

## 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 (1½ 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 10,544,000 (Source: U.S. Census Bureau 2010). Table 3C1-1 provides a summary of the cities, counties and population within the market area.

Table 3C1-1. Summary of States, Counties, Cities and Population within the Market Area for the GWNF

DC and States	Number of Counties & Cities	Population
DC	1	601,723
MD	9	2,705,547
NC	2	62,790
PA	6	428,305
VA	83	5,509,723
WV	32	1,236,481
TOTAL	131	10,544,569

Source: National Survey on Recreation and the Environment, Southern Research Station, US Census Bureau 2010.

#### AFFECTED ENVIRONMENT

The most populated counties in the market area are Fairfax County, Virginia and Montgomery and Prince George's Counties, Maryland and then followed by Washington, DC. Other large municipalities within the market area include Alexandria, Arlington, Fredericksburg, Harrisonburg, Lynchburg, Manassas, Richmond, Roanoke, 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 shifts in demographics and income levels; 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 3C1-2 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 3C1-2. 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 3C1-3 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 3C1-3. 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 market area: 131 counties, 16 and older population (2010 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 3C1-4 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 3C1-4. Fifty Year Projected Activities in Outdoor Recreation, 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
TOTAL FOR GROUP	12.15	13.69	15.28	16.68	18.14	19.74

Recreation Activity	2010	2020	2030	2040	2050	2060
<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
TOTAL FOR GROUP	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
TOTAL FOR GROUP	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
TOTAL FOR GROUP	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>	<b>1,066.56</b>	<b>1,184.35</b>	<b>1,302.08</b>	<b>1,402.63</b>	<b>1,507.33</b>	<b>1,621.68</b>

Data Source: Bowker, J. M. and Askew, Ashley (2012) Outdoor Recreation Participation Projections to 2060. GTR-SRS-150. 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. The US Forest Service manages a supply of settings and the facilities to accommodate recreational pursuits appropriate to those settings in a manner that protects the resources.

## Settings Supply

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 per 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 (R) 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 3C1-5 shows the current inventoried supply of these four ROS settings on the GWNF.

Table 3C1-5. 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%
Total	1,065,872	100%

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. Only highly developed campground complexes meet the characteristic of Rural ROS.

*The Southern Appalachian Assessment: Social, Cultural, Economic Technical Report (SAMAB 1996d)* 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. This reveals that the GWNF's supply of semi-primitive settings, at about 38% of the forest, is significantly high compared to the 8% total offered in the Southern Appalachians. The GWNF is uniquely able to offer a recreation setting that is in relatively low supply in this part of the country.

## Developed Recreation Facilities Supply

The GWNF manages a variety of facilities located in developed recreation sites. 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 moderate to significant investment in infrastructure and are managed under the direction of an administrative unit in the National Forest System.

Recreation sites are developed within different outdoor settings to facilitate a variety of desired recreational uses. Developed recreation sites include 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. 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 with facilities provided 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 offer 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. This development scale typically offers 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 North River. 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 not 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.

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 3C1-6 and 3C1-7 illustrate the different types of facilities provided across the forest and their current capacity in PAOTs.

Table 3C1-6. 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 use 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 campgrounds.

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 typically 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 rather than increase our carbon footprint, and in keeping with our Forest's recreation niche which is primarily trails and dispersed recreation. State parks and private sector campgrounds are typically more highly developed than Forest Service campgrounds and are more capable of meeting public demand for campsites with hookups and other amenities.

## Dispersed Recreation Facilities Supply

**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. The developed sites that help accommodate dispersed recreationists typically provide parking and an information board, and some also provide vault toilets. Very few provide picnic tables and/or benches. Boating areas

provide a boat ramp. Also included as developed recreation facilities that support dispersed recreation activities are overnight trail shelters on long distance trails.

There are 56 developed recreation sites that support dispersed use of the forest. Table 3C1-7 provides a summary of these sites used to access or accommodate dispersed recreation opportunities on the national forest.

Table 3C1-7. 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 3C1-8 gives a breakdown of the miles of trail that are managed for various types of uses. The total trail miles do not equal the total National Forest System Trail miles because of the overlap in uses allowed.

Table 3C1-8. 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 motorbikes	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 or 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 was a goal in the 1993 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 2011, volunteers contributed approximately 43,320 hours to the dispersed recreation program, equivalent to 21 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 each been consistent, a decline in either of these programs will have negative implications for the sustainability of the trail 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 Division of Natural Resources stock certain streams and lakes. Table 3C1-9 provides acres currently managed for fish and wildlife habitat emphasis.

Table 3C1-9. 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\_AltComparison\_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 Division of Natural Resources at <http://www.wvdnr.gov/Fishing/Regs10/TroutStocking.pdf>.

## DIRECT, INDIRECT EFFECTS AND CUMULATIVE EFFECTS

As the population increases, recreation demand is expected to grow for a variety of activities including dispersed and developed recreation. New, unforeseen uses will also likely arise as technology and entrepreneurs develop new outdoor equipment and as changes in population demographics and/or income levels shift user preferences.

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. There is such a wide range of user preferences, that any given management emphasis will typically result in some users being satisfied and others being dissatisfied. For example, those that enjoy motorized access to reach early successional habitat for hunting will likely not be pleased with an alternative that emphasizes decommissioning roads and late successional habitat. However, those that prefer hiking into remote settings with mature forests will likely be satisfied.

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

## Settings - Recreation Opportunity Spectrum (ROS)

Table 3C1-10 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 the inventoried setting. Specifically, prescription areas where construction of permanent roads is allowed could be 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 and 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 semi-primitive 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 3C1-10. 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	Alts H and I
<b>SPNM*</b> 198,281 acres	10-15%	15-20%	<1%	15-20%	10-15%	5-10%	10-15%	10-15%
<b>SPM*</b> 210,995 acres	45-50%	60-65%	5-10%	40-45%	45-50%	45-50%	50-55%	50-55%
<b>RN**</b> 656,596 acres	25-30%	35-30%	55-60%	25-30%	30-35%	25-30%	30-35%	25-30%

\*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 result in a change to that RN inventory.

The alternative that could 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 range for protecting SPNM are Alternatives A, E, G, H and I. The alternatives that could 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 conservation areas. Alternative B provides the potential for the greatest number of inventoried SPM acres to change. This is followed by Alternatives G, H and I and then Alternatives E and F, then finally D. Alternatives G, H and I have an objective to maintain 85% of the inventoried SPM areas in their SPM settings. Those alternatives also include 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, F, H and I, 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 consistently with 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, G, H and I, the changes in the recreation settings will result in fewer effects 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

The developed recreation capacity in 1993 was 13,820 persons at one time (PAOTs). The 1993 Forest Plan provided for the expansion of 10 campgrounds, 1 picnic area, 1 fishing/picnic area and an organizational camp. It also provided for the development of new recreation areas including 5 minimally developed campgrounds, 1 horse campground, 2 interpretive sites and 3 target ranges. The total projected capacity to be achieved was 16,200 PAOTs. During Plan implementation, there were expansions at several recreation areas, one minimally developed campground was constructed, the horse campground was developed, and one new target range was constructed. However, due to budget constraints, most of the expansions and new facilities were never developed. The organizational camp planned for expansion was closed along with 2 visitor centers, 3 minimally developed campgrounds, 2 specialized sites (hang gliding), 2 picnic areas and a trailhead. One organizational camp was converted to an administrative site. PAOTs have been reduced since the 1993 Plan, and the method by which PAOTs are counted has changed as well. Current developed recreation capacity is estimated to be 10,225 PAOTs plus 2,608 PAOTs that support dispersed recreation opportunities for a total of 12,833.

Assuming for Alternative A that the expansions and planned new facilities listed in the 1993 Forest Plan will still occur, but the closed and disposed sites will not be reopened, and using current PAOTs for existing sites, the projected capacity is 12,546 PAOTs. The developed recreation facilities that support dispersed activities

(trailheads and trail shelters) would supply another 1,188 PAOTs. Table 3C1-11 below indicates the range of developed recreation capacity by alternative excluding developed sites that support dispersed recreation, with the baseline being current capacity.

Table 3C1-11. Estimated Capacity (PAOTs) of Developed Recreation Areas by Alternative

Site Type	Alt A <sup>1</sup> Current Capacity (Baseline)	Alt A No Action	Alt B Increase 0 - 5%	Alt C Decrease 5-15%	Alt D No change	Alt E Decrease 5-15%	Alt F Increase 5 - 15%	Alts G, H and I Increase 0 - 5%
Water Based Recreation: Swimming, boating, developed fishing	1,295	1,315	1,295- 1,360	1,101- 1,230	1,295	1,101- 1,230	1,360- 1,489	1,295- 1,360
Overnight Use: Family, Equestrian, Group Campgrounds	6,765	7,996	6,765- 7,103	5,750- 6,427	6,765	5,750- 6,427	7,103- 7,780	6,765- 7,103
Interpretive and Observation Day Use Sites	1,300	2,220	1,300- 1,365	1,105- 1,235	1,300	1,105- 1,235	1,365- 1,495	1,300- 1,365
Day Use Picnic Sites	730	870	730-767	621-694	730	621-694	767-840	730-767
Specialized Sports Sites*	135	145	135-142	115-128	135	115-128	142-155	135-142
<b>Grand Total</b>	<b>10,225</b>	<b>12,546</b>	<b>10,225- 10,736</b>	<b>8,691- 9,714</b>	<b>10,225</b>	<b>8,691- 9,714</b>	<b>10,736- 11,759</b>	<b>10,225- 10,736</b>

Alt A<sup>1</sup> represents the actual implementation level of the 1993 Revised GWNF Plan

\* Specialized sports sites include target ranges and hang gliding sites.

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 meet the demand for developed recreation opportunities that serve activities such as highly developed camping and swimming, or developed fishing sites which are typically at the lower end of the development scale. The effects of this unmet demand will be greatest with Alternatives C and E, followed by D. Alternatives B, G, H and I are in the middle of the range of alternatives. Alternatives A and F meet more of the demand than the others, with A best meeting this demand. The ability to meet demand for developed recreation will diminish with time as the population increases while the amount of public lands offering these opportunities remain static.

Some sites will become increasingly overused and crowded, particularly the highly developed campgrounds and day use areas. Initially this may occur only at peak times such as holidays and weekends; but over time this could extend to the entire primary recreation season from Memorial Day to Labor Day. This will result in lower satisfaction levels as people are turned away from full recreation areas, and some visitors will have unmet expectations. Some will seek the supply of developed recreation provided 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.

Putting sites on the national reservation service and implementing visitor use controls may help alleviate problems of overuse at these sites.

Some management actions will effect 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.

The degree to which new roads are constructed could be a factor for Alternative A which includes the development of new recreation sites. Roads are needed to access developed recreation areas. The degree to which new roads are constructed is not a significant factor for any of the action alternatives because they propose no new developed recreation areas, only the expansion or reduction of existing sites. 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 disturbances, 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

**Trails:** 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 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 estimated changes from current miles that might occur in each Alternative.

Table 3C1-12. 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	Alts G, H and I
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
Effect of Wilderness Designation on Mountain Bicycling on Designated System Trails*	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 estimated changes from current miles of motorized trails and featured OHV routes that could occur by alternative.

Table 3C1-13. 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	Alts G, H and I
ATVs* and motorcycles	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.

Increases in 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 Alternatives A and 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 Study 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 Study 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 wildfires. 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.

Alternatives G, H and I provide 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. Alternatives G, H and I do not identify featured OHV routes, but provide 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. Firelines that use trails and then veer off may appear to trail users to be a new trail. Forest Plan standards will require the trails be repaired and any firelines 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, 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 C, 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:** According to results from the National Surveys on Recreation and the Environment, the South exceeds the national average for the percent of the population that participates in hunting and fishing. The national forests are the largest provider of hunting and fishing opportunities in Virginia. Table 3C1-14 provides the approximate acreages by alternative for habitats conducive for big and small game hunting.

Table 3C1-14. Estimated Total Acres of Big & Small Game Emphasis Areas by Alternative, thousands

Type of Game Habitat (Management Prescription Area)	Rx Area	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Mix of Successional Habitats	8A1 8A1U	258 70	0 0	0 0	317 0	0 0	0 0	0 0	0 0
Early Successional Habitat	8B 8BU	39 1	0 0	0 0	34 0	0 0	0 0	0 0	0 0
Bear/Remote Habitat	8C 8CU	74 61	0 0	0 0	125 0	0 0	0 0	0 0	0 0
Mosaic of Habitats	13 13U	0 0	569 0	0 246	0 0	491 3	350 109	508 0	508 0
<b>TOTAL ACRES % of GWNF (approx.)</b>		503 47%	569 53%	246 23%	475 45%	494 46%	459 43%	508 48%	508 48%

Alternatives that allocate additional acres to prescriptions that emphasize big and small game habitat will increase and enhance the hunting and wildlife viewing opportunities on the national forest. Detailed wildlife habitat analysis specific to Demand Species is provided in the Final EIS, Chapter 3, in Section B2C.

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, G, H and I 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, 53% of the GWNF, with an emphasis on providing wildlife habitat. Alternatives G, H, I, A and E are next with the most acres allocated specifically to wildlife habitat management prescriptions, at 48% to 46% of the GWNF.

Under Alternative D, the number of acres allocated to 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 has the potential to provide 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, relying primarily on natural events such as ice

and wind storms, wildfires, disease/insect outbreaks, and natural tree mortality due to age, to provide early successional habitat often sought by hunters.

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 for hunting under Alternatives B, G, H, I and E and some areas may become more difficult to access under Alternative C.

With regards to fishing, a detailed analysis of fisheries and aquatic habitat is found in the Final EIS, Chapter 3, at Section B4A and an aquatic species viability analysis is in Section B4B. 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. Since the 1993 Plan, some additional rivers have been proposed for consideration but were found to not meet the eligibility requirements.

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 unsuitability, 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) through a land allocation to a management prescription designed to protect the river segment outstandingly remarkable resources. 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 effects 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, wildfire and prescribed fire, vegetation removal, erection of new structures, looting or vandalism, and land use changes. However, compliance-related inventories or Phase I inventory surveys would be conducted prior to ground disturbance related to project activities.

