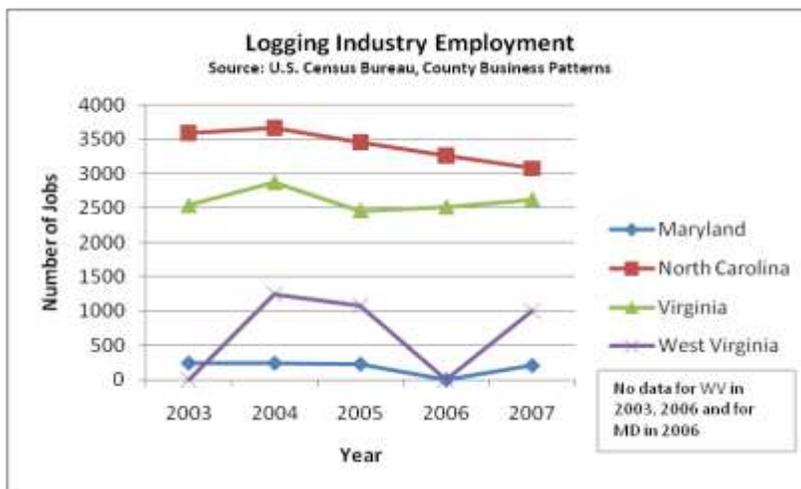
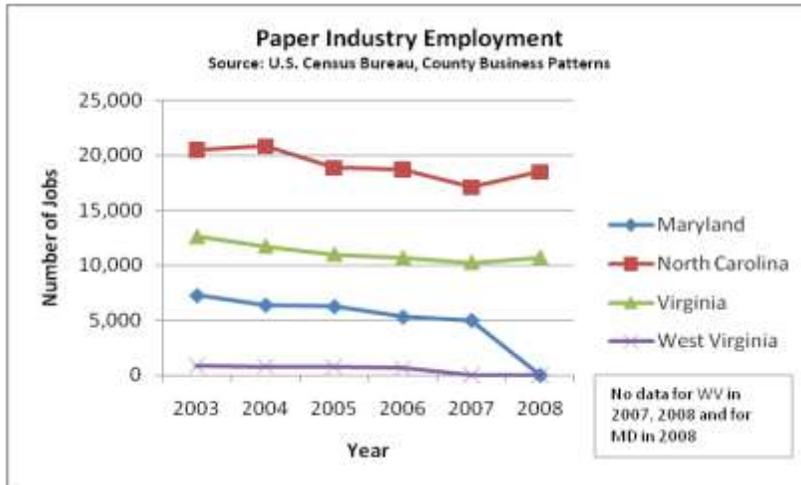
Of the industries and services that use forest or wildland-related resources, only the wood products sector and the recreation and tourism activities can be examined in more detail. The current range program and the oil and gas leasing program on the GWNF are too minimal to have any impact on the local economy.

### WOOD PRODUCTS

Timber harvest levels on NFS lands declined over the past 15 years, but were relatively stable between 2000 and 2003 and increased slightly between 2003 and 2005. See Timber Management Affected Environment for specific analysis of timber harvest trends.

The following charts show the changes in employment for the timber products industry on a regional level, from 2003 to 2008.





## RECREATION AND TOURISM

Recreation and tourism economic contributions related to National Forest management are difficult to identify within the IMPLAN Retail and Service sectors because the sectors cover such a diversity of recreation and tourism factors. However, there are a few other sources of recreation data that can provide some insight.

Stynes and White (2005) analyzed national forest visitor spending profiles developed from the USDA Forest Service National Visitor Use Monitoring (NVUM) project surveys over a four year period. Table C12.8 presents the national spending averages across all national forest visits based on the spending reports of 19,113 visitors sampled on 119 national forests between January, 2000 and September, 2003. Table C12.9 shows the national spending averages by several primary activities. Although Stynes and White stated that NVUM economic survey sample sizes are too small at the individual forest level (there were 158 economic survey samples for the GWNF and JNF) to reliably capture spending for individual forests, the authors did estimate that the average spending for day trips on the GWNF and JNF combined as \$55 (2003 dollars) and for overnight trips as \$75 per party per trip.

**Table C12.8 National Forest Visitor Spending Profiles by Trip Type and Spending Category, \$ per party per trip**

Spending Category	Non-Local Visitor			Local Visitor		
	Day Trip	Overnight Trip on NF	Overnight Trip off NF	Day Trip	Overnight Trip on NF	Overnight Trip off NF
Lodging	\$ 0	\$ 25.3	\$ 64.9	\$ 0	\$ 16.2	\$ 17.6
Restaurant	13.6	25.3	58.9	6.1	13.6	21.5
Groceries	7.6	36.5	31.3	5.4	41.1	23.5
Gas and Oil	16	37.3	35.8	11.7	27.7	25.9
Other Transportation	1	3	7.5	0.2	0.2	1
Activities	3.9	8	15.5	1.8	3.8	6.8
Admissions/Fees	5.2	10.2	9	3.42	10.5	8.4
Souvenirs/Other	4.3	15.6	22.4	4.2	11.2	11.4
<b>Total</b>	<b>51.6</b>	<b>161.2</b>	<b>245.3</b>	<b>32.8</b>	<b>124.3</b>	<b>116.1</b>

**Table C12.9 Spending Averages by Primary Activities and Trip Type, \$ per party per trip**

Primary Activity	Non-Local Visitor			Local Visitor		
	Day Trip	Overnight Trip on NF	Overnight Trip off NF	Day Trip	Overnight Trip on NF	Overnight Trip off NF
Biking			343	20		
Developed Camping		140	146		128	127
Driving	40		166	24		
Fishing	42	205	238	33	125	148
General Relaxing	46	158	245	33	125	148
Hiking	37	147	276	20	79	83
Hunting	44	201	250	51	174	130
Multiple Activities			173	36		
OHV Use	62	147	182	38		
Picnic	59			38		
Primitive Camping/Backpacking		105	104			
Viewing	52	213	225	27		134

Another way to look at economic diversity is the Shannon Weaver Diversity Index (USDA 2005d). A large number of economic sectors within an economy allows for more resiliency to downturns in any one sector. The Shannon Weaver Diversity Index ranges between 0 (no diversity) and 1.0 (perfect diversity). These two extremes would occur when there is only one industry in the economy (no diversity) and when all industries contribute equally to the region's employment (perfect diversity). Table C12.10 contrasts the change in diversity from 1990 to 2000 at the four-digit Standard Industrial Code (SIC), or at the individual industry level.