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 3C3-1. Estimated Harvest Acres and Allowable Sale Quantity  
for Timber Management Activities by Alternative, First Decade

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Acres harvest, in thousands, first decade	24	7	30	0	42	18	10	30	30
Allowable Sale Quantity, in million cubic feet, first decade	47	47	55.8	0	105.8	31.1	19.10	55.2	55.3

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

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 could receive the greatest depth of disturbance and thus provide the most significant direct effects to significant cultural properties. Indirect effects could include deterioration of sites and artifacts from subsequent erosion and increased site vandalism from increased access and surface exposure of historic sites.

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 3C3-2. Average Miles of Road Construction per Year by Alternative

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Road Construction, miles	2.9	1.8	1.5	0	4.1	1	0.5	1.5

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

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

Cultural resources may be directly and indirectly affected by heat damage to artifacts and sites and erosion of sites resulting from wildfires 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 wildfire. However, wooden structures and cemetery markers could still be damaged, as could surface artifacts.

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 fireline construction. Thus, there is a potential for unknown properties to be affected by wildfire suppression. Indirect effects following the installation of firelines 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 3C3-3. Acres of Prescribed Fire per Year and Use of Unplanned Ignitions

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Prescribed Fire, acres per year	3,000	7,400	12,000-20,000	Limited	5,000-12,000	20,000	12,000-20,000	12,000-20,000
Unplanned Ignitions	Allow to achieve forest goals	Allowed 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

A<sup>1</sup> represents the actual implementation level of the 1993 Revised GWNF Plan

Alternative E potentially affects the greatest number of acres through prescribed fire and Alternative C the least. Alternatives B, F, G, H and I follow Alternative E for having the most potential adverse effects 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 could 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 could 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 3C3-4. Percent Change in Developed Recreation Capacity and Dispersed Recreation Trail Miles by Alternative

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
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 in Alternatives B, F, G, H and I 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, could likely come from construction of new miles of trail. Alternative D affects the greatest number of acres through trail construction, and Alternatives B and 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 could 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, Saint Mary's, Three Ridges, and Priest totaling about 40,000 acres or roughly 4% of the forest's area. Small portions of Barbours Creek (20 acres) and Shawvers Run (95 acres) Wildernesses that lie on the GWNF are managed under the revised Jefferson Forest Plan. One area, Saint 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, Mount Pleasant. The Mount 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 for the GWNF 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 3C4-1). Appendix C contains an evaluation of each of these areas in relation to their availability, capability, and the need to be recommended for wilderness study.

Table 3C4-1. 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	7,019
Ramseys Draft Addition	19,072
Rich Hole Addition	12,165
Rich Patch	871
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
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 an inventory similar to the Potential Wilderness Areas but identified the areas as Inventoried Roadless Areas. In the late 1990s 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 (RACR) in 2001. 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: Saint Mary's Addition, Three Ridges, and 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 Mount Pleasant, each with its own Desired Future Condition and standards. According to the 1993 Plan, 89% of the roadless acreage is allocated to management areas which would preserve the roadless character and the remaining 11% could have projects that alter the roadless nature of a given area. However, it should be noted that such projects would not be consistent with the requirements of the 2001 RACR.

Two areas (Southern Massanutten and The Friar) from the 1993 roadless area inventory are not included in the Potential Wilderness Area inventory. The Friar is too small in size (2,051 acres) for it to have any kind of "core" area to provide for a sense of solitude, 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 3C4-2.

Table 3C4-2. 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
Galford Gap	6,689	
Gum Run	14,547	12,620
High Knob	18,447	12,871
Jerkemtight	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	

Potential Wilderness Name	Potential Wilderness Area Acres	Inventoried Roadless Area Acres
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
TOTAL GWNF ACRES	372,631	242,278

## 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 (NSAs) 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.

Alternative F includes three National Scenic Area recommendations: the Virginia portion of Shenandoah Mountain between Highway 33 and Highway 250, Kelley Mountain, and Adams Peak for a total of 128,000 acres.

In Alternatives H and I about 90,000 acres are recommended for designation as a National Scenic Area on Shenandoah Mountain, including just over 22,000 acres of designated and recommended wilderness.

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.

## 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 3C4-3 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 3C4-3. Management Prescription Area Allocations within Potential Wilderness Areas (PWAs) and Inventoried Roadless Areas (IRAs)

Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within an IRA	Acres of PWA not within an IRA	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		7,500			7,500			7,500	7,500		
		20,800			20,800			20,800		20,800		
Crawford Knob (PWA, IRA)	14,800		4,900			4,900			4,900	4,900		
		9,900			8,500	1,400		8,600	1,300	9,900		
Dolly Ann (PWA, IRA)	9,500		1,600			1,600			1,600	1,600		
		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		
Jerkemtight (PWA, IRA)	27,300		10,500			10,500			10,500	10,500		
		16,800			16,000	800		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 Area Name	Total PWA Acres	Acres of PWA within an IRA	Acres of PWA not within an IRA	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	1,100	9,300	16,900	1,000	27,200		
Massanutten North (PWA, IRA)	16,500		7,000			7,000			7,000	7,000		
		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	6,100	6,700	0	12,800		
Rich Hole Addition (PWA, IRA)	12,200		1,300			1,300			1,300	1,300		
		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				1,200		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			300	300			300		



Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within an IRA	Acres of PWA not within an IRA	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
Shaws Ridge (PWA)	7,300		7,300			7,300			7,300	7,300		
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), not a PWA	N/A											
		12,100			12,100			12,100		12,100		
The Friars (IRA), not a PWA	N/A											
		2,000			2,000			2,000		2,000		
Whites Peak, not a PWA or IRA	N/A											
		N/A	4,200		4,200			4,200			4,200	
TOTAL ACRES IN ALL AREAS	372,609	242,200	148,709	1,500	224,500	164,909	20,400	227,800	142,709	386,709	4,200	0

Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	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			7,100		7,100				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		7,500		200	7,300		200	7,300		7,500	
		20,800			20,800			20,800		7,200	13,600	
Crawford Knob (PWA, IRA)	14,800		4,900			4,900		2,500	2,400		2,500	2,400
		9,900			8,500	1,400		9,900			9,900	
Dolly Ann (PWA, IRA)	9,500		1,600			1,600		500	1,100		500	1,100
		7,900			7,300	600		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			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)	18,400		5,600		300	5,300		5,600			5,600	
		7,200			7,200			7,200			7,200	
- Skidmore (IRA)		5,600			5,600			5,600		5,600		
Jerkemtight (PWA, IRA)	27,300		10,500		100	10,400		6,200	4,300		6,200	4,300
		16,800			16,100	700		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 Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	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			9,100	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		600	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		7,000		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			7,000		7,000		4,200	2,800	
Ramseys Draft Add. (PWA, IRA)	19,100		6,300		800	5,500		1,600	4,700		6,300	
		12,800			12,800		3,100	9,700		12,400	400	
Rich Hole Addition (PWA, IRA)	12,200		1,300			1,300			1,300	200	1,100	
		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 Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	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	2,700			8,200		5,500	2,700	
Southern Massanutten (IRA), not a PWA	N/A											
		12,100			12,100			12,100			12,100	
The Friars (IRA), not a PWA	N/A											
		2,000			2,000			2,000			2,000	
Whites Peak, not a PWA or IRA	N/A											
		N/A	4,200	4,200				4,200		4,200		
TOTAL ACRES IN ALL AREAS	372,609	242,200	148,709	14,600	250,209	126,100	24,500	314,109	52,300	113,209	246,600	31,100

Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	ALT G			ALTS H and I		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Adams Peak (PWA, IRA)	8,200		900		100	800		100	800
		7,300			7,300			7,300	
Archer Knob (PWA)	7,100		7,100		4,900	2,200		5,100	2,000
Beards Mountain (PWA, IRA)	10,100		2,600		800	1,800		800	1,800
		7,500			7,500			7,500	
Beech Lick Knob (PWA)	14,100		14,100		8,300	5,800	5,700	3,500	4,900
Big Schloss (PWA, IRA)	28,300		7,500		200	7,300		200	7,300
		20,800			20,800			20,800	
Crawford Knob (PWA, IRA)	14,800		4,900			4,900			4,900
		9,900			9,900			9,900	
Dolly Ann (PWA, IRA)	9,500		1,600		500	1,100		500	1,100
		7,900			7,900			7,900	
Duncan Knob (PWA)	6,000		6,000		3,400	2,600		3,400	2,600
Elliott Knob (PWA, IRA)	11,100		1,700			1,700			1,700
		9,400			9,400	0		9,400	
Galford Gap (PWA)	6,700		6,700			6,700			6,700
Gum Run (PWA, IRA)	14,500		1,900		1,900			1,900	
		12,600			12,600			12,600	
High Knob (PWA, IRA)	18,400		5,600		1,500	4,100		1,500	4,100
- Dry Run (IRA)		7,200			7,200			7,200	
- Skidmore (IRA)		5,600			5,600			5,600	
Jerkentight (PWA, IRA)	27,300		10,500		6,800	3,700		5,500	5,000
		16,800			16,800			16,800	
Kelley Mountain (PWA, IRA)	12,900		5,200		2,400	2,800		2,400	2,800
		7,700			7,700			7,700	
Laurel Fork (PWA, IRA)	10,200		200		200			200	
		10,000			10,000			10,000	

Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	ALT G			ALTS H and I		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Little Alleghany (PWA, IRA)	15,400		5,200		100	5,100		100	5,100
		10,200			10,200			10,200	
Little Mare Mountain (PWA)	11,900		11,900		4,500	7,400		4,500	7,400
Little River (PWA, IRA)	30,200		3,000		1,500	1,500		1,500	1,500
		27,200		9,300	17,900		9,500	17,700	
Massanutten North (PWA, IRA)	16,500		7,000		2,000	5,000		2,000	5,000
		9,500			9,500			9,500	
Oak Knob-Hone Quarry Ridge (PWA, IRA)	16,300		5,500		5,500			5,500	
		10,800			10,800			10,800	
Oliver Mountain (PWA, IRA)	13,100								
		13,100			13,100			13,100	
Paddy Knob (PWA)	6,000		6,000		900	5,100		900	5,100
Potts Mountain (PWA)	7,000		7,000			7,000			7,000
Ramseys Draft Add. (PWA, IRA)	19,100		6,300		2,900	3,400		900	5,400
		12,800		6,100	6,700		6,100	6,700	
Rich Hole Addition (PWA, IRA)	12,200		1,300		200	1,100		200	1,100
		10,900		4,700	6,200		4,600	6,300	
Rich Patch (PWA)	900		900		900			900	
Rough Mountain Add. (PWA, IRA)	2,100		900			900		100	800
		1,200			1,200		1,000	200	
St Mary's North (PWA)	3,000		3,000		3,000			3,000	
St Mary's South (PWA, IRA)	1,700		200			200			200
		1,500			1,500			1,500	
St Mary's West (PWA)	300		300						
				300			300		
Shaws Ridge (PWA)	7,300		7,300		7,300			7,300	

Potential Wilderness Area Name	Total PWA Acres	Acres of PWA within IRA	Acres of PWA not within IRA	ALT G			ALTS H and I		
				Recomm Wild Ac	Remote Ac	Other Ac	Recomm Wild Ac	Remote Ac	Other Ac
Shawvers Run Add (PWA)	100		100		100			100	
Three Ridges Add North (PWA)	100		100		100			100	
Three Ridges Add South (PWA)	200		200		200			200	
Three Ridges Add SW (PWA)	9		9		9			9	
Three Ridges Add West (PWA)	100		100		100			100	
Three Sisters (PWA, IRA)	9,900		1,700		200	1,500		200	1,500
		8,200			8,200			8,200	
Southern Massanutten (IRA), not a PWA	N/A								
		12,100			12,100			12,100	
The Friars (IRA), not a PWA	N/A								
		2,000			2,000			2,000	
Whites Peak, not a PWA or IRA	N/A								
		N/A	4,200		4,200			4,200	
TOTAL ACRES IN ALL AREAS	372,609	242,200	148,709	20,400	286,809	83,700	27,200	277,909	85,800

## Potential Wilderness Areas That are Recommended for Wilderness Study

Allocation of Potential Wilderness Areas (PWAs), 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 3C4-4.

Table 3C4-4. Numbers of Areas and Acres Allocated to Recommended Wilderness Study by Alternative

Potential Wilderness Area	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Adams Peak			8,226					
Archer Knob			7,110					
Beards Mountain			10,152					
Beech Lick Knob			14,087			11,600		5,730
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	9,545
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	6,146
Rich Hole Addition		4,703	12,165	4,703	4,703	11,169	4,714	4,629
Rich Patch			871					
Rough Mountain Add			2,063		2,063	2,063		1,028
Saint Mary's North			3,006					
Saint Mary's South	1,478		1,651		1,651	1,654		



Potential Wilderness Area	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Saint Mary's West		278	278	179	178	179	278	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		
Total	1,478	20,443	386,762	14,686	24,382	113,268	20,454	27,356

Alternative C recommends all of the PWAs and Southern Massanutten and the Friars Inventoried Roadless Areas (IRAs) for Wilderness Study Areas. This would result in about 40 percent of the GWNF in wilderness. A large cluster of Recommended Wilderness Study Areas would be located near the center of the GWNF. The largest recommended wilderness in this cluster is Little River at about 30,000 acres in size. It is separated by a Forest Service Road from Ramseys Draft Addition (about 25,000 acres). Four other PWAs (Shaws Ridge, Gum Run, Oak Knob/Hone Quarry Ridge, and High Knob) are also in this cluster, each separated by existing roads. The total acreage of recommended Wilderness in this cluster would be about 110,000 acres. Alternative C would also recommend 5 areas on the northern end of the Forest closest to Northern Virginia and Washington, where there are currently no wilderness areas.

Alternatives B, E, G, H and I 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 in the areas.

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

Table 3C4-5 displays the ecological subsections represented currently by designated wilderness on the forest as well as those that could potentially be added if recommended Wildernesses are designated by Congress.

Table 3C4-5. Ecological Sections/Subsections represented by Wilderness  
or Recommended Wilderness Study areas by Alternative, acres

Ecological Section/ Subsection	Existing Wild- erness	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
M221Da - Blue Ridge Section/Northern Blue Ridge Subsection	111,215	1,478	278	38,344	9,983	1,829	12,006	278	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	27,000
M221Ab - Northern Ridge and Valley Section/Great Valley of Virginia	0	0	0	34,583	0	0	0	0	0
M221Bd - Allegheny Mountains Section/Eastern Allegheny Mountain and Valley	11,174	0	0	20,374	0	0	7,698	0	0
M221Ba – Allegheny Mountains Section/Northern High Allegheny Mountain	56,913	0	0	10,236	0	0	10,236	0	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. This would reduce motorized access to parts of the national forest which would reduce satisfaction of visitors with limited mobility such as families with young children, senior citizens, and people with mobility disabilities. The satisfaction of people seeking remote settings and personal challenge would increase. 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 primitive and unconfined recreation will increase, including settings that offer solitude and remoteness due to road decommissioning. Non-motorized dispersed recreation activities such as hiking, horseback riding, camping, fishing, and hunting would continue. Motorized and mechanized transport, including mountain bicycling and use of wheeled carts by hunters, would be prohibited.

Table 3C4-6 shows, by alternative, the miles of system trail that would be closed to bicycle use if the recommended wilderness study areas are designated as wilderness.

Table 3C4-6. Miles of Trails to be Closed to Bicycles by  
Alternative if Recommended Wilderness Study Areas become Wilderness

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Trails to be closed to bicycles	0	9	434	1	11	70	9	9

Bicycles are also allowed on closed roads across the GWNF, unless otherwise specified. Table 3C4-7 enumerates miles of road that would be decommissioned. Alternative C would close the highest number of

miles, about 156 in 16 separate areas. Alternative D would close about 26 miles of road that may currently be used by mountain bicycles and motorized vehicles. Alternatives A, B, G, H and I would result in the least miles of road closed to these uses as a result of wilderness designation.

Table 3C4-7. Miles of Road to be Closed by Alternative  
if Recommended Wilderness Study Areas become Wilderness

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Roads to be decommissioned	0	2	155	6	4	26	2	4

Within wilderness study areas that are recommended by Congress as Wilderness, maintenance of trails and facilities, including the Appalachian National Scenic Trail and associated shelters sites would be done using hand tools only and 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 recreation events would only be affected in Alternative C.

Additional wilderness would potentially increase National Forest visitation (Cordell 1999). Between 1994 and 2009, the national participation rate for visiting a wilderness increased by 15% and the total activity days increased by almost 32%. Using three scenarios for projecting recreation use, indexed per capita participation rates for visiting a wilderness, primitive camping or backpacking is estimated to increase from 0.383 in 2008 to about 0.947 to 0.995 in 2060 (Cordell 2012). The anticipated increase in visitation would increase economic benefits resulting from tourism in the surrounding local communities. This would be greatest with Alternatives C and F, and have the least economic benefits with Alternatives A and D.

However, there would also be a reduction in economic benefits associated with the management, harvesting, manufacturing and retail sale of timber products from the areas that currently are suitable for timber production; a reduction in local tourism associated specifically with recreation special events such as endurance races that are not permitted in wilderness; and a reduction in local contracting of road maintenance and repairs where roads will be decommissioned. There would be reduced opportunities to recover commercial minerals and mineral exploration and development will be hindered. Specific analysis of net public values between all of the alternatives is provided in this chapter at Section C12.

Table 3C4-8. Effects of Wilderness Designation on Timber and Mineral Resources

Category	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
	Acres Recommended for Wilderness Study							
Lands Tentatively Suitable for Timber Production	1,116	19,182	346,329	12,739	22,645	106,273	19,182	23,838
Lands Identified as Suitable for Timber Production in 1993 Forest Plan	0	1,202	78,278	1,485	2,688	20,350	1,202	3,873
Lands Underlain with Privately Owned Minerals	253	0	37,280	581	2,956	9,976	0	0

As shown in Table 3C4-8, Alternative C has by a large margin 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. While road construction and structures associated with minerals development are inconsistent with managing an area for wilderness values, reasonable access would have to be granted to those owning the subsurface mineral rights. If this were to occur, the wilderness resource would be negatively impacted.

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 will be administratively unavailable for federal oil and gas and other federal mineral leases, pending final congressional action. These areas will not be 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 3C4-9.

Table 3C4-9. 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		Alts H and I	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	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%			1.1	8%
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%	0%	0%
Massanutten North					48.6	69%										
Oak Knob - Hone Quarry					4.7	15%										
Oliver Mountain					34.3	77%					27.3	79%				

	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F		Alt G		Alts H and I	
PWA Name	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
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%	0%	0%
Rich Hole Addition			3.8	29%	12.9	36%	3.8	29%	3.8	29%	12.9	35%	3.8	29%	3.8	29%
Rich Patch					9.1	37%										
Rough Mountain Add.					5.4	54%			5.4	54%	5.4	54%			0.8	13%
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%	0.5	19%
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 after congressional designation. New permanent wildlife openings would not be created. Habitat for early successional species will decrease. Fish stocking would emphasize reestablishment or maintenance of indigenous, threatened, endangered, or sensitive species. Rare communities and threatened and endangered species would be managed within the limitation of activities allowed within wilderness study areas.

Some of the areas contain threatened, endangered or sensitive (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 limited, 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 requires additional analysis during project level NEPA and it requires authorization by the Regional Forester. Table 3C4-10 provides information about the vegetative communities, TES species, acidified streams and special biological areas that could be affected by Wilderness designation for each of the alternatives.

Table 3C4-10. 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 frostweed, 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
H and I	876	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 the Forest Supervisor 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-dependent. 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 them qualify as a



Potential Wilderness Areas. Due to management direction in the Forest Plan, these remote areas would still qualify during the next forest plan revision for placement on the Potential Wilderness Area Inventory according to final agency guidance ([Forest Service Handbook \(FSH\) 1909.12 Chapter 70](#)). 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 Recommended Wilderness Study Area (1B), Remote Backcountry (12D), Recommended National Scenic Area (4FA), Research Natural Area (4B), Shenandoah Mountain Crest (8E7), and large blocks of Special Biological Areas (4D), like Kelley Mountain. These management prescription areas are all unsuitable for timber production. The biggest factor contributing to an area retaining the qualities to meet the PWA inventory is a restriction or prohibition on road construction.

In Alternative A, the Remote Backcountry 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, G, H and I, roads may not be constructed or reconstructed in the Remote Backcountry 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 Appropriate Decision-maker (Secretary of Agriculture for Inventoried Roadless Areas) 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, G, H and I, timber harvest is restricted in the Remote Backcountry 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 Remote Backcountry 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

With the exception of Alternative C, the alternatives allocate some of the Potential Wilderness Areas, or portions of these areas, to other management prescription areas that emphasize resources other than recreation and remote backcountry. See Table 3C4-3 for acres of Potential Wilderness Areas that are allocated to "Other Acres". 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. PWAs or portions of PWAs where these activities occur may not meet the PWA inventory criteria for the next GWNF plan

revision. Management prescription allocations in a Forest Plan do not necessarily commit an area to development. Before a decision is made to conduct one of these activities (for example: build a road or harvest timber in a Potential Wilderness Area), a site-specific analysis must be conducted.

Based on the data in Table 3C4-3, Alternative C provides for protection of all acres of Potential Wilderness Areas. Alternatives F, G, H and I follow with potential impacts to 31,300, 87,800 and 88,700 acres respectively where the PWA inventory criteria could be affected. Alternatives A and B provide the least protection of Potential Wilderness Areas, with potential impacts to 147,509 and 138,109 acres respectively.

With active management through road construction in these areas, the remote character may be diminished over time. The naturalness of these areas may be reduced. 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.

## 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 (IRAs) recommended for wilderness study are discussed in the above section on Potential Wilderness Areas.

Alternative A was developed to reflect the continuation of the management direction of the 1993 Plan, which was developed before the 2001 RACR and hence, does not have direction that requires that all inventoried roadless areas retain their roadless characteristics. However, the management prescribed for the areas that are in the IRAs 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 1993 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 and therefore the roadless qualities will be protected.

In Alternatives F, G, H and I all of the Inventoried Roadless Areas that are not Recommended for Wilderness Study have direction to maintain their roadless character and they will be managed consistent with the requirements of the 2001 RACR. For the recommended National Scenic Areas (NSAs), direction is dependent upon the authorizing legislation, but any IRAs within the NSAs will be managed consistent with the requirements of the 2001 RACR.

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, G, H and I. 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, which are activities that would not be consistent with the 2001 RACR) would be allowed where active management has occurred along existing roads regularly over the past forty years. These areas are identified in Table 3C4-11. All other areas of Inventoried Roadless Areas would have management direction to maintain their roadless character and would be consistent with the 2001 RACR. In addition, Alternatives B and D allow salvage harvest (which would be an activity that would not be consistent with the 2001 RACR) 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 would allow for the removal of dead trees with relatively little impact on the remote character of the Inventoried Roadless Areas.

Table 3C4-11. Portions of Inventoried Roadless Areas without Plan Direction to Maintain Roadless Character

Inventoried Roadless Area	Total Acres	Portions of Area Without Plan Direction to Maintain Roadless Character (Acres)						
		Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
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 would be outside of the management restrictions for IRAs, and if road construction or timber harvest is needed for wind energy development, it would be an activity that is not be consistent with the 2001 RACR.

Based on the above discussion, Alternative C provides the most protection for Inventoried Roadless Areas, followed by Alternatives F, G, H and I. Alternatives B and D provide the least overall protection for Inventoried Roadless Areas.

NOTE: Management activities in Inventoried Roadless Areas are conditional on the 2001 Roadless Area Conservation Rule. During the development of the issues and alternatives in this EIS, the 2001 RACR was under litigation and subject to changes in policy. Currently the 2001 RACR is in effect and applies to all IRAs. While Forest Plan management direction would allow timber harvest and road construction in some IRAs under Alternatives A, B, D and E, the 2001 RACR would not allow such activities to be implemented. Forest Plan direction under Alternatives C, F, G, H and I would be the same as the 2001 RACR for all of the IRAs.

## 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 forests 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, lakes and ponds, historic furnaces, pastoral areas, and administrative sites. 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 and 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 and grasslands/brushlands. These components 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, G, H and I 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 resource management direction in the 1993 Forest Plan was the Visual Quality Objectives (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>1</sup> Table 3C5-1 provides a crosswalk between VQOs used in the 1993 George Washington Forest Plan, and SIOs in the Revised Forest Plan.

Table 3C5-1. 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 management prescription area. 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 3C5-2. SMS Inventory

Scenic Integrity Objectives	Acres	% of GWNF Land
Very High	46,000	4%
High	379,000	36%
Moderate	548,000	52%
Low	88,000	8%
Very Low	0	0%

## 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>1</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 wildfires, 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 Study Areas are 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 National Scenic Trail Corridor, Eligible Wild and Scenic Rivers (scenic classification), Geologic Areas, Riparian Corridors and Remote Backcountry. In Alternatives B through I, Recommended Wilderness Study Areas are 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, Communication Sites and Utility Corridors. In Alternatives B through I, there are no prescription areas assigned a SIO of Low across all scenic classes.

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

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

SIO	Alt A*	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
VH – Very High	46,000	45,028	44,972	44,972	44,972	44,970	44,971	44,963
H – High	379,000	374,408	594,472	379,210	450,269	499,890	432,963	424,322
M - Moderate	548,000	199,216	237,678	196,132	178,843	160,927	182,157	579,573
L - Low	88,000	446,776	188,343	445,151	391,381	359,676	405,374	16,722

\*No Action Alternative

Alternatives that receive the most acres assigned SIOs of Very High and High would result in more protection of the scenic resources than alternatives having fewer acres assigned to the higher SIOs.

The difference between alternatives with regards to acres assigned to the Very High SIO is negligible.

Alternative C assigns the most acres to the High SIO since the majority of those acres (386,786) are in the Recommended Wilderness Study prescription. For those acres that Congress designates Wilderness, the SIO would change to Very High. Alternative C provides the best protection of the current scenic integrity with primarily intact forest canopies. Alternatives F, E, G, H and I, in that order, assign the next most acres to the High SIO. Of those, Alternative F has the most acres allocated to the Recommended Wilderness Study prescription that would change to Very High if designated by Congress. Alternatives C and F have the potential to result in the most acres of the national forest being managed with a SIO of Very High.

Alternatives H and I assign the most acres to the Moderate SIO, followed by Alternatives A, B, C and D. The acreage in Alternatives H and I was designed to mimic the emphasis on scenic resources in the 1993 Forest Plan and resulted from increasing the Scenic Integrity Objectives in the Mosaics of Habitat Management Prescription Area from Low to Moderate in Scenic Classes 3, 4 and 5.

Alternatives B, D and G assign the most acres to the Low SIO and provide the least protection for the current scenic integrity of primarily intact forest canopies. Alternatives A, H and I have the fewest acres in the Low category due to the emphasis on protecting resources in the 1993 Forest Plan and carrying that emphasis forward in the preferred alternative. While Alternative C has more acres assigned to a Low SIO, its low level of management activities will result in the best protection of the current scenic integrity.

All alternatives propose prescribed burning, as detailed in Table 3C5-4 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 in the short-term. The contrast levels and duration vary with fire intensity. Blackened vegetation usually lasts a short time but charring of trees may be evident for years. Repetitive burning often results in loss of valued mid- and understory species such as flowering dogwood, but tends to promote herbaceous flowering species. Stands with open understories allow views farther into the landscape, sometimes to adjacent forest stands, a valley or meadow below, or to the next ridge.

Table 3C5-4. Planned Prescribed Burning Program by Alternative, acres per year

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Prescribed Burns, acres per year	3,000	7,400	12,000 - 20,000	0	5,000 - 12,000	20,000	12,000 - 20,000	12,000-20,000

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

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, G, H and I contain management prescription area 13-Mosaics of Habitat that includes a landscape character goal of restoring the historic role of fire in the ecosystem, including the influence it had on landscape scenery. This landscape was characterized by a mosaic of closed canopy, open woodlands and grasslands/brushlands. Fire suppression has contributed to a transition in the landscape character to a predominantly closed canopy forest. This intact forest with little disturbance is the valued scenery today. The 1993 Forest Plan emphasized protecting this scenery by mitigating the appearance of canopy disturbing management activities. The reintroduction of fire into the ecosystem included in Alternatives B, E, F, G, H and I represents a potentially significant change in scenery to lands allocated to management prescription area 13. This prescription emphasizes, among other projects, restoring those open woodlands and grasslands/shrublands that existed as part of the natural evolving landscape. This restoration is expected to benefit many species of wildlife, grass forbs, and understory and mid-story species, including many flowering shrubs and edge-loving trees.