**Table C12.10 Shannon-Weaver Entropy Indices**

	1990 Index	2000 Index	Percent Change
<b>GWNF Counties</b>	.60128	.60883	1.17
<b>Virginia</b>	.70796	.70342	-0.64
<b>West Virginia</b>	.69591	.69607	0.02

Source: USDA Forest Service, Information Monitoring Institute

The indices measuring diversity indicate significantly more diversity in both states than in the GWNF county area during the 1990-decade. In 1990 the George Washington area had an index of .60128 versus Virginia's .70796 and West Va.'s .69591. Because the GWNF county area comprises only 17 counties, a less diverse condition can be expected versus a larger area, such as Virginia and West Virginia, which would have more varied characteristics.

### **ECONOMIC TRADE**

A principle way an economy grows is by export of goods and services. Most typically, manufacturing activity is thought of as providing most of this export related activity. However, services and retail trade can be considered "export" industries if significant visitors come in from outside in travel related activities to bring in new dollars to an economy. A manufacturing industry can be a net importer if it imports more of a commodity or service than it exports.

Table C12.11 shows that the George Washington's local economy increased its net importing characteristic in 2000 by almost double from 1990. The 1990 decade saw the total economy's reliance on imports increase tremendously, thereby becoming more reliant on outside areas for its goods and services production. Such a characteristic causes dollars to leak out of the economy faster (and hence reduce having a greater multiplier capability) than if the economy was a net exporting one.

Meanwhile, all three segments of the Wood Products manufacturing showed net exporting increases. Total manufacturing also gained a significant share in net exporting, by almost doubling its amount in 1990. Other than Construction, Manufacturing, and Minerals, all other major sectors showed an increase of net imports from 1990.

**Table C12.11 Exporting of Selected Industries in millions of 2000 dollars**

	1990 Net Exports*	2000 Net Exports
Wood Furniture & Fixtures	\$2.5	\$12.5
Paper & Pulp Products	\$459.8	\$491.4
Wood Products	\$0.0	\$160.5
Total Manufacturing	\$965.4	\$1,817.1
Total of All Sectors	-\$1,463.3	-\$2,860.6

Source: IMPLAN 1990 and 2000 Data

\*1990 Dollars Converted to 2000 Dollars via GDP Price Deflator; in millions of dollars

In summary, the George Washington area economy became more reliant on imports during the 1990's. More dollars, therefore, flowed out of the economy than flowed in, decreasing the ability of enhancement of further economic activity through the multiplier effect. However, manufacturing including wood based industries were a net exporter of manufacturing goods, providing "new" monies for the local economy.

## FEDERAL PAYMENTS

Counties receive two types of payments when federal lands are located within their boundaries. The first of these is Payment in Lieu of Taxes (PILT). These payments are based on the acreage of National Forest System lands within each county. The second payment is based on revenue-producing activities (such as timber harvest, mineral extraction, special use permits) on NFS lands to compensate for loss of property tax revenue. The Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393), was enacted to provide five years of transitional assistance to rural counties affected by the decline in revenue from timber harvests on federal lands. The last payment authorized under P.L. 106-393 was for FY 2006; however, the Act was amended and reauthorized in 2008 and was set to expire in 2011. The Act gives Counties the option of receiving payments based on either: the Twenty-Five Percent Fund (25% of receipts from NFS revenue-producing activities generated within that County); or a funding amount that is based on several factors, including acreage of Federal land, previous payments, and per capita personal income. These funds can be used for improvements to public schools, roads, stewardship projects, watershed and ecosystem improvements, community protection and strengthening of local economies. Tables C12.12 and C12.13 highlight the payments made under PILT and the Secure Rural Schools and Community Self-Determination Act for the last three years.

**Table C12.12 Payment in Lieu of Taxes (PILT)**

County, State	2007	2008	2009
Alleghany, VA	\$150,295	\$240,286	\$243,345
Amherst, VA	\$47,645	\$76,239	\$76,962
Augusta, VA	\$223,709	\$357,462	\$362,266
Bath, VA	\$184,200	\$290,482	\$278,208
Botetourt, VA*	\$88,667	\$144,705	\$149,664
Frederick, VA	\$5,173	\$8,267	\$8,369
Highland, VA	\$56,551	\$90,471	\$91,526
Nelson, VA	\$28,120	\$44,864	\$45,536
Page, VA	\$84,901	\$133,786	\$136,452
Rockbridge, VA*	\$71,583	\$115,597	\$118,056
Rockingham, VA	\$200,716	\$320,280	\$325,269
Shenandoah, VA	\$79,820	\$127,621	\$129,232
Warren, VA	\$29,109	\$46,973	\$46,205
Hampshire, WV	\$5,076	\$8,056	\$8,247
Hardy, WV	\$75,002	\$119,032	\$121,849
Monroe, WV*	\$29,198	\$46,337	\$47,433
Pendleton, WV**	\$123,500	\$196,519	\$205,174
Virginia	\$1,250,489	\$1,997,033	\$2,011,090
West Virginia	\$232,776	\$369,944	\$382,703
<b>TOTAL</b>	<b>\$1,483,265</b>	<b>\$2,366,977</b>	<b>\$2,393,793</b>