Prescribed fires mimicking the role of historic natural wildfires under Alternatives B, E, F, G, H and I would include more acres than under Alternatives A and D. These fires, some several thousand acres in size, would result in blackened and charred trees, including large patches of dead trees that will create openings in the canopy. With time, these openings will become natural appearing and add diversity to both the visual and biologic resources. These benefits are expected to make the transition from predominantly closed canopy to a mosaic that includes open woodlands and grasslands/brushlands an acceptable and valued landscape character.

Middleground is usually the predominant distance zone at which the national forest landscapes are seen. As stated previously, the George Washington National Forest is predominantly close canopied and evenly textured on the ridges and sideslopes, so the period of transition to the desired historic landscape character disturbed by fire will have a greater social effect when viewed in the middleground than in the foreground. This effect can be reduced by assuring that the target landscape character remains within the historic range; and, to the extent possible, attempt to design the openings to follow contours and be screened from critical viewing platforms by intervening vegetation and/or landforms.

In the long-term, added diversity of open woodlands and grasslands/shrublands intermixed with the closed canopy forests will enhance landscapes viewed in the foreground. The "green tunnel" on trails and roads will be interspersed with openings affording views to wildflowers, flowering shrubs and trees, landforms and rock outcrops, and increase opportunities to view wildlife within these areas. Opportunities exist to further enhance foreground views by creating vistas to scenic features.

Insect infections and diseases can cause strong, unattractive contrasts in the landscape. Management efforts to control insect infestations and diseases can minimize or reduce effects. 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, G, H and I provide the least potential effects 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, G, H and I. Alternative A focuses primarily on controlling gypsy moth and Alternative B increases recognition of non-native and invasive species. Both Alternatives 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 and 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, G, H and I 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 hydraulic fracturing.

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 3C5-5. Average Miles of Road Construction per Year by Alternative

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Road Construction, miles per year	2.9	1.8	1.5	0	4.1	0.9	0.5	1.5

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

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 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 3C5-6. Estimated Harvest Acres and Allowable Sale Quantity  
for Timber Management Activities by Alternative, First Decade

Activity	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Acres regeneration harvest, in thousands, first decade	24	7	30	0	42.5	18	10	30	30
Allowable Sale Quantity, in million cubic feet, first decade	47	47	55.3	0	105.8	31.1	19.1	55.2	55.3

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

Related to timber production, Alternative C would have the least adverse effect on the scenic resource and Alternative D would have the greatest potential for adverse effects to scenery. Of the alternatives that provide for an active timber program, Alternative F would have the least effect 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 can 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 3C5-6 provides the allowable sale quantity (ASQ) and annual harvest program by alternative.

In Chapter 3 of the Revised Forest Plan, Table 3-3 is a Scenery Treatment Guide which offers a list of measures to be considered for mitigating scenery impacts from management activities.

Recreation facilities are deviations to the natural landscape. None of the alternatives provide for the development of new developed recreation sites. Alternatives B, F, G, H and I 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.

Areas recommended for national scenic area designation are managed to assure protection of the area's scenic qualities. Alternatives with lands allocated to this management prescription area, in order of acres allocated, are Alternatives F, H, I and D. All alternatives contain the existing Mount Pleasant National Scenic Area.

In summary for scenery, the most significant potential adverse effects would come from (in order):

- industrial wind energy development (highly visible ridgetop development),
- road construction associated with special uses and timber production (canopy opening, line/color/texture contrast of the roads),
- minerals development and extraction (vegetative clearing, structures, previously mentioned roads),
- prescribed burning associated with restoration of fire dependent ecosystem (large canopy openings, charred trees and rock outcrops), and
- timber production (canopy openings, slash, previously mentioned roads)

The alternatives in order that provide the most protection of current scenic conditions and integrity are C, E, A, F, H, I, G, B, D. The alternatives that would restore, in part, the historic naturally evolving landscape character are B, E, F, G, H and I. This would result in a transition to a landscape character appearance that is within the historic range of variability.

## C6 - TIMBER MANAGEMENT

### AFFECTED ENVIRONMENT

#### Forested Area

The GWNF includes approximately 1,066,000 acres of National Forest System land in Virginia and West Virginia. Of this, approximately 1,058,000 acres are known to be forested. As indicated in Table 3C6-1, 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 3C6-1. 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 3C6-2 displays lands eliminated in Stage I suitability analysis to determine acres tentatively suitable for timber production.

Table 3C6-2. Stage I Acres Tentatively Suitable for Timber Production

Category of Stage I Lands	Acres
Total GWNF Acres	1,065,000
Non-Forest Land	(7,000)
Forest Land	1,058,000
Withdrawn for Existing Wilderness	(43,000)
Withdrawn for Existing National Scenic Area	(8,000)
Withdrawn for Research Natural Areas	(2,000)
Irreversible Damage & Not Restockable	(29,000)
Incapable of Producing Industrial Wood	(65,000)
Stage I Tentatively Suitable for Timber Production	911,000
Stage I Not Suitable for Timber Production	154,000

## Age Class Distribution

Most of the timber on the GWNF is currently in the 90-130 year old age class as evidenced by Table 3C6-3 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 3C6-3. 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 exhibit periodic outbreaks in an unpredictable fashion (Elkinton and Liebhold 1990). Varying amounts of mortality are expected in the two oak-associated community 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 (Gansner and Herrick 1984). 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 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 decline which has continued since 1993 to the present. The following Table 3C6-4 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 2011. The most recent 3 year average volume sold (2009-2011) reflects an almost 300% drop as compared to the 3 year average of 1993-1995. Historically about 30% of the volume sold is sawtimber, 50% is roundwood (pulpwood), and 20% is fuelwood. Of the fuelwood category, a large majority is personal use firewood permits while a small percentage is offered through a conventional commercial timber sale.

Table 3C6-4. Total Timber Volume Sold

FY	CCF	MBF
1993	68,118	34,059
1994	58,550	29,275
1995	52,122	26,061
1996	41,074	20,537
1997	38,436	19,218
1998	16,876	8,438
1999	30,086	15,043
2000	20,202	10,101
2001	24,886	12,443
2002	26,994	13,497
2003	24,210	12,105
2004	36,814	18,407
2005	23,550	11,775
2006	22,047	11,023
2007	16,362	8,181
2008	22,416	11,208
2009	16,403	8,201
2010	24,280	12,140
2011	23,598	11,799

During the period from 1993-2011, the harvest cutting methods by acres displayed in Table 3C6-5 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 3C6-5. Acres by Harvest Cutting Method for Harvested Volume by Fiscal Year

FY	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
2010	97	371	0	67	71	0	606
2011	10	498	0	143	0	0	651
10 Yr. Av.	24	540	18	159	47	1	788
5 Yr. Av.	42	427	1	188	29	0	687
3 Yr. Av.	59	404	0	185	48	0	697

## 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 3C6-1 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 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.



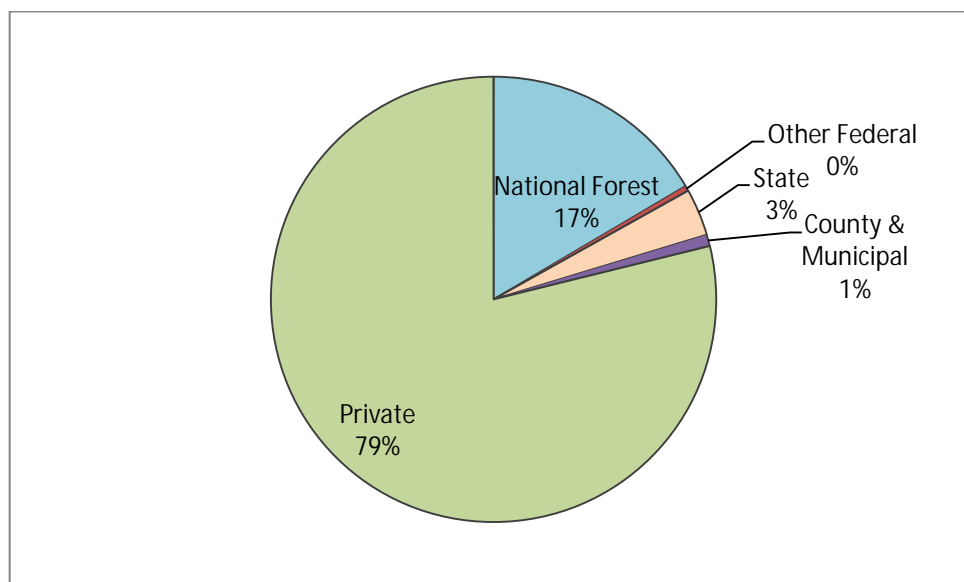


Figure 3C6-1. Percent Ownership of Timberland in the GWNF Market Area

We estimate 7-8 BCF (Billion Cubic Feet) of timber supply on economically available timberland in the market area and considering landowner attitudes (after Worthington et al. 1996). We can expect this to grow by about 0.57 BCF per year. Annual demand is about 0.3 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 trees. However, of the 2 BCF in live standing volume on the GWNF, we estimate only 0.51 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, referred to here as wood biomass energy, are gaining interest and support in many parts of the south. The potential to supply wood biomass energy from the GWNF is included in the aforementioned estimates. Of the 0.51 BCF available as supply, anywhere from 0 to 0.25BCF (250 MMBF) could potentially be utilized as wood biomass energy, 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 wood biomass energy. 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 0.5 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 wood biomass energy, 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 three states, we believe it is also important to consider the role of NFS lands on a more local level. NFS lands occupy 30% or more of three of the 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 3C6-2 above, approximately 86% (911,000 acres) of the Forest is “tentatively suitable” for timber production. Table 3C6-6 displays the acreage unsuitable for timber production and suitable for timber production for the nine alternatives considered. None of the alternatives used more than 46% of the lands tentatively suitable for timber production. Alternatives B and D contain the most lands suitable for timber production. Suitable acres vary from 0 to 499,000 acres.

Table 3C6-6. 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	566,000	499,000	47%
C	1,065,000	0	0%
D	570,000	495,000	46%
E	698,000	367,000	34%
F	784,000	281,000	26%
G	616,000	449,000	42%
H and I	613,000	452,000	42%

### Allowable Sale Quantity

Table 3C6-7 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 FEIS. 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 3C6-7 calculations to convert from cubic feet to board feet.

These alternatives have ASQs ranging from 0 to 105.8 MMCF per decade. As Table 3C6-7 indicates the alternatives explore a wide range of volume outputs to achieve a wide variety of desired conditions.

Table 3C6-7. Allowable Sale Quantity for all Products by Decade

Alternative	MMCF	MMBF
A*	47	235
B	55.8	279
C	0	0
D	105.8	529
E	31.1	155
F	19.1	96
G	55.2	276
H and I	55.3	276

\*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 3C6-8 displays ASQ for each alternative by decade. Table 3C6-9 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 a 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 3C6-8. 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	55.8	61.3	65.2	65.7	65.7
C	0	0	0	0	0
D	105.8	105.8	105.8	105.8	105.8
E	31.1	34.2	37.6	38.4	38.4
F	19.1	20.9	23.1	23.1	23.1
G	55.2	57.6	58.4	59.2	59.2
H and I	55.3	60.7	60.7	63.5	65.4

\*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 3C6-9. Estimated Volume by Wood Product for First Decadal ASQ by Alternative, MMCF

Alternative	Hardwood Sawtimber	Softwood Sawtimber	Hardwood Pulpwood	Softwood Pulpwood	Total
A	13.1	0.1	33.8	0.1	47.1
B	17.6	3.0	29.3	5.9	55.8
C	0	0	0	0	0
D	60.5	4.9	36.1	4.3	105.8
E	8.8	1.3	17.6	3.4	31.1
F	5.2	0.9	10.0	3.0	19.1
G	18.3	2.4	29.2	5.3	55.2
H and I	19.5	2.9	27.6	5.3	55.3

Table 3C6-10. Long-Term Sustained Yield Capacity, Inventory Volume, Allowable Sale Quantity, and Acres Regenerated by Alternative

Unit of Measure	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
	MMCF/Year							
Long Term Sustained Yield Capacity	5.8	6.5	0	11.6	4.9	3.2	6.3	6.4
Inventory Volume, Decade 1	21.58	22.3	0	36.2	15.6	9.5	21.9	23.1
Allowable Sale Quantity	4.7	5.6	0	10.6	3.1	1.9	5.5	5.5
	Acres/Year							
Acres Regenerated	2,400	1,800 - 3,000	0	3,000 - 4,250	1,800 – 3,000	1,000 – 1,800	1,800 - 3,000	1,800 - 3,000

## 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 3C6-11 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, G, H and I, 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 3C6-11. 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	(7.22)	(4.88)	(3.30)	(2.23)	(1.50)
B	(7.36)	(1.0)	6.60	0.9	2.36
C	0	0	0	0	0
D	16.79	6.88	6.87	4.96	3.80
E	(8.15)	(2.95)	0.18	0.12	0.52
F	(7.84)	(4.24)	(1.08)	(0.96)	(0.61)
G	(7.09)	(1.75)	0.57	0.26	1.17
H and I	(5.94)	(0.08)	1.84	0.89	1.66

## 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 (Virginia Primary Forest Products Directory 2001; West Virginia Division of Forestry, Maryland Department of Natural Resources). 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/year).

Currently, the demand for wood biomass energy 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 (personal communication, Jed Brown, Virginia Department of Environmental Quality). 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. Additionally, Mead-Westvaco has announced the conversion/construction of a large boiler capable of accepting wood biomass for energy. They are projected to use more than 500,000 tons annually in the near future. There are 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 wood biomass energy over the life of this analysis, it appears that any increase in the near future may be relatively small.

## Supply and Demand Comparison

Table 3C6-12 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 3C6-12. Supply (ASQ) as a Percent of Current Annual Demand from GWNF Lands

Alternative	MMCF	% of Demand
A	4.7	18
A <sup>1</sup>	2.2	9
B	5.6	22
C	0	0
D	10.6	41
E	3.1	12
F	1.9	7
G	5.5	22
H and I	5.5	22

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

As displayed in the table above, no alternative meets or exceeds current market demand. Alternatives meet between 0% and 41% of current demand for timber products that would come from GWNF lands.

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 3C6-12 Alternative D would provide the highest level of high value sawtimber. Other alternatives provide considerably less in descending order from Alternative B, G, H and I, A, E, F, and C.