\* - includes Jefferson NF

\*\* - includes Monongahela NF

**Table C12.13 Payments to States under the Secure Rural Schools and Community Self-Determination Act**

County, State	FY 2007	FY 2008	FY 2009
Alleghany, VA	\$83,974	\$221,404	\$234,008
Amherst, VA	\$34,000	\$93,181	\$98,128
Augusta, VA	\$115,383	\$242,363	\$257,013
Bath, VA	\$103,078	\$160,507	\$182,166
Botetourt, VA*	\$44,901	\$83,906	\$70,335
Frederick, VA	\$2,914	\$5,843	\$5,262
Highland, VA	\$34,323	\$93,504	\$87,986
Nelson, VA	\$11,117	\$5,760	N/A
Page, VA	\$16,082	\$60,635	\$54,515
Rockbridge, VA*	\$38,857	\$90,162	\$96,184
Rockingham, VA	\$82,679	\$40,614	N/A
Shenandoah, VA	\$45,009	\$22,089	N/A
Warren, VA	N/A	\$1,827	N/A
Hampshire, WV	\$2,159	\$9,219	\$8,716
Hardy, WV	\$34,431	\$104,740	\$117,169
Monroe, WV*	\$12,089	\$50,763	\$49,673
Pendleton, WV**	\$210,798	\$321,007	\$289,044
Virginia	\$612,317	\$1,121,795	N/A
West Virginia	\$259,477	\$485,729	N/A
TOTAL	\$871,794	\$1,607,524	N/A

\* - includes Jefferson NF

\*\* - includes Monongahela NF

## DIRECT, INDIRECT AND CUMULATIVE SOCIAL ENVIRONMENT EFFECTS

Perhaps the most important effect related to the social environment is the continuing increase in population in many Virginia counties within close proximity of the George Washington National Forest. Most of the areas with the greatest population growth (over 25%) either contain NFS lands or are within a short travel time from the Forest. Many people move to these areas to be within commuting distance of employment opportunities in urban/metro areas such as Northern Virginia, Richmond and the coastal region of Virginia, while still living in a more rural setting. As the more rural communities become more populated, social expectations of residents related to Forest management can change. Long-term residents of rural communities generally value the natural scenery and quality of life more highly than the conveniences that increased development in services can bring.

The effects of this population growth are likely most felt in the demand for, and use of, a variety of recreation opportunities on the Forest. In addition to population growth, another social factor that affects the recreation experience is the increasing average age of the population. Therefore the need for some recreationists to have remote settings to escape an increasing population should be balanced with the need for more accessible settings for older recreationists. The alternatives developed for the EIS address the different types of recreation in various ways and those effects are discussed in more detail within the Recreation section of the EIS. In general, Alternative C, and to a lesser extent Alternative F, is more favorable for those recreationists

seeking a more remote experience, because of the decreased amount of roads, increase in recommended wilderness study areas and decreased amount of timber harvest. However, motorized access to more areas of the national forest increases the satisfaction of visitors who hunt, fish, photograph scenery, birdwatch, pick berries, disperse camp or drive for pleasure. The roads themselves are often enjoyed by people with limited mobility and/or limited time.

Developed recreation does not vary significantly by alternative. In all alternatives there will be an emphasis to upgrade the accessibility of existing and expanded sites, which are considered high priority improvements. None of the alternatives will meet the local market demand for developed recreation. The effects of unmet demand will be greatest with Alternatives C and E, followed closely by Alternatives A, B, D and G. Alternative F meets more of the developed recreation demand than the others, but this will diminish with time as the population increases while the amount of public lands offering these opportunities remain fairly static. Some sites will become increasingly overused and crowded. Initially this may occur only at peak times such as holidays and weekends; but over time this could extend to much of the primary recreation season from Memorial Day to Labor Day. This will result in lower satisfaction levels and some visitors will have unmet expectations. Some will seek the supply of developed recreation on state, county and private lands.

The biggest effect for non-motorized recreation is with the miles of trail currently open to mountain bicycles that would be closed to that use if Recommended Wilderness Study areas are designated by Congress as Wilderness. Alternatives C and F allocate the most acres to Recommended Wilderness Study. This would also have a lesser effect on horseback use on trails in these areas. Although horses are allowed in Wilderness, it can become more difficult to maintain those trails for horseback use without the use of mechanized equipment. An additional effect would be on the loss of opportunities for long-distance bicycling and equestrian events through Wilderness.

Other effects from an increasing population include: impacts on native fish and wildlife habitats and populations; greater opportunities for the spread of non-native invasive species, impacts on recreation access, management and quality of recreation experiences; impacts on fire management and suppression; impacts on water quality and hydrology; increases in special use permit requests, and impacts on law enforcement.

## **ENVIRONMENTAL JUSTICE AND CIVIL RIGHTS**

A specific consideration of equity and fairness in resource decision-making is encompassed in the issues of environmental justice and civil rights. Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Principles for considering environmental justice are outlined in Environmental Justice Guidance under the National Environmental Policy Act (Council on Environmental Quality (CEQ) 1997). The Executive Order makes clear that its provisions also apply fully to programs involving Native Americans. The Executive Order also contains emphasis on the potential effects of agency actions on subsistence consumption of fish, vegetation or wildlife. The Executive Order also requires agencies to work to ensure effective public participation and access to information.

To fulfill these principles, environmental justice was considered throughout the land management planning process in the following phases:

1. Scoping and Public Participation – Efforts were made by the forest to reach as many people in the area as possible, through mailings, newspaper articles, news releases, radio interviews and contacts with federal, state and local governments, churches, libraries, non-profit organizations, civic associations, industries, academia, and other types of organizations. Participation was sought in various locations and formats throughout the planning area.
2. Determining the Affected Environment – The Social and Economic Environment section of Chapter 3 of the EIS presented information related to population growth, minority populations, population density, income, unemployment and poverty, households, and economic diversity in the area directly affected by

George Washington National Forest management and compared this information within a more regional context when appropriate. There were no segments of the population identified that depend on subsistence consumption of fish, wildlife or vegetation within the planning area. No areas were identified that had significant minority populations, high poverty and unemployment rates, negative population growth, or depressed housing values.

**DIRECT, INDIRECT AND CUMULATIVE ECONOMIC ENVIRONMENT EFFECTS**

The management of the George Washington National Forest has the potential to affect jobs and income within its area of influence. Employment and income estimates were determined by using the input-output model IMPLAN (Impact for Planning Analysis). Due to substitution effects from competing non-government sources (such as similar volume of timber harvesting which may occur on private lands if national forest timber is not offered to the market), these jobs are characterized as being associated with local economic activity initiated by Forest Service programs and activities, rather than caused by these activities. The database in IMPLAN represents Census 2000 information for 528 economic sectors. On the Forest, effects are based on changes in six major Forest-level outputs: the amount of timber volume and type of product to be harvested, payments to states (counties), Forest Service expenditures, recreation use, and mining leases. For purposes of estimating the socio-economic impact, counties and cities that contain forest acreage were selected as the impact area. The input /output analysis is based on the interdependencies of the production and consumption elements of the economy within the impact area. Industries purchase from primary sources (raw materials) and other industries (manufactured goods) for use in their production process. These outputs are sold either to other industries for use in their production process or to final consumers. The structure of interdependencies between the individual sectors of the economy forms the basis of the input/output model. The flow of industrial inputs can be traced through the input/output accounts of the IMPLAN model to show the linkages in the impact area economy. This allows the determination of estimated economic effects (in terms of employment and income).

**EMPLOYMENT**

Table C12.14 illustrates how the proposed alternatives differ from the current management direction (Alternative A) for potentially affecting jobs in the local economy.

**Table C12.14 Employment by Program by Alternative (Average Annual, Decade 1, jobs contributed)**

Resource	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Recreation	152	154	131	162	145	162	157
Wildlife and Fish	91	92	77	97	86	97	94
Timber	109	130	0	235	73	47	130
Minerals*	339	256	2	256	50	194	50
Payments to States/Counties	57	57	57	57	57	57	57
Forest Service Expenditures	339	348	311	362	340	338	349
Total Forest Service Management	1,087	1,037	578	1,169	752	895	836
Percent Change from Current	0.0%	-4.6%	-46.8%	+7.4%	-30.8%	-17.7%	-23.1%

\* The estimates for the Minerals Program include the effects from horizontal drilling if it is allowed in the alternative.

**Table C12.15 Employment by Major Industry by Alternative (Average Annual, Decade 1, jobs contributed)**

Industry	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Agriculture	68	77	7	125	47	34	77
Mining*	105	80	4	80	19	62	19
Utilities	2	2	1	3	1	2	2
Construction	14	14	11	15	12	13	13
Manufacturing	25	27	7	40	17	17	23
Wholesale Trade	35	32	12	35	18	27	21
Transportation & Warehousing	34	30	9	33	16	24	18
Retail Trade	99	97	58	107	75	88	83
Information	10	9	4	10	6	8	7
Finance & Insurance	23	20	8	22	12	17	13
Real Estate & Rental & Leasing	29	26	9	28	15	21	16
Prof, Scientific, & Tech Services	61	53	16	57	28	44	30
Mngt of Companies	16	12	2	13	4	10	5
Admin, Waste Mngt & Rem Serv	35	31	13	34	19	27	21
Educational Services	10	9	4	10	6	8	7
Health Care & Social Assistance	52	50	21	57	32	41	37
Arts, Entertainment, and Rec	28	28	19	30	23	27	26
Accommodation & Food Services	128	127	92	136	109	125	119
Other Services	35	33	13	39	21	27	24
Government	273	273	266	275	270	272	271
Total Forest Management	1,082	1,030	578	1,151	749	894	830
Percent Change from Current		-4.8%	-46.6%	+6.4%	-30.8%	-17.4%	-23.3%

\* The estimates for the Minerals Program include the effects from horizontal drilling if it is allowed in the alternative.

## LABOR INCOME

Labor income is employee compensation (value of wages and benefits) plus the income to sole proprietorships. Labor income for the first decade for each resource program expenditure is given by alternatives in Table C12.17. Impacts to the local economy sectors are shown in Table C12.16.

**Table C12.16 Labor Income by Program by Alternative (Average Annual, Decade 1, thousand dollars)**

Resource	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Recreation	\$4,666	\$4,737	\$4,030	\$4,994	\$4,469	\$4,984	\$4,835
Wildlife and Fish	\$2,867	\$2,911	\$2,437	\$3,065	\$2,734	\$3,059	\$2,971
Timber	\$3,388	\$4,056	\$0	\$7,440	\$2,283	\$1,458	\$4,056
Minerals	\$18,167	\$13,709	\$79	\$13,709	\$2,644	\$10,394	\$2,645
Payments to States/Counties	\$2,334	\$2,334	\$2,334	\$2,334	\$2,334	\$2,334	\$2,334
Forest Service Expenditures	\$10,582	\$11,555	\$7,558	\$13,046	\$10,723	\$10,473	\$11,580
Total Forest Service Management	\$42,004	\$39,303	\$16,437	\$44,589	\$25,187	\$32,702	\$28,421
Percent Change from Current	0.00%	-6.40%	-60.90%	6.20%	-40.00%	-22.10%	-32.30%