Presumably the supply/demand relationship as it relates to wood biomass energy under each alternative would roughly follow the same relationship displayed in Table 3C6-12 above. Since current demand is minor 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 woody biomass utilization. Alternatives A, C, and F would limit woody biomass utilization to a minimum of a 4" diameter, the same limit that currently applies to the standard commercial timber sale. These alternatives would have less potential to supply wood biomass energy as compared to Alternatives B, D, E, G, H, and I. However, all alternatives, except C, will supply some level of small roundwood. Whether this material is used to produce paper or wood biomass energy is solely related to local market conditions in the area at the time; the Agency does not control that aspect. This factor further contributes to the inability to estimate our supply or role in wood biomass energy markets in any meaningful way.

## Age Class Distribution

Table 3C6-13 displays expected age class distribution in 2040, by alternative, following 30 years of plan implementation.

Table 3C6-13. Estimated Percentage of Forest by Age Class and Alternative on the GWNF Base Year 2040

Age Class	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
1-10	2	0	3	0	4	2	1	3	3
11-20	2	0	3	0	4	2	1	3	3
21-30	2	0	3	0	4	2	1	3	3
31-40	1	1	1	1	1	1	1	1	1
41-50	3	3	3	3	3	3	3	3	3
51-60	2	2	2	2	2	2	2	2	2
61-70	4	4	4	4	4	4	4	4	4
71-80	1	1	1	1	1	1	1	1	1
81-90	0	0	0	0	0	0	0	0	0
91-100	1	1	1	1	1	1	1	1	1
101-110	6	7	6	7	6	6	7	6	6
111-120	12	13	11	13	11	12	12	11	11
121-130	19	21	19	22	17	20	20	19	19
131-140	16	18	16	22	15	17	17	16	16
141-150	7	8	7	8	7	8	8	7	7
151+	20	20	20	20	20	20	20	20	20
Total	100	100	100	100	100	100	100	100	100

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

As Table 3C6-13 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. Alternative C will have the highest percentage of stands 100 years and older with 92%. Alternatives B, E, F, G, H and I are grouped between 79 and 87%, and Alternative D is the lowest at 76%. Conversely, Alternative D will have the greatest percentage of habitats less than forty years of age with 13%. Alternatives B, G, H and I are grouped at about 10%. Alternatives A and E are 7% followed by Alternative F and C at 4 and 1%, respectively.

## Methods of Harvest

Table 3C6-14 displays the method of timber harvest by alternative for the first 10 years of plan implementation.

As Table 3C6-14 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, H and I, F, and C. All alternatives employ various mixes of shelterwood harvesting, and significant thinning is employed in Alternatives B, E, G, H and I.

Table 3C6-14. Acres by Method of Harvest for the First 10 Years for all Harvest Methods

Alternative	GS	CC	SWR	SW-2 Stage	Thin	Total
A	800	3,000	20,000	0	1,740	25,540
A <sup>1</sup>	0	600	4,500	0	1,900	7,000
B	500	900	21,300	7,300	4,000	34,000
C	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
H and I	500	900	22,300	6,300	4,000	34,000

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

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 3C6-15 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 3C6-15. 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%
H and I	24%	74%	2%



## C7 - MINERAL RESOURCES MANAGEMENT

### AFFECTED ENVIRONMENT

The public use and enjoyment of the GWNF as well as the Forest's administration of renewable resources requires the use of, and creates demand for, a wide range of energy and non-energy mineral resources. The GWNF also contains mineral resources and is a potential source, or supply, for some mineral resources. For more information on the affected environment and environmental effects related to federal oil and gas leasing on the GWNF, see Section D of this Chapter.

### Forest's Demand for Minerals

This million-acre Forest uses energy and non-energy mineral resources to accomplish Forest Plan goals and objectives for the wide range of resource programs. The overwhelming majority of the tools, equipment and energy used to manage the Forest and sustain ecosystems are made of minerals, not wood. Minerals are used in three forms, 1) the hardware made from minerals: tools, equipment, infrastructure, vehicles, etc. 2) highly processed mineral supplies needed to operate and maintain the hardware: gasoline, oil, chemicals, batteries, etc. 3) minerals used as construction materials or in a relatively raw form: aggregate, rip-rap, concrete, landscaping rock, crushed limestone for liming streams.

Every day personnel on the GWNF use the non-renewable resources of gasoline and diesel fuel. Based on Forest fleet records, the GWNF in 2012 used an estimated 78,000 gallons of fossil fuels (gasoline and diesel) traveling 1.1 million miles in 128 vehicles. Assuming comparable annual use over the past 20 years since the previous Forest Plan, the Forest fleet has used on the order of 1.5 million gallons of fossil fuel. This estimate does not include the many other uses of fossil fuel such as, 1) contractors performing road grading, road resurfacing, cutting up and hauling fallen trees that block roads and bridges, 2) volunteers travel back and forth to the Forest, such as indicated by the 43,000 hours contributed by volunteers to the dispersed recreation program in FY2011, 3) helicopters and fixed wing aircraft used in fire management, insects and disease surveillance and monitoring, and flood and wind storm damage assessments, 4) airplane, bus and vehicle transportation of fire fighters from across the U.S. to fight forest fires on the Forest. Considering these other uses as well as fleet use, the annual gasoline/diesel consumption for Forest administration is estimated to be on the order of 100,000 gallons.

Gasoline is also used by the recreating public in travel to the GWNF. The numbers of Forest visitors and distances travelled in FY2011 are reported in the Forest's Visitor Use Report as part of National Visitor Use Monitoring (FY2011 USDA-Forest Service). Data in the Report was used to make an estimate of total miles travelled and fuel consumption. Visitors travelled about 80 million miles in order to recreate on the Forest in FY2011. Assuming 20 miles per gallon, recreation use of the Forest consumed on the order of 4 million gallons of gasoline/diesel in FY2011. This estimate includes only round trip mileage from the visitor's home to the Forest, and does not include any additional miles the visitor may have travelled on the Forest as part of the visit.

The Forest uses mineral materials (crushed rock aggregate, rip rap, landscaping rock, etc.) to construct and maintain the roads, develop recreation sites, trailheads, and other facilities. The largest use of mineral materials is on the Forest's 1,823 miles of system roads. Traffic on the 1,000 miles of system roads that are open year-round or seasonally wears out the road surfacing aggregate. Traffic crushes and abrades the rock fragments, turning the rock to dust that washes off or blows off the roads. New aggregate must be added to the roads periodically to maintain the road. Every year the Forest resurfaces a few roads with several thousand tons of aggregate. But road surfacing as well as periodic road grading are the two most expensive items in maintaining roads, and so, there is a backlog of many miles of roads needing resurfacing.

In addition to regular maintenance, minerals materials in large quantities are need to repair the roads and stream crossings damaged or destroyed by storm events, floods, road slopes failures, etc. The Forest uses rocks pits on the Forest to supply some mineral materials. However, the vast majority of mineral materials used by the Forest are purchased from private rocks pits located off the Forest.

The GWNF, like other National Forests, depends on the U.S. maintaining and continuing the historic shift from use of wood to the use of minerals. In the 19th century, conservation pioneers were predicting the catastrophic loss of American forests since wood was among the most widespread and essential materials both for domestic use and industry (MacCleery 1992). The escalating trend to loss of forests was broken when the U.S. made an historic shift from the use of wood to the use of minerals. Several factors for this break in trend are discussed by MacCleery (1992), including the important role of mineral resources, such as: “During the first half of the 19th century, domestic output of forest products rose at the rate of population growth. Heating and cooking was the largest use of wood during this period, averaging from one-half to two-thirds of total wood use. In 1850 wood provided over 90 percent of the nation’s energy. After 1900, fossil fuels largely replaced wood fuels, and wood substitutes, such as steel and concrete, replaced wood in some structural applications.” MacCleery (1992) states, “By the 1920s, the three-hundred-year loss of Forest land in the United States had nearly halted. Today, the country has about the same area of forest as it did in 1920.” As Sedjo (1990) notes, although the population had continued to increase, the total wood consumption in the U.S. declined after the first decade of the 20th century. The indispensable role of mineral resources in the historic restoration and sustainability of forests continues up to the present, and will be required in the future to restore and sustain forests (Collins et al. 1997).

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

## 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 as 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 3D-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 or relocations, Wild & Scenic River designations, Recommended Wilderness Study Areas, or Remote Backcountry prescriptions.

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, INDIRECT AND CUMULATIVE EFFECTS

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

## Effects Associated with Forest Demand for Mineral Resources

The consumption of, and irretrievable commitment of, non-renewable mineral resources would vary by alternative. The estimates in the following table indicate 1) the order of magnitude of the effect on mineral resources, 2) the relative differences between Alternatives.

Under the current Plan (Alternative A) the annual gasoline and diesel consumption for Forest administration is estimated to be about 100,000 gallons. The consumption will vary by alternative depending on the amount of on-the-ground activities. The Acres of Soil Disturbance by alternative (Table 3A6-3) was used as an indicator of field activities. The table for fuel consumption uses 100,000 gallons of Alt A as the base (100%) and then calculates the gallons for each Alt based on the proportional change in activities from the Acres of Soil Disturbance.

Table 3C7-1. Estimated Annual Gas/Diesel Consumption for Forest Administration (thousands of gallons)

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Annual Fuel Consumption (thousand gallons)	100	98-144	66	152-227	96-140	76-110	101-147

The diesel consumption for truck log hauling for GWNF timber harvest was estimated using Forest appraisal information, and is estimated to be about 7 gallons per CCF. Truck log hauling typically is the largest user of fuel on a timber sale, and can be 50 percent of the cost of a timber sale. The diesel and gasoline consumption for other timber harvest operations (road work, landing construction, felling, bucking, yarding, etc.) is estimated to be about 7 gallons per CCF. The total diesel/gas consumption per CCF harvested on the Forest is estimated to be about 14 gallons per CCF. This estimate was applied to the Allowable Sale Quantity for All Products by Decade (CCF) in Table 3C6-8 to develop Table 3C7-2.

Table 3C7-2. Estimated Annual Gas/Diesel Consumption for Forest Timber Harvest (thousands of gallons)

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Annual Fuel Consumption (thousand gallons)	658	781	0	1,481	435	267	773	774

Under the current Plan (Alternative A) it is estimated that the public consumes on the order of 4 million gallons of gasoline/diesel a year traveling to the GWNF. Using the estimated capacity (PAOTs) of developed recreation areas as an indicator of National Forest visits by the public (Table 3C1-11), the gasoline and diesel consumption by visitor travel for Forest recreation by alternative is estimated in Table 3C7-3 by using the alternative's proportion of PAOTs relative to Alternative A.

Table 3C7-3. Estimated Annual Gas/Diesel Consumption for Forest Public Recreation (thousands of gallons)

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Annual Fuel Consumption (thousand gallons)	4,000	4,000 - 4,200	3,400 - 3,800	4,000	3,400 - 3,800	4,200 - 4,600	4,000- 4,200

From the Forest's establishment up to the present, the Forest has been primarily a user of, rather than a supplier of, mineral resources. In the future, the administration of the Forest as well as timber harvest and recreation will continue to require mineral resources regardless of whether or not the Forest supplies any mineral resources. The consumption of gasoline/diesel for these major consumers of fossil fuels is estimated for decade 1 in Table 3C7-4. The consumption of gasoline/diesel by potential federal oil and gas operations is shown and added to the subtotal in Table 3C7-4.

Table 3C7-4. Estimated Gas/Diesel Consumption for Decade 1 (millions of gallons)

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Forest administration*	1.0	1.2	0.7	1.9	1.2	0.9	1.2	1.2
Timber Harvest	6.6	7.8	0.0	14.8	4.4	2.7	7.7	7.7
Recreation*	40.0	41.0	36.0	40.0	36.0	44.0	41.0	41.0
Total	47.6	50.0	36.7	56.7	41.5	47.6	50.0	50.0

\*Based on midpoint of range in annual gas/diesel consumption tables

**Mineral materials (aggregate, rip-rap, stone, etc.)** – Because roads use the most mineral materials, the projected miles of road in the minimum road system at the end of 10 years will be used as one indicator of the effect of each Alternative on mineral material use. Based on Table 3C8-2 Road construction and Decommissioning miles, Alternative A has the potential for most use of mineral materials; and Alternative C has the potential for least use of mineral materials; Alternatives D, B, G, H, I, E and F have potential for intermediate levels of use of mineral materials.

## Effects Associated with Forest Supply of Mineral Resources

**Federal leasable minerals other than oil and gas** - 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, H, I 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, Alternatives A and D have the most potential and Alternative C has the least potential for effects; Alternatives F, B, E, G, H and I 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.

**Federal mineral materials (36CFR228C)** - The areas of suitable use to meet demand from the public and from public agencies for mineral materials 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, H, I 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, Alternatives A and D have the most potential and Alternative C has the least potential for effects; Alternatives F, B, E, G, H and I have intermediate potential for effects.

**Outstanding and reserved mineral rights** - 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, Section D of this Chapter.
- 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 taking 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 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, H and I, F, E, and C.

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, H, I, 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.

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 should be further analyzed and implemented through project level NEPA.

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 next decade. 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 is borne by the permitted entity. Where these routes are no longer needed, used or not being maintained, they will be decommissioned.

TAP should 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 3C8-1. Maintenance Levels of Current Road System and Transportation Analysis Process (TAP) Objective, miles

Description	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%

**DIRECT, INDIRECT AND CUMULATIVE EFFECTS**

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 3C8-2 below.

Table 3C8-2. Road Construction and Decommissioning, miles

Description	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Current Roads	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805
Special Use Roads – Not part of Minimum Roads System	50	50	50	50	50	50	50	50	50
Potential Forest Highways – Not Part of Minimum Roads System	129	129	129	129	129	129	129	129	129
Roads to be Decommissioned			160	160	80	160	160	160	160
Potential Additional Decommissioning from Future Wilderness Designation	0	0	2	147	6	4	26	2	4
Acres Timber Regeneration Harvest	2,400	700	3,000	0	4,250	1,800	1,000	3,000	3,000
Road Construction (miles during decade)	29	18	15	0	41	9	5	15	15
Minimum Road System at End of 10 years	1,655	1,644	1,479	1,319	1,581	1,471	1,445	1,479	1,477

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

As Table 3C8-2 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.

Alternative C could result in additional decommissioning of roads, since many of the closed roads and administrative use roads would no longer be needed for vegetation management activities. It is estimated that up to 200 miles of additional closed roads could be decommissioned, but it is difficult to quantify the extent of the needs for these closed roads.