**Table C12.17 Labor Income by Major Industry by Alternative (Average Annual, Decade 1, thousands dollars)**

Industry	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Agriculture	\$1,721	\$1,970	\$101	\$3,261	\$1,170	\$809	\$1,966
Mining	\$7,586	\$5,759	\$160	\$5,769	\$1,224	\$4,406	\$1,235
Utilities	\$253	\$233	\$104	\$260	\$148	\$197	\$164
Construction	\$593	\$577	\$457	\$604	\$501	\$547	\$518
Manufacturing	\$1,446	\$1,499	\$360	\$2,173	\$900	\$950	\$1,258
Wholesale Trade	\$2,060	\$1,845	\$714	\$2,028	\$1,063	\$1,567	\$1,189
Transportation & Warehousing	\$1,471	\$1,271	\$350	\$1,401	\$610	\$1,025	\$687
Retail Trade	\$2,571	\$2,497	\$1,493	\$2,737	\$1,931	\$2,299	\$2,122
Information	\$560	\$514	\$248	\$557	\$336	\$452	\$366
Finance & Insurance	\$1,290	\$1,155	\$455	\$1,257	\$675	\$971	\$740
Real Estate & Rental & Leasing	\$575	\$494	\$144	\$530	\$241	\$404	\$264
Prof, Scientific, & Tech Services	\$3,458	\$2,940	\$796	\$3,105	\$1,376	\$2,406	\$1,481
Mngt of Companies	\$1,161	\$932	\$136	\$972	\$312	\$737	\$336
Admin, Waste Mngt & Rem Serv	\$850	\$766	\$331	\$831	\$466	\$658	\$509
Educational Services	\$276	\$259	\$117	\$291	\$171	\$220	\$192
Health Care & Social Assistance	\$2,500	\$2,351	\$1,012	\$2,650	\$1,537	\$1,969	\$1,726
Arts, Entertainment, and Rec	\$574	\$569	\$419	\$609	\$491	\$567	\$535
Accommodation & Food Services	\$2,725	\$2,712	\$2,034	\$2,899	\$2,369	\$2,718	\$2,579
Other Services	\$1,111	\$1,038	\$431	\$1,178	\$660	\$860	\$747
Government	\$9,021	\$9,647	\$6,577	\$10,737	\$8,873	\$8,873	\$9,531
Total Forest Management	\$41,804	\$39,028	\$16,437	\$43,848	\$25,050	\$32,638	\$28,146
Percent Change from Current	0.00%	-6.60%	-60.70%	+4.90%	-40.10%	-21.90%	-32.70%

## GEORGE WASHINGTON NATIONAL FOREST'S CURRENT ROLE

Finally, Table C12.18 illustrates the percentage contribution of the GWNF's current management program (Alternative A) to the area's economy. The George Washington NF is associated with 0.12% of the total local economy's jobs, and 0.10% of the labor income. Retail Trade, Accommodation and Food Services and Government are the sectors of the economy that show the most benefit from the Forest's activities.

**Table C12.18 Current Role of Forest Service-Related Contributions to the Area Economy**

Industry	Employment (jobs)		Labor Income (Thousands of 2011 dollars)	
	Area Totals	FS-Related	Area Totals	FS-Related
Agriculture	29,015	72	\$275,559	\$1,744
Mining*	7,238	110	\$474,654	\$7,782
Utilities	3,234	3	\$343,678	\$293
Construction	70,928	16	\$2,975,493	\$657
Manufacturing	99,786	33	\$6,083,625	\$1,818
Wholesale Trade	28,430	53	\$1,691,993	\$3,095
Transportation & Warehousing	38,715	43	\$1,736,814	\$1,815
Retail Trade	131,269	167	\$3,587,658	\$4,319
Information	14,914	12	\$893,183	\$684
Finance & Insurance	32,595	26	\$1,904,470	\$1,481
Real Estate & Rental & Leasing	37,331	34	\$587,095	\$648
Prof, Scientific, & Tech Services	48,825	66	\$2,822,183	\$3,709
Mngt of Companies	12,429	17	\$931,526	\$1,270
Admin, Waste Mngt & Rem Serv	50,106	41	\$1,285,395	\$1,006
Educational Services	24,722	11	\$731,435	\$331
Health Care & Social Assistance	122,867	61	\$6,122,913	\$2,933
Arts, Entertainment, and Rec	21,039	53	\$371,489	\$1,132
Accommodation & Food Services	80,486	186	\$1,603,514	\$3,861
Other Services	67,312	42	\$2,076,612	\$1,316
Government	185,407	278	\$11,387,887	\$9,433
Total	1,106,649	1,323	47,887,178	49,329
FS as Percent of Total	---	0.12%	---	0.10%

\* The estimates for the Minerals Program include the effects from horizontal drilling.

## FINANCIAL EFFICIENCY

When discussing the evaluation of Forest Plan alternatives, the regulations state that the evaluation 'shall compare present net value, social and economic impacts, outputs of goods and services, and overall protection and enhancement of environmental resources' [36 CFR 219.12(h)]. Present net value is defined as 'the difference between the disputed value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area' [36 CFR 219.3] and is the primary criteria used to measure the financial efficiency of the different resource management programs. The analyzed benefits include market values, where the Forest Service receives money for timber, range, special uses, etc, and non-market values. Non-market values can be assigned for activities such as wildlife viewing and recreation using values from Resource Pricing and Valuation Procedures for the 1990 Resource Planning Act (RPA) program.

There are many values associated with National Forests that cannot be expressed in monetary terms. Many values are highly personal and subjective in nature. These, however, may be the greatest value of National

Forests to the nation. The regulations state that plans ‘shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long term net public benefits in an environmentally sound manner’ [36 CFR 219.1]. The NFMA regulations define net public benefits as: ‘An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index’ [36 CFR 219.3]. Because not all values are expressed in monetary terms and therefore not included in the financial efficiency analysis does not mean that they have been excluded from the determination of ‘net public benefits.’ For those resources that can be reasonably valued via market data (e.g. timber, minerals and range) and for those non-market resources that have Forest Service estimated values from research (recreation), we have presented values in the present net value calculations. For resources that have no values estimated by generally accepted methods, we will discuss them in a narrative fashion as part of the assessment of net public benefits that is made in the Record of Decision for the George Washington National Forest Plan.

The cumulative total present net values between all of the alternatives are fairly close together. Although some program emphases change between alternatives, both the costs and benefits change at a proportional rate, making the net PNV more comparable.

**Table C12.19 Cumulative Decadal Present Net Values of Benefits and Costs (millions of dollars, 4% discount rate cumulative to midpoint of 5th decade)**

<b>Present Value Benefits by Program:</b>	<b>Alt A</b>	<b>Alt B</b>	<b>Alt C</b>	<b>Alt D</b>	<b>Alt E</b>	<b>Alt F</b>	<b>Alt G</b>
Range	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1
Timber	\$36	\$68	\$0	\$123	\$38	\$22	\$68
Minerals	\$24	\$19	\$4	\$20	\$6	\$16	\$6
Recreation	\$1,163	\$1,181	\$1,007	\$1,242	\$1,111	\$1,244	\$1,205
Wildlife	\$661	\$669	\$562	\$713	\$640	\$698	\$684
<b>Total Present Value Benefits</b>	<b>\$1,884</b>	<b>\$1,937</b>	<b>\$1,573</b>	<b>\$2,098</b>	<b>\$1,795</b>	<b>\$1,980</b>	<b>\$1,963</b>
<b>Present Value Costs by Program:</b>							
Range	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1
Timber	\$41	\$47	\$0	\$80	\$27	\$17	\$47
Roads/Engineering	\$29	\$30	\$25	\$32	\$29	\$28	\$30
Minerals	\$4	\$4	\$4	\$5	\$4	\$4	\$4
Recreation	\$84	\$84	\$78	\$90	\$78	\$90	\$84
Wildlife	\$12	\$14	\$8	\$15	\$14	\$14	\$14
Soil, Water and Air	\$30	\$29	\$15	\$29	\$29	\$29	\$29
Protection/Forest Health	\$26	\$42	\$26	\$33	\$48	\$42	\$42
Lands	\$9	\$9	\$9	\$9	\$9	\$9	\$9
Planning/Inventory/Monitoring	\$9	\$9	\$9	\$9	\$11	\$9	\$9
<b>Total Present Value Costs</b>	<b>\$244</b>	<b>\$268</b>	<b>\$174</b>	<b>\$302</b>	<b>\$249</b>	<b>\$242</b>	<b>\$268</b>
<b>Cumulative Total Present Net Value</b>	<b>\$1,640</b>	<b>\$1,669</b>	<b>\$1,399</b>	<b>\$1,796</b>	<b>\$1,546</b>	<b>\$1,738</b>	<b>\$1,695</b>

## **C13 – WIND ENERGY DEVELOPMENT**

Wind energy is renewable and can reduce the use of fuels generating carbon gases and positively affect climate change. Wind energy development is a priority for Federal agencies. The Forest Service is the only agency in the east that can accommodate wind development within its multiple-use mission and has the land base to accommodate this development.

### **AFFECTED ENVIRONMENT**

Nationally, the best areas for wind energy are the plains and the coast. The U.S. Department of Energy has identified many of the ridges on the Forest as potentially able to support wind energy production (Figure C13.1). The USDA Forest Service and National Renewable Energy Laboratory (2005) identified 35,810 acres of the GWNF with a high potential for wind area development. The GWNF is in close proximity to growing population centers that would benefit from additional and clean energy production.

Wind energy development has not occurred on the Forest. A project is under construction in Highland County adjacent to the GWNF.

Alternative A. This is an emerging issue. Ridgeline development associated with wind energy development is not discussed in the George Washington 1993 Forest Plan. Basically, the special use process would be used to consider any applications for wind energy development. No areas are considered to be unsuitable for wind energy development, though management area guidance would limit road construction and clearing activities in some areas.

Alternatives B, F, and G would allow consideration of wind energy development proposals on some areas of the Forest. Proposals for development would be evaluated and if accepted, would be analyzed through the NEPA process. The following areas are unsuitable for wind energy development:

- Wilderness
- Recommended Wilderness
- Special Biological Areas
- Research Natural Areas
- Special Geologic Areas
- Shenandoah Mountain Crest – Cow Knob Salamander Area
- Indiana Bat Protection Areas
- Appalachian Trail Corridor
- Blue Ridge Parkway Scenic Corridor
- Remote Backcountry Areas
- Mt. Pleasant National Scenic Area

Alternatives C and E prohibit the development of wind energy across the GWNF.

Alternative D is similar to Alternatives B, F, and G except that wind energy development proposals would be considered in several remote backcountry areas. The areas identified as unsuitable contain many of the ridges with high potential for wind energy development. To increase the availability of high potential sites, this alternative removes the ridgelines from some of the remote backcountry areas from the list of unsuitable areas for wind development. Wind energy development proposals could be considered in the following remote backcountry areas: Little Alleghany, Oliver Mountain, Elliott Knob, Crawford Knob, Northern Massanutten, Beech Lick Knob and Church Mountain. Aside from wind energy development proposals (including associated road and transmission line access); these backcountry areas would be managed like the other remote backcountry areas.

### DIRECT, INDIRECT AND CUMULATIVE EFFECTS

For purposes of analysis, the following assumptions were made regarding possible wind energy development.

**Table C13.1 Potential Wind Energy Development**

Wind energy development							
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Sites, #		1		3		1	1
Turbines, #		15		45		15	15
Openings, acres		57		172		57	57
Transmission, miles		1		3		1	1
Road construction, miles		1.8		5.5		1.8	1.8
Road Improvement, miles		3		9		3	3

Alternatives A, C, and E would have no wind energy development. They would not address the need for alternative energy sources and they would not provide jobs, taxes and economic returns to the local communities from construction and operation of the turbines.

Effects of the development on soils, scenery, aquatic resources, geologic resources and water are addressed in those sections of the EIS. Potential effects on wildlife include the long term occupation of the ridgetops with openings, roads and turbines. Ridgetops are used by many birds and bats during migrations and during resident activities.

### TIMBER MANAGEMENT

In the short term, wind development would generate wood products as sites are cleared for turbines, transmission lines, and access. Because most of the development is assumed to occur on ridgetops with poor site productivity, the vast majority of product resulting from this activity would be pulpwood. Relatively low volumes and values per acre would be realized. Table C13.2 provides an estimate of the acres and volume that would result from clearing for wind energy development.

**Table C13.2 Volume (ccf) of pulpwood and acres cleared that would result from wind development.**

Wind energy development						
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Openings, acres		57		172		57
Transmission, miles		4		11		4
Road construction, miles		7		20		7
Total Acres Cleared		68		203		68
Total Volume Produced (ccf)	0	680		2030		680

In the long term, these acres would be taken out of wood and fiber production. No future production of wood can be expected on these acres.