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 3C8-3.



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

Maintenance Level	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Maintenance Level 1 - Closed in storage for future use	249	238	155	100	217	147	137	153	151
Maintenance Level 2 - High Clearance, seasonal or admin	967	967	1,003	912	1,043	1,004	994	1,005	1,005
Maintenance Level 3 - Passenger Car	379	379	281	268	281	280	274	281	281
Maintenance Level 4 - Passenger Car, collector	56	56	32	32	32	32	32	32	32
Maintenance Level 5 - Passenger Car, 2-lane, paved, arterial	5	5	8	8	8	8	8	8	8

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

Table 3C8-4 displays an estimate of the road closure status by alternative. Road closure status can be affected by many site specific factors relating to road stability, wildlife and recreation settings and resource needs, so these are only estimates.

Table 3C8-4. Road Closure Status, miles

Closure Status	Current Road Miles	Miles of Road by Closure Status at End of First Decade								
		Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Closed	223	252	241	157	70	221	150	135	157	156
Admin	557	557	557	526	454	564	525	514	526	525
Seasonal	424	424	424	369	369	369	369	369	369	369
Open	601	601	601	606	606	606	606	606	606	606

Alt<sup>1</sup> represents the actual implementation level of the 1993 Forest Plan

## C9 - LAND USE

### AFFECTED ENVIRONMENT

The proclamation boundary of the George Washington National 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.

The Forest property boundaries total approximately 3,000 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 3C9-1. Boundary Lines and Planned Level of Maintenance

District	Boundary Miles	Range of Boundary Line Maintenance (Miles per Year)	
		Low	High
Lee Ranger District	614	17	26
North River Ranger District	801	30	45
Pedlar Ranger District	468	20	30
Warm Springs Ranger District	496	16	24
James River Ranger District	611	17	26
Total	2,990	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

All occupancy or use on NFS lands that are not directly related to timber harvest, grazing, mining activities, and recreation are referred to as 'non-recreation special uses.' Typically non-recreation special uses includes: roads, easements, storage facilities, agricultural improvements, locations of scientific equipment, dams, communication sites, and utility/energy transmission infrastructure. Recreation special uses include: outfitter & guides, and a variety of uses that provide access to NFS lands by commercial ventures. Special use authorizations are issued for multiple purposes to individuals, corporations, and other government agencies for uses that are determined to be in the public interest and are compatible with management direction in the Forest Plan. Proposals for use are screened prior to acceptance and if accepted for consideration, undergo a site-specific environmental analysis. 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 3C10-1. Special Use Permits

District	Permits	Acres
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.

Each land use authorization contains terms and conditions designed to protect the public interest in accordance with applicable statutes, rules and regulations. Periodic reviews and inspections of land uses seek to ensure that the terms and conditions are met and to identify and correct non-compliance with permits.

### DIRECT, INDIRECT AND CUMULATIVE EFFECTS

None of the alternatives propose any site-specific changes to existing special use authorizations on the GWNF. With such a fragmented ownership pattern and increasing development along its boundaries, the GWNF is expected to see a continuing increase in requests for special use permits, ranging from minor private road easements to requests for new utility corridors or rights-of-way (e.g. fiber optic cables) and communication sites. The Forest is also expecting an increase in the requests from existing permittees to upgrade existing aboveground transmission lines, underground pipelines, communication site facilities, and dams to meet new regulatory requirements, replace deteriorating structures, meet increased demands or implement new technology.

The potential for new special use permits could vary by alternative since one evaluation factor is whether it is compatible with the management prescription for the area in question. There could be a higher number of new special use permits in Alternative D since one of the emphases is to support economic development of local communities. Alternatives C and F would have the lowest potential for new special use permits because of the

amount of land allocated to more management prescriptions (e.g. Recommended Wilderness Study, Recommended National Scenic Areas, Remote Backcountry) where new special uses are not allowed or road construction is limited.

Due to the ownership pattern of the Forest, sometimes the infrastructure needed for energy transmission, communications, water, and other services cannot be provided or developed on private lands without crossing National Forest Service lands. Without the use authorized in the Forest, this could result in diminished public health and safety, community services, economic growth and sustainability or could result in increased environmental impacts on private lands.

Non-recreational special uses also generate revenue for the federal government (see Chapter 3, Section C12, Social and Economic Environment).

## 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

Utility corridors can provide a grassland/shrubland that is beneficial for wildlife species but require mechanical or chemical treatment of unwanted vegetation and non-native invasive species.

All alternatives designate areas as unsuitable for new utility corridors in certain areas (i.e. Wilderness), 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 NFS lands with new utility corridors.

## Communication Sites

### AFFECTED ENVIRONMENT

There were eleven classified communications sites on Forest in the 1993 GWNF Plan. Three additional sites that have existed for many years are designated through this planning process. The Alleghany County site was approved through a non-significant amendment to the 1993 GWNF Forest Plan in March 2014. 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 3C10-2.

Table 3C10-2. Communication Sites

District	Site	Year Approved	Use	FS Use	Use Type
Lee	Signal Knob	1978	Single	No	High and low Power
Lee	Great North Mtn	1980	Multiple	Yes	High and low Power
Lee	Big Mtn	1978	Multiple	Yes	High and low Power
North River	Elliot Knob	1977	Multiple	Yes	High and low Power
North River	White Grass Knob	1982	Single	No	Low power
North River	Narrowback Mountain	1993	Single	No	High power
James River	North Mountain	1979	Multiple	No	Low power
James River	Fore Mountain	1994	Single	Yes	High and low Power
James River	Harmons Branch	1966*	Single	No	Low power
James River	Alleghany County	2014	Multiple	No	Low power
Pedlar	Rocky Mountain	1977	Multiple	Yes	High and low Power
Warm Springs	Duncan Knob	1977	Multiple	No	Low power
Warm Springs	Little Back Creek	~1980*	Multiple	No	Low power
Warm Springs	Bald Mountain	~1980*	Multiple	Yes	Low power

\*Existing sites being designated as communication sites

## DIRECT, INDIRECT AND CUMULATIVE EFFECTS

Communication facilities have been found to have detrimental effects on some mammal and migratory bird species and also affect visual resources. Site-specific analysis will address these concerns during construction of new towers or replacement of existing towers.

All alternatives designate areas as unsuitable for new communication sites in certain areas (i.e. Wilderness). 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 NFS 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 RESOURCES

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, federal payments, 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, such as data by county, can be found in Appendix C of the Analysis of the Management Situation for the GWNF.

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 connecting biological habitat and resources for ecological and species diversity and in providing social and economic opportunities for a large and growing population base.

The bounds for most social and economic effects are defined by the counties that contain lands administered by the George Washington National Forest. However, the Jefferson National Forest and the Monongahela National Forest also have land within several of the same counties. Table 3C12-1 identifies the acres of federal and state ownerships within the 17 counties that contain GWNF lands so that one can see the cumulative influence of public ownership within these counties. For the counties containing GWNF lands, Bath and Alleghany Counties have about 50 percent of their acres comprised of GWNF lands. Five additional counties (Amherst, Augusta, Highland, Rockingham, and Shenandoah) have from 20-30% of their acres comprised of GWNF lands. Together with additional national forest system lands for the Jefferson and Monongahela National Forests, the total amount of national forest system lands in Botetourt and Pendleton Counties increases to 23% and 29%, respectively, of total county acres.

In Virginia, some social and economic data for independent cities are reported separate from county data. The following GWNF counties have the associated independent city data included in the effects analysis for social and economic effects: Alleghany County – Covington city; Augusta County - Staunton and Waynesboro cities; Frederick County – Winchester city; Rockbridge County - Buena Vista and Lexington cities; and Rockingham County – Harrisonburg city.



Table 3C12-1. Federal and State Ownership Acres in Counties with GWNF Lands

County, State	Total County Acres	George Washington National Forest Acres	% GWNF Acres of Total County Acres	Other National Forest Acres	National Park Service Acres	State Acres
Alleghany, VA	290,703	141,866	49%			385
Amherst, VA	306,333	57,877	19%		2,224	
Augusta, VA	643,628	196,057	30%		16,299	12,393
Bath, VA	341,984	173,705	51%			17,395
Botetourt, VA	349,262	13,047	4%	68,102 <sup>1</sup>	3,222	
Frederick, VA	271,708	4,885	2%			
Highland, VA	266,030	58,255	22%			13,689
Nelson, VA	303,426	19,825	7%		5,129	1,508
Page, VA	200,922	27,082	13%		38,290	
Rockbridge, VA	390,413	45,541	12%	21,306 <sup>1</sup>	1,710	22,244
Rockingham, VA	557,093	139,783	25%		37,746	845
Shenandoah, VA	327,906	76,057	23%			360
Warren, VA	138,143	6,290	5%		14,632	1,706
Hampshire, WV	412,342	3,518	1%			18,316
Hardy, WV	373,906	52,047	14%			6,512
Monroe, WV	302,994	428	<1%	18,530 <sup>1</sup>		2,740
Pendleton, WV	446,620	49,106	11%	82,038 <sup>2</sup>		629
VIRGINIA (above listed counties)	4,387,551	960,270	<1%	89,408	119,252	70,525
WEST VIRGINIA (above listed counties)	1,535,862	105,099	<1%	100,568	0	28,197
TOTAL (above listed counties)	5,923,413	1,065,369	0%	189,976	119,252	98,722

Source: national forest acres are from USDA Forest Service "Land Areas of the NF System", 2011, <http://www.fs.fed.us/land/staff/lar/2011/lar2011index.html>; All other acres are from US Census Bureau (2010).

<sup>1</sup> – Jefferson National Forest

<sup>2</sup> – Monongahela National Forest

## Social Environment

### AFFECTED 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 has steadily increased from 5.35 million in the 1980 Census to 8.0 million in the 2010 Census. This represents a 16% increase between 1980 and 1990, a 14% between 1990 and 2000, and a 13% increase between 2000 and 2010 as shown in Table 3C12-2. However, West Virginia's population has decreased overall from 1.95 million in 1980 to 1.85 million in 2010. Population decreased from 1980 to 1990 by 8%, increased from 1990 to 2000 by 0.8 percent and increased 2.5% from 2000 to 2010. Much of the population 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.

Table 3C12-2. Population Change in Virginia and West Virginia from 1980 to 2010

State	Population	1980	1990	2000	2010
Virginia	Total Population	5,346,818	6,187,358	7,078,515	8,001,024
	Population Change from prior period		840,540	891,157	922,509
	Percent Change from prior period		15.7%	14.4%	13.0%
West Virginia	Total Population	1,949,644	1,793,477	1,808,344	1,852,994
	Population Change from prior period		-156,167	14,867	44,650
	Percent Change from prior period		-8.0%	0.8%	2.5%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

The report "Virginia Demographic Profile 2009" from the Council on Virginia's Future ([covf@virginia.edu](mailto:covf@virginia.edu)) 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.

Table 3C12-3 shows the population trends by the counties having GWNF lands. When compared to Virginia's overall trends (since the majority of GWNF lands lie in Virginia), the GWNF counties show a growth of more than half the rate of Virginia between 1980 and 1990 (8.9% versus 15.7%), slightly more than Virginia's growth rate between 1990 and 2000 (15.7% versus 14.4%), and a greater growth rate than Virginia's growth rate between 2000 and 2010 (16.6% versus 13%).

Table 3C12-3. Population for Counties with GWNF Lands from 1980 to 2010 (includes independent cities data)

County, State	1980	1990	2000	2010	Change 1980- 1990	Change 1990- 2000	Change 2000- 2010
Alleghany County, VA	23,396	20,167	19,229	22,395	-13.80%	-4.70%	16.5%
Amherst County, VA	29,122	28,578	31,894	32,315	-1.90%	11.60%	1.3%
Augusta County, VA	75,589	79,138	89,468	117,892	4.70%	13.10%	8.2%
Bath County, VA	5,860	4,799	5,048	4,779	-18.10%	5.20%	-5.3%
Botetourt County, VA	23,270	24,992	30,496	32,867	7.40%	22.00%	7.8%
Frederick County, VA	54,367	67,670	82,794	101,788	24.50%	22.30%	22.9%
Highland County, VA	2,937	2,635	2,536	2,395	-10.30%	-3.80%	-5.6%
Nelson County, VA	12,204	12,778	14,445	14,989	4.70%	13.00%	3.8%
Page County, VA	19,401	21,690	23,177	24,116	11.80%	6.90%	4.1%
Rockbridge County, VA	24,628	24,756	27,157	35,860	0.50%	9.70%	5.4%
Rockingham County, VA	76,709	88,189	108,193	122,328	15.00%	22.70%	13.1%
Shenandoah County, VA	27,559	31,636	35,075	41,468	14.80%	10.90%	18.2%
Warren County, VA	21,200	26,142	31,584	37,044	23.30%	20.80%	17.3%
Hampshire County, WV	14,867	16,498	20,203	23,594	11.00%	22.50%	16.8%
Hardy County, WV	10,030	10,977	12,669	13,832	9.40%	15.40%	9.2%
Monroe County, WV	12,873	12,406	14,583	13,495	-3.60%	17.50%	-7.5%
Pendleton County, WV	7,910	8,054	8,196	7,773	1.80%	1.80%	-5.2%
Total Forest Counties	443,902	483,095	558,747	648,930	8.90%	15.70%	16.1%
Virginia (state total)	5,346,818	6,187,358	7,078,515	8,001,024	15.70%	14.40%	13.0%
West Virginia (state total)	1,949,644	1,793,477	1,808,344	1,852,994	-8.00%	0.80%	2.5%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

Population outside of counties with GWNF ownership is also important to consider, especially 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 (Overdest and Cordell 2001). Using this definition, the GWNF market area for recreation entails portions of Virginia, West Virginia, Pennsylvania, Maryland, North Carolina and the District of Columbia. The population living within the market area is about 10.54 million (US Census Bureau 2010). 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, Fredericksburg, Harrisonburg, Lynchburg, Manassas, Richmond, Roanoke, Staunton, Vienna, and Winchester, Virginia; Beckley, Bluefield, Elkins, Martinsburg and Princeton, West Virginia; and Frederick and Silver Spring, Maryland.

## Race/Minorities

Different groups of people may value and use public lands in different ways. Understanding those various values, beliefs, and attitudes in an area can be an important consideration to meet the needs of the public, such as developing multilingual communication strategies.

For public land managers, one of the important considerations of proposed management actions is whether the action could have disproportionately high and adverse effects on minority populations. This consideration, broadly referred to as "Environmental Justice", is a requirement of Executive Order 12898. The discussion of Environmental Justice and Civil Rights is provided later in this section.

Table 3C12-4 shows the number of people within the counties that contain GWNF lands who self-identified as belonging to a particular race for the 2010 Census. When comparing those counties to each other, the following counties have a slightly higher percentage of Hispanics or Latinos than the average: Rockingham (9%), Frederick (8%) and Shenandoah (6%). The Census Bureau predicts that 24.4% of the population in the U.S. will be Hispanic by 2050. Between 2000 and 2010, Hispanics accounted for over one-half of the nation's population growth. The following counties have a higher percentage of Blacks or African Americans, compared to other GWNF counties: Amherst (19%) and Nelson (14%).

Table 3C12-4. Racial Composition of GWNF Counties in Virginia and West Virginia in 2010

Race	Number of People	Percentage of Total Population in GWNF Counties
White	570,389	87.90%
Black or African American	33,593	5.18%
Hispanic or Latino (of any race)	29,058	4.48%
Two or More Races	6,962	1.07%
Asian	5,954	0.92%
American Indian	1,522	0.23%
Other	981	0.15%
Native Hawaiian	471	0.07%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

## Age

Understanding the age distribution can help highlight whether management actions might affect some age groups more than others. It also may highlight the need to understand the different needs, values, and attitudes of different age groups. If an area has a large retired population, or soon-to-be-retired population, the needs and interests of the public may be focused on easily accessible recreation opportunities. Younger people may want physically challenging mountain bicycling opportunities. For many areas, a significant consideration is the aging of the population, and in particular the retirement of the "Baby Boomer" generation (those born between 1946 and 1964). As this generation enters retirement age, their mobility, spending patterns, and consumer demands (for health care and housing, for example) can affect how communities develop economically. An aging population can also affect changing demands on land use, such as increased opportunities for driving for pleasure or increased parking opportunities for hunters.

Table 3C12-5 shows the share of population by age within the counties having GWNF lands. Within the last ten years, the percentage of people aged 45 and older has increased from 38% of the total population to 43%. On a county comparison level, Bath, Highland and Pendleton Counties have a larger percentage of people aged 65 and older compared to the other counties and a smaller percentage of youth. Rockingham County has a larger percentage of youth in comparison to other counties.

Table 3C12-5. Population Age within GWNF Counties in 2010

Population Age	2000	2010
Total Population	583,134	648,930
Under 18	133,001	142,438
18-34	134,072	141,507
35-44	91,571	86,773
45-64	142,334	178,984
65 and over	82,156	99,228
Percent of Total		
Under 18	22.80%	21.90%
18-34	23.00%	21.80%
35-44	15.70%	13.40%
45-64	24.40%	27.60%
65 and over	14.10%	15.30%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at

<http://headwaterseconomics.org/tools/eps-hdt>

## Population Density

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. Of all the national forests and grasslands, the GWNF was found to have the most acreage of increases in housing density, 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.

## Agricultural Lands

Table 3C12-6 presents a picture of how much a county has in farmlands.

Table 3C12-6. Percent of County Acres in Farmlands, 2007

County, State	% of County Acres in Farmland
Alleghany County, VA	10%
Amherst County, VA	29%
Augusta County, VA	45%
Bath County, VA	11%
Botetourt County, VA	25%
Frederick County, VA	36%
Highland County, VA	29%
Nelson County, VA	24%
Page County, VA	32%
Rockbridge County, VA	36%
Rockingham County, VA	42%
Shenandoah County, VA	43%
Warren County, VA	35%
Hampshire County, WV	32%
Hardy County, WV	36%
Monroe County, WV	44%
Pendleton County, WV	38%
County Region	33%
Virginia	32%
West Virginia	24%

Source: Bureau of Economic Analysis, National Agricultural Statistics Service, Bureau of Labor Statistics, US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

## 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.

The Southern Research Station and the University of Tennessee conducted a public survey of residents within 75 miles of Southern Appalachian Mountains national forests concerning the public use and preferred objectives for the management of the southern Appalachian national forests (USDA Forest Service 2002). Survey questions concerned the respondents' (1) values, attitudes, and beliefs at a specific forest level; (2) participation activities on national forest lands; (3) feelings toward natural resource management in general; (4) beliefs on how the national forests should be managed; and (5) concern about various environmental issues in the southern Appalachians.

The public survey provided information on the values residents have related to natural resources in the publication "Public Survey Report Southern Appalachian National Forests, George Washington and Jefferson National Forests." Well over 90% of the sample for the George Washington National Forest market area thought maintaining the forests in good condition for future generations protection of clean water was the most important management goal. The next highest percentages (in the low 90s) included protecting sources of clean water, providing protection for wildlife and habitat, protecting trees for healthy forests, leaving forests natural in appearance, and protecting rare or endangered species. Other values favored by survey participants included management of national forests as sources of raw materials and products to support local industries (38%), permitting of grazing by livestock (44%), helping local tourism businesses (58%), provisions of an abundant timber supply (72%) and outdoor recreation (72%). All of these values were highly consistent with priorities of residents throughout the Southern Appalachian region.

Over 80% of the survey participants thought the top management objectives should include: protection of streams, lakes and watershed areas, protection of wildlife habitats, protection of old growth areas and provision of habitat for wildlife and bird viewing. Almost 65% thought more areas should be designated as wilderness, as well as use of controlled fire was important. About 60% thought provision of trail systems for non-motorized recreation and a diversity of uses such as grazing, recreation and wildlife habitat (in other areas) were important. On the lower end of the spectrum, the objectives from least to greater importance included: allowance of commercial leasing of oil and gas rights, expansion of access for motorized off-highway vehicles, provision of new paved roads for cars and allowance of harvesting and mining to support communities. The priority for these objectives was nearly the same as the average for the entire Southern Appalachian region. People who reside in areas near the GWNF generally put ecosystems, wildlife and naturalness above utilitarian objectives in national forest management. However, as shown in the Economic Impacts section, commodities such as mining and timber can contribute important portions of income and employment to the local economy. Therefore, impacts to the 'naturalness' aspect of the forest are compared with impacts to the 'commodity' aspect of the forest.

## Economic Environment

### AFFECTED 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, and economic industrial sector representation are used to measure economic progress, viability and stability.

## 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. Understanding income differences within and between areas helps to highlight areas where the population or a sub-population may be experiencing economic hardship.

According to the 2010 Statistical Abstract (US Census Bureau), the per capita income for Virginia was \$44,224 (7<sup>th</sup> in nation) and for West Virginia it was \$31,641 (49<sup>th</sup> in nation). The per capita income and median household income for the counties with GWNF lands are shown in Table 3C12-7.

Table 3C12-7. Per Capita Income and Median Household Income for GWNF Counties, 2010. Independent city estimates are identified exclusive of the county estimates.

County or Independent City	Per Capita Income	Median Household Income
Alleghany County, VA	\$22,013	\$43,160
Covington city, VA	\$20,781	\$35,277
Amherst County, VA	\$21,097	\$44,757
Augusta County, VA	\$23,571	\$50,612
Staunton city, VA	\$24,077	\$42,724
Waynesboro city, VA	\$23,190	\$40,977
Bath County, VA	\$22,083	\$50,589
Botetourt County, VA	\$29,540	\$64,724
Frederick County, VA	\$27,977	\$61,973
Winchester city, VA	\$26,341	\$44,873
Highland County, VA	\$25,690	\$43,481
Nelson County, VA	\$26,996	\$48,118
Page County, VA	\$22,969	\$41,617
Rockbridge County, VA	\$23,753	\$44,417
Buena Vista city, VA	\$19,030	\$39,955
Lexington city, VA	\$17,022	\$31,571
Rockingham County, VA	\$25,274	\$49,930
Harrisonburg city, VA	\$16,750	\$37,235
Shenandoah County, VA	\$24,502	\$50,171
Warren County, VA	\$29,098	\$60,522
Hampshire County, WV	\$17,752	\$31,792



County or Independent City	Per Capita Income	Median Household Income
Hardy County, WV	\$16,944	\$31,347
Monroe County, WV	\$18,927	\$39,574
Pendleton County, WV	\$19,401	\$33,323

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

## 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, as shown in Table 3C12-9. In 2011, out of the 13 Virginia counties with GWNF lands, seven had unemployment rates higher than the state average, and out of the four West Virginia counties, one had an unemployment rate higher than the state average.

Table 3C12-8. People and Families Below the Poverty Level in GWNF Counties, 2010

County, State	People Below Poverty	Families Below Poverty	People Below Poverty	Families Below Poverty
Alleghany County, VA	2,851	514	13%	8%
Amherst County, VA	4,004	626	13%	7%
Augusta County, VA	13,744	2,800	12%	9%
Bath County, VA	491	99	10%	7%
Botetourt County, VA	1,783	405	6%	4%
Frederick County, VA	10,201	1,723	10%	6%
Highland County, VA	211	43	9%	5%
Nelson County, VA	1,767	403	12%	9%
Page County, VA	3,033	593	13%	9%
Rockbridge County, VA	5,482	960	17%	10%
Rockingham County, VA	20,088	2,379	18%	8%
Shenandoah County, VA	3,811	754	9%	6%
Warren County, VA	3,484	708	10%	7%
Hampshire County, WV	3,759	638	16%	11%
Hardy County, WV	2,055	334	15%	11%
Monroe County, WV	1,778	404	13%	10%
Pendleton County, WV	1,159	244	15%	11%
County Region	79,701	13,627	13%	8%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

Table 3C12-9. Percent Unemployment Rates in GWNF Counties, 1990, 2000, and 2011

County or Independent City	1990	2000	2011
Alleghany County, VA	7.9	3.0	8.3
Covington city, VA	10.0	3.9	9.2
Amherst County, VA	5.1	2.1	7.2
Augusta County, VA	4.0	1.9	6.0
Staunton city, VA	4.3	2.1	6.9
Waynesboro city, VA	4.3	2.6	7.9
Bath County, VA	12.1	2.6	5.4
Botetourt County, VA	3.6	1.8	5.5
Frederick County, VA	5.4	2.0	5.9
Winchester city, VA	6.3	2.2	7.7
Highland County, VA	4.3	2.8	7.0
Nelson County, VA	4.3	2.3	5.4
Page County, VA	13.3	2.6	10.9
Rockbridge County, VA	5.8	2.1	6.5
Buena Vista city, VA	9.1	2.3	8.0
Lexington city, VA	8.0	3.5	11.4
Rockingham County, VA	5.1	1.7	5.5
Harrisonburg city, VA	6.2	2.3	7.3
Shenandoah County, VA	4.8	1.8	7.0
Warren County, VA	7.3	2.0	6.4
Hampshire County, WV	9.5	3.3	7.8
Hardy County, WV	5.8	3.8	8.4
Monroe County, WV	9.5	4.9	7.1
Pendleton County, WV	5.9	7.9	6.5
Virginia	4.5	2.3	6.2
West Virginia	8.6	5.5	8.0

Source: US Department of Labor, Bureau of Labor Statistics

## 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. Diverse economies are those with a large number of economic sectors. They are more resilient and less vulnerable to downturns in any one sector. The size and vitality of these economic sectors and linkages to other sectors in the economy are also important. If a county economy is heavily dependent on only one sector, it may be vulnerable to declining prosperity if business conditions for that industry deteriorate. Table 3C12-10 is derived from the 2011 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 industries are defined by North American Industry Classification System (NAICS) Sectors. A brief description of each industry/sector follows the table. The impact study area used in IMPLAN is defined as the counties having GWNF lands.

### Employment by Industry

The local economy reflected in Table 3C12-10 shows a fairly diverse distribution among the twenty industries. The Manufacturing and Government Sectors account for 30% of the area's total employment and 42% of the labor income. The Retail Trade and Construction Sectors provide another 18% of the area's jobs and 15% of the labor income. Health Care and Social Assistance provides another 8% of the total employment and 8% of the labor income.

Forest Service-related activities on the GWNF contribute about 0.27% of all area jobs, with a total of about 3% contributed to the jobs within the Agriculture, Forestry, Fishing and Hunting Sector, the Arts, Entertainment and Recreation Sector and the Government Sector.

Table 3C12-10. Current Role of Forest Service-Related Contributions to the Area Economy by NAICS Sector

Industry	Employment (jobs)		Labor Income (thousands of 2012 dollars)	
	Area Totals	FS-Related*	Area Totals	FS-Related*
Agriculture, Forestry, Fishing and Hunting (Sector 11)	10,972	64	\$80,850	\$1,676
Mining, Quarrying, and Oil and Gas Extraction (Sec 21)	857	1	\$38,630	\$23
Utilities (Sector 22)	624	1	\$94,102	\$110
Construction (Sector 23)	18,967	5	\$672,359	\$176
Manufacturing (Sectors 31-33)	31,775	10	\$1,811,431	\$488
Wholesale Trade (Sector 42)	5,497	10	\$318,870	\$580
Transportation & Warehousing (Sectors 48-49)	11,289	10	\$583,277	\$425
Retail Trade (Sectors 44-45)	20,129	52	\$554,733	\$1,313
Information (Sector 51)	1,842	2	\$99,742	\$88
Finance & Insurance (Sector 52)	7,367	7	\$301,333	\$286
Real Estate & Rental & Leasing (Sector 53)	7,834	10	\$95,068	\$141
Professional, Scientific, & Technical Svcs (Sector 54)	7,282	9	\$313,297	\$384
Mngt of Companies (Sector 55)	1,404	1	\$96,587	\$33
Admin, Waste Mngt & Remediation Services (Sect 56)	8,796	9	\$199,359	\$190
Educational Services (Sector 61)	3,270	2	\$110,361	\$73
Health Care & Social Assistance (Sector 62)	17,102	19	\$693,082	\$698
Arts, Entertainment, and Rec (Sector 71)	3,587	22	\$44,490	\$290
Accommodation & Food Services (Sector 72)	14,430	59	\$255,180	\$969
Other Services except Public Administration (Sect 81)	11,892	11	\$380,415	\$308
Government/Public Administration (Sector 92)	32,337	280	\$1,739,943	\$9,544
Total	217,252	584	8,483,108	17,796
FS as Percent of Total	---	0.27%	---	0.21%

\* FS-Related: Due to substitution effects from competing non-government sources (such as volume of timber harvesting which may occur on private lands if national forest timber is not offered to the market to meet local demand), these jobs are characterized as being related or associated with local economic activity initiated by Forest Service programs and activities, rather than directly caused by these activities.