## **THREATENED & ENDANGERED & SENSITIVE SPECIES**

Commercial wind power development has rapidly expanded across the Appalachians. Multiple sites have been developed in West Virginia and one site is being constructed in Virginia west of Monterey in Highland County. There is growing concern that Indiana bats and Virginia big-eared bats, plus several other rare bat species like the small-footed bat, may be threatened by the recent surge in construction and operation of wind turbines across the species' range. This potential for increasing mortality and population decline has been exacerbated by the recent establishment and rapid spread of White Nose Syndrome (WNS) throughout the eastern U.S. which has killed millions of bats and has led to the precipitous decline of many once common bat species like small brown and red bats. Bats are often killed during wind tower operations when they fly into the lower pressure area surrounding the trailing edge of spinning blades and suffer extreme barotrauma where decompression causes capillaries in the lungs to explode (Baerwald, et al., 2008). Bats are most affected during periods of fall migration when they often follow ridgetops and come into contact with wind towers built along those same ridgetops. Until the fall of 2009, no known mortality of an Indiana bat had been associated with the operation of a wind turbine/farm. The first documented wind-turbine mortality event occurred during the fall migration period in 2009 at a wind farm in Benton County, Indiana. Research is now under way to develop operation or engineering guidelines to avoid and minimize take of bats and assess the magnitude of the threat. A recent study has shown that injury and death to bats (and also birds) during periods of spring and fall migrations can be reduced by 44 to 93% with an annual power loss of 1% by raising the cut-in speed for blade spin and tower operation to 11-14 mph from the current industry standard of 8-9 mph (Arnett, et.al, 2010). Currently this is the only proven mitigation option that will reduce bat mortality.

The Bald eagle (*Haliaeetus leucocephalus*) was delisted from federal status as Threatened by the FWS, but is considered a Sensitive Species by the Regional Forester (USDA 2007). The Bald eagle and golden eagle (*Aquila chrysaetos*) are protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). Neither law has take provisions as mitigation measures to protect Bald or golden eagles from a variety of harmful actions and impacts. Bald eagles and other large raptors are known to be negatively affected by commercial wind towers (Bell and Smallwood 2010, FWS 2009). Bald eagles, golden eagles and other large raptors are vulnerable to colliding with wind tower blades, especially during spring and fall migration periods. Wind energy projects can also affect bald and golden eagles by degrading or fragmenting habitat, and by introducing new sources of disturbance (noise, construction activity, permanent changes to the landscape, barriers to movement, and increased human activity). Furthermore, both bald and golden eagles may be attracted to forest openings around wind turbines to feed, particularly if sources of carrion (large birds killed by collisions) are present. Both eagle species are increasing in population, especially during the non-breeding season, in the central Appalachians (Katzner et al. 2009). The FWS's National Bald Eagle Management Guidelines recommend siting wind turbines away from known nests, foraging areas, and communal roost sites (FWS 2007).

## **NON-NATIVE INVASIVE PLANTS**

Alts A, C, and E would have no wind power development and would not create disturbed habitat that would promote NNIP infestations. Alt B and F would create ground disturbance from the openings created for the wind tower sites, transmission lines, and road construction. These disturbed areas would be potential sites for NNIP infestations. The roads and transmission lines could act as dispersal corridors for NNIP. Alt D would create three times the ground disturbance over Alts B and F. Aggressive control treatments for NNIP could mitigate the impacts of the ground disturbing activities.

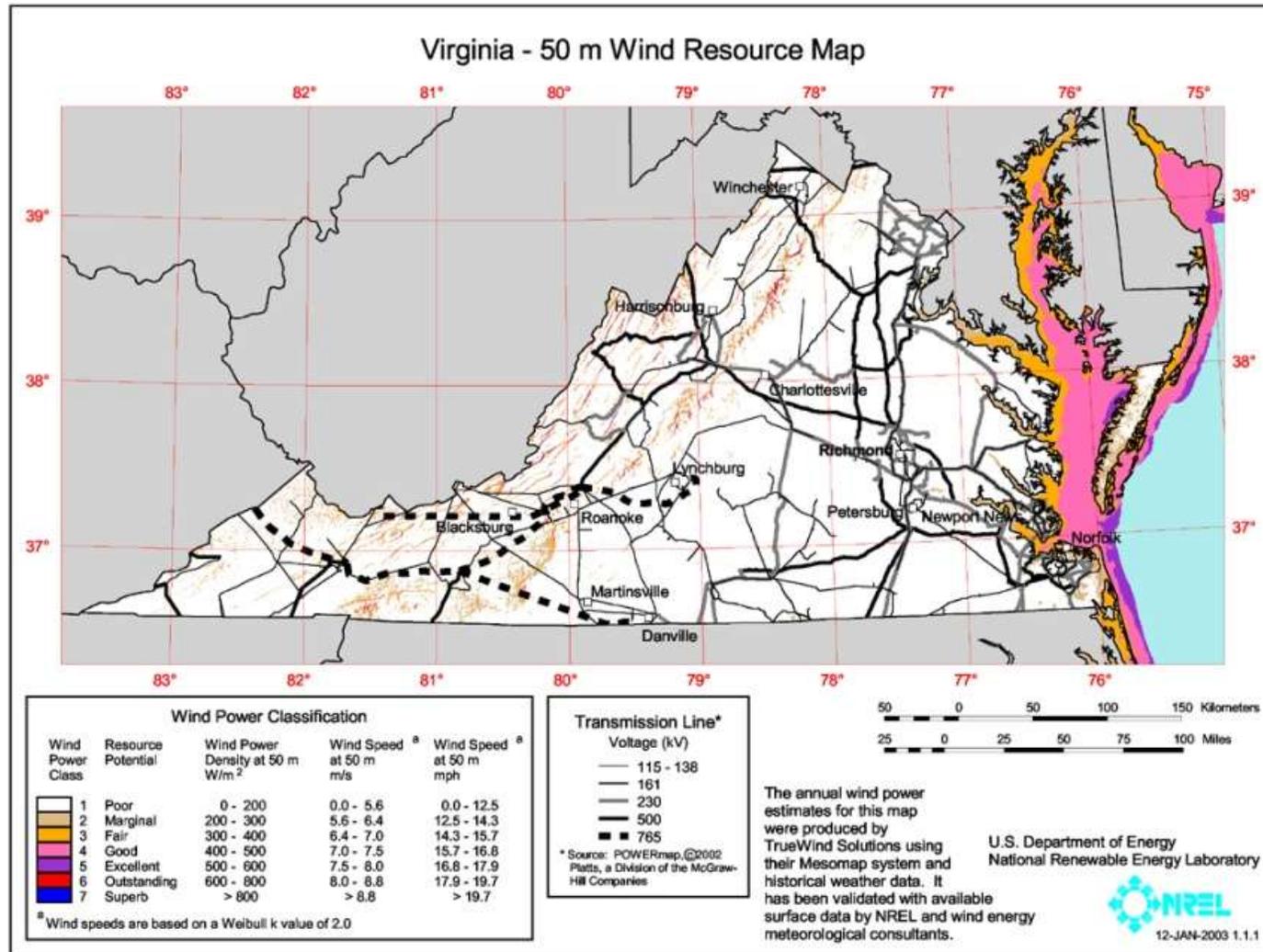


Figure 13.1 Virginia Wind Energy Potential

## **C14 - OTHER EFFECTS**

### **RELATIONSHIP OF SHORT-TERM USE AND LONG-TERM PRODUCTIVITY**

The relationship between the short-term uses of the environment and the maintenance and enhancement of long-term productivity is complex. Short-term uses are generally those that occur irregularly on parts of the Forest, such as prescribed burning. Long-term refers to a period greater than ten years.

Productivity is the capability of the land to provide market and amenity outputs and values for future generations. Soil and water are the primary factors of productivity and represent the relationship between short-term uses and long-term productivity. The quality of life for future generations would be determined by the capability of the land to maintain its productivity. By law, the Forest Service must ensure that land allocations and permitted activities do not significantly impair the long-term productivity of the land.

The alternatives considered in detail, including the preferred alternative, incorporate the concept of sustained yield of resource outputs while maintaining the productivity of all resources. The specific direction and mitigation measures included in the forest-wide management standards ensure that long-term productivity would not be impaired by the application of short-term management practices.

Each alternative in the Forest Plan was analyzed using the SPECTRUM linear programming model (See Appendix B – Description of the Analysis Process), to ensure that the minimum standards could be met. The alternative was changed if some aspect did not meet any of the minimum standards. Through this analysis, long-term productivity of the Forest's ecosystems is assured for all alternatives.

As stated earlier, the effects of short-term or long-term uses are extremely complex, and depend on management objectives and the resources that are emphasized. No alternative would be detrimental to the long-range productivity of the Jefferson National Forest.

The management prescriptions and the effects of implementing the revised Forest Plan will be monitored. Evaluation of the data collected will determine if standards for long-term productivity are being met, or if management practices need to be adjusted. Monitoring requirements and standards apply to all alternatives, and are included in Chapter 5 of the revised Forest Plan.

### **IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Irreversible and irretrievable commitments of resources are normally not made at the programmatic level of a Forest Plan. Irreversible commitments are decisions affecting non-renewable resources such as soils, minerals, plant and animal species, and cultural resources. Such commitments of resources are considered irreversible because the resource has been destroyed or removed, or the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense. While a Forest Plan can indicate the potential for such commitments, the actual commitment to develop, use, or affect non-renewable resources is normally made at the project level.

Irretrievable commitments represent resource uses or production opportunities, which are foregone or cannot be realized during the planning period. These decisions are reversible, but the production opportunities foregone are irretrievable. An example of such commitments is the allocation of management prescriptions that do not allow timber harvests in areas containing suitable and accessible timber lands. For the period of time during which such allocations are made, the opportunity to produce timber from those areas is foregone, thus irretrievable.

In the case of the Federal oil and gas leasing discussed in the minerals section of this Chapter, actual extraction of oil and gas would be considered an irreversible commitment, since this is a non-renewable resource. However, the decision to actually permit this extraction will occur following receipt of an Application for Permit to Drill,

## **EFFECTS ON WETLANDS AND FLOODPLAINS**

No significant adverse impacts on wetlands or floodplains are anticipated. Wetlands values and functions would be protected in all alternatives through the implementation of the Riparian Management Prescription and following Virginia's Best Management Practices for Forestry. Under the requirements of Executive Order 11990 and Clean Water Act, Section 404, wetland protection would be provided by ensuring that new construction of roads and other facilities would not have an adverse effect on sensitive aquatic habitat or wetland functions. In addition, wetland evaluation would be required before land exchanges or issuance of special-use permits in areas where conflicts with wetland ecosystems may occur.

Mitigation measures have been designed to conserve riparian areas and protect floodplains through the Riparian Management Prescription. The direction of this prescription is embedded in all management prescriptions. Executive Order 11988 also requires site-specific analysis of floodplain values and functions for any project occurring within the 100-year floodplain zone, and prior to any land exchange involving these areas.

Protective measures for riparian areas include the delineation of riparian corridors on perennial and intermittent streams. Management activities within the riparian corridor must comply with the previously mentioned State BMPs and other State water quality regulations. Floodplains would be managed by locating critical facilities outside of floodplains or by using structural mitigation measures. Further protections are provided in forest-wide standards for management of ephemeral stream zones.

## **UNAVAILABLE OR INCOMPLETE INFORMATION**

The George Washington National Forest has used the most current scientific information available and state-of-the-art analytical tools to evaluate management activities and to estimate their environmental effects.

However, gaps will always exist in our knowledge. The Council on Environmental Quality regulations discuss the process for evaluating incomplete and unavailable information (*40 CFR 1502.22 (a) and (b)*). Incomplete or unavailable information is noted in this chapter for each resource, where applicable.

Forest Plan monitoring is designed to evaluate assumptions and predicted effects. Should new information become available, the need to change management direction or amend the Forest Plan would be determined through the monitoring and evaluation process.

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