Source: 2011 IMPLAN data model

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**Descriptions of NAICS Industries**

The Agriculture, Forestry, Fishing and Hunting industry (NAICS Sector 11) includes establishments primarily engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals from a farm, ranch, or their natural habitats.

The Mining, Quarrying, and Oil and Gas Extraction Industry (NAICS Sector 21) includes establishments that extract naturally occurring mineral solids, such as coal and ores; liquid minerals, such as crude petroleum; and gases, such as natural gas. The term mining is used in the broad sense to include quarrying, well operations, beneficiating (e.g., crushing, screening, washing, and flotation), and other preparation customarily performed at the mine site, or as a part of mining activity.

The Utilities Industry (Sector 22) comprises establishments engaged in the provision of the following utility services: electric power, natural gas, steam supply, water supply, and sewage removal.

The Construction Industry (Sector 23) comprises establishments primarily engaged in the construction or maintenance of buildings or engineering projects (e.g., highways and utility systems) or in the preparation of sites for new construction.

The Manufacturing Industry (Sectors 31-33) comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. Establishments in the Manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment.

The Wholesale Trade Industry (Sector 42) includes establishments engaged in wholesaling merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The merchandise described in this sector includes the outputs of agriculture, mining, manufacturing, and certain information industries, such as publishing. The wholesaling process is an intermediate step in the distribution of merchandise.

The Transportation and Warehousing Industry (Sectors 48-49) includes industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation. Establishments in these industries use transportation equipment or transportation related facilities as a productive asset. The modes of transportation are air, rail, water, road, and pipeline.

The Retail Trade Industry (Sectors 44-45) comprises establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The retailing process is the final step in the distribution of merchandise; retailers are, therefore, organized to sell merchandise in small quantities to the general public.

The Information Industry (Sector 51) comprises establishments engaged in the publishing industries, including software publishing, and both traditional publishing and publishing exclusively on the Internet; the motion picture and sound recording industries; the broadcasting industries, including traditional broadcasting and those broadcasting exclusively over the Internet; the telecommunications industries; Web search portals, data processing industries, and the information services industries.

The Finance and Insurance Industry (Sector 52) comprises establishments primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets) and/or in facilitating financial transactions.

The Real Estate and Rental and Leasing Industry (Sector 53) comprises establishments primarily engaged in renting, leasing, or otherwise allowing the use of tangible or intangible assets. The major portion of this sector comprises establishments that rent, lease, or otherwise allow the use of their own assets by others. The assets may be tangible, as is the case of real estate and equipment, or intangible, as is the case with patents and trademarks.

The Professional, Scientific, and Technical Services Industry (Sector 54) comprises establishments that specialize in performing professional, scientific, and technical activities for others. These activities require a high degree of expertise and training. Activities performed include: legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services.

The Management of Companies and Enterprises Industry (Sector 55) comprises: (1) establishments that hold the securities of (or other equity interests in) companies and enterprises for the purpose of owning a controlling interest or influencing management decisions; or (2) establishments (except government establishments) that administer, oversee, and manage establishments of the company or enterprise and that normally undertake the strategic or organizational planning and decision making role of the company or enterprise.

The Administrative and Support and Waste Management and Remediation Services Industry (Sector 56) comprises establishments performing routine support activities for the day-to-day operations of other organizations. Activities performed include: office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services.

The Educational Services Industry (Sector 61) comprises establishments that provide instruction and training in a wide variety of subjects. This instruction and training is provided by specialized establishments, such as schools, colleges, universities, and training centers. These establishments may be privately owned and operated for profit or not for profit, or they may be publicly owned and operated.

The Health Care and Social Assistance Industry (Sector 62) comprises establishments providing health care and social assistance for individuals. The services provided by establishments in this sector are delivered by trained professionals.

The Arts, Entertainment, and Recreation Industry (Sector 71) includes: (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

The Accommodation and Food Services Industry (Sector 72) comprises establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption.

The Other Services, except Public Administration Industry (Sector 81) comprises establishments engaged in providing services not specifically provided for elsewhere in the classification system. Establishments in this sector are primarily engaged in activities, such as equipment and machinery repairing, promoting or administering religious activities, grantmaking, advocacy, and providing drycleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services.

The Government/Public Administration Industry (Sector 92) consists of establishments of federal, state, and local government agencies that administer, oversee, and manage public programs and have executive, legislative, or judicial authority over other institutions within a given area.

### County Employment

Table 3C12-11 displays a snapshot view (based on Virginia and West Virginia labor statistics websites) of jobs by industrial sector and by county. However, a look at commuting patterns shows that many of the jobs do not necessarily occur within the counties of residence. Of the 17 counties, nine have over 40% of their workforce

who commute outside of their county for work (Amherst, Augusta, Botetourt, Frederick, Page, Nelson, Rockbridge, Rockingham, and Warren), with the majority of commuters likely working in larger metropolitan areas in Northern Virginia, Washington DC, Richmond and Roanoke.

Table 3C12-11. Number of Jobs by Counties with GWNF lands for First Quarter 2012

1st Qtr 2012	Natural Resources & Mining	Con- struction	Trade	Trans- portation & Util	Mfg	Info	Financial	Services	Govt	Other	TOTAL
Alleghany	15	349	1,079	186	1,852	126	175	2,535	1,659	0	7,976
Amherst	68	398	1,258	341	1,237	78	169	2,579	2,808	0	8,936
Augusta	225	2,084	6,987	2,926	7,027	504	1,244	15,531	8,704	0	45,232
Bath	24	129	108	103	41	33	54	1,283	378	0	2,153
Botetourt	148	692	1,608	890	1,907	174	174	2,325	1,451	0	9,369
Frederick	382	2,155	9,173	1,856	6,728	522	1,889	19,662	7,637	0	50,004
Highland	40	37	44		24		49	121	175	0	490
Nelson	259	236	283	107	303	30	103	1758	724	0	3803
Page	28	227	763	58	784	24	149	1,679	1,295	0	5,007
Rockbridge	111	458	1,660	120	2,138	75	352	5,369	2,601	0	12,884
Rockingham	853	2,996	9,507	2,613	10,532	1,397	1,732	19,767	9,985	0	59,382
Shen	195	523	1,754	455	3,234	285	414	3,956	2,270		13,086
Warren	15	376	1,747	1,116	930	58	306	4,934	1,862	0	11,344
Hampshire	45	152	515	39	135		202	1,335	1,415		3,838
Hardy	48	71	592	178	2,769	79	159	1,106	840		5,842
Monroe	37	115	27	25			52	334	753	57	1,400
Pendleton	82	29	196	98		23	69	536	462		1,495
County Totals	2,575	11,027	37,301	11,111	39,641	3,408	7,292	84,810	45,019	57	242,241
%	1.1%	4.6%	15.4%	4.6%	16.4%	1.4%	3.0%	35.0%	18.6%	0.0%	100.0%

Sources: [yesvirginia.org/communityprofiles](http://yesvirginia.org/communityprofiles), [workforcewv.org](http://workforcewv.org)

### Wood Products Jobs per County

Timber harvest levels on NFS lands within the GWNF declined over the past 15 years. See Timber Management Affected Environment for specific analysis of timber harvest trends. Table 3C12-12 shows number of jobs (full-time and part-time) in the wood products sector for the counties having GWNF acres in 2009.

Table 3C12-12. Local Area Employment in the Wood Products Sector, 2009

County or Independent City	Forestry and Logging	Sawmills and Wood Preservation	Pulp, Paper and Paperboard	Veneer, Plywood and Engineered Wood	Wood Products Mfg	Non-employer Timber Jobs <sup>1</sup>	Total Timber Jobs	%Timber Jobs of Total Jobs in County
Alleghany County, VA	12	67	0	0	38	21	138	5%
Covington city, VA	0	0	1,261	0	0	4	1,265	36%
Amherst County, VA	19	41	312	0	21	32	425	6%
Augusta County, VA	2	46	0	0	270	31	349	2%
Staunton city, VA	0	0	0	0	77	0	77	1%
Waynesboro city, VA	0	0	0	0	164	0	164	2%
Bath County, VA	9	0	0	0	35	9	53	3%
Botetourt County, VA	9	0	0	0	155	23	187	2%
Frederick County, VA	0	302	0	126	181	20	629	3%
Winchester city, VA	0	0	0	13	2	0	15	<1%
Highland County, VA	34	2	0	0	0	7	43	12%
Nelson County, VA	64	7	0	0	4	26	101	3%
Page County, VA	2	0	0	0	328	4	334	7%
Rockbridge County, VA	15	205	0	0	9	33	262	6%
Buena Vista city, VA	2	58	0	63	67	0	190	10%
Lexington city, VA	0	0	0	0	0	0	0	0%
Rockingham County, VA	1	34	0	9	94	30	168	7%
Harrisonburg city, VA	0	0	0	0	155	0	155	1%
Shenandoah County, VA	4	4	0	63	34	16	121	1%
Warren County, VA	0	2	0	0	67	9	78	<1%
Hampshire County, WV	11	64	0	14	14	45	148	5%
Hardy County, WV	2	2	0	0	816	12	832	16%
Monroe County, WV	26	14	0	0	0	44	84	6%
Pendleton County, WV	4	36	0	0	14	27	81	7%
County Region	216	884	1,573	288	2,545	393	5,899	3%

<sup>1</sup> Nonemployer Timber Jobs are usually self-employed individuals operating very small unincorporated businesses, which may or may not be the owner's principal source of income. These are not reported by County Business Patterns but are reported by Nonemployer Statistics. Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>

**Recreation and Tourism Jobs per County**

Table 3C12-13 describes the number of jobs (full and part-time) and the share of total jobs in industries that include travel and tourism. Travel and Tourism consists of sectors that provide goods and services to visitors to the local economy, as well as to the local population. These industries are: retail trade; passenger transportation; arts, entertainment, and recreation; and accommodation and food. It is not known, without additional research such as surveys, what exact proportion of the jobs in these sectors is attributable to expenditures by visitors, including business and pleasure travelers, versus by local residents. Components of Retail Trade include Gasoline Stations, Clothing and Accessory Stores, Miscellaneous Store Retailers (includes Gift, Novelty, and Souvenir). Components of Passenger Transportation includes: Air Transportation, Scenic and Sightseeing Transportation. Components of Arts, Entertainment, and Recreation consists of Performing Arts and Spectator Sports; Museums, Parks, and Historical Sites (includes National Parks, Conservation Areas); Amusement, Gambling, and Recreation (includes Golf Courses, Alpine and Cross Country Skiing Facilities).

**Table 3C12-13. Employment in the Travel and Tourism Sector, 2009**

County or Independent City	Retail Trade	Passenger Transportation	Arts, Entertainment, and Recreation	Accommodation and Food	Percent Travel and Tourism Jobs of Total Jobs within County
Alleghany County, VA	77	0	95	316	11%
Covington city, VA	161	13	8	331	9%
Amherst County, VA	248	0	67	571	8%
Augusta County, VA	528	7	59	1,166	6%
Staunton city, VA	335	0	205	1,446	14%
Waynesboro city, VA	408	0	121	1,232	13%
Bath County, VA	34	0	5	762	43%
Botetourt County, VA	304	65	79	753	7%
Frederick County, VA	750	9	234	1,969	10%
Winchester city, VA	848	0	271	2,208	10%
Highland County, VA	19	0	3	41	11%
Nelson County, VA	90	0	1,008	237	8%
Page County, VA	139	0	128	834	18%
Rockbridge County, VA	461	0	107	851	18%
Buena Vista city, VA	20	0	1	146	8%
Lexington city, VA	108	1	80	713	17%
Rockingham County, VA	325	0	146	2,673	56%
Harrisonburg city, VA	1,145	0	327	4,734	17%
Shenandoah County, VA	477	0	224	1,192	10%
Warren County, VA	335	1	232	1,107	11%
Hampshire County, WV	182	0	2	365	13%
Hardy County, WV	72	0	19	278	5%
Monroe County, WV	50	0	6	73	5%
Pendleton County, WV	48	0	42	117	10%
County Region	7,164	96	3,469	24,115	12%

Source: US Census Bureau data and the Economic Profile System-Human Dimensions Toolkit, at <http://headwaterseconomics.org/tools/eps-hdt>



**Recreation and Tourism Spending Profiles**

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 3C12-14 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 3C12-15 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 3C12-14. National Forest Visitor Spending Profiles by Trip Type and Spending Category, \$ per party per trip (2003 dollars)

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
Total	51.6	161.2	245.3	32.8	124.3	116.1

Table 3C12-15. Spending Averages by Primary Activities and Trip Type, \$ per party per trip (2003 dollars)

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

## Federal Receipts

Federal income generated by activities on the GWNF is displayed in Table 3C12-16. These receipts are used to calculate the federal payments to states. Recreation user fees on this forest are under the Federal Lands Recreation Enhancement Act (sunset date 2014), which means that the majority of those receipts are returned directly back to the site of collection to enhance visitor services and reduce the backlog of maintenance needs for recreation facilities. K-V Revenue includes collections under the Knutson-Vandenberg (K-V) Act of June 9, 1930, as amended (16 U.S.C. 576-576b). The K-V Act authorizes collections from timber sale purchasers for sale area improvement work, including reforestation and wildlife habitat improvements. Specified Road Costs are, generally, credits, deposits or adjustments to payments by purchasers of timber sale contracts.

Table 3C12-16. Federal Receipts from Resource Programs on the GWNF

Source	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Class 1 - Timber	\$153,403	\$233,606	\$153,642	\$15,136	\$123,010
Class 2 - Grazing in East	\$3,233	\$2,335	\$2,842	\$3,113	\$3,010
Class 3 - Land Use	\$52,134	\$37,655	\$96,477	\$98,974	\$79,991
Class 4 - Recreation Special Uses	0	0	0	0	0
Class 5 - Power	\$22,273	\$18,429	\$45,631	\$72,611	\$70,843
Class 6 - Minerals	\$1,690	\$1,495	\$2,180	\$1,575	\$1,355
Class 7 - Recreation User Fees	\$665,457	\$717,703	\$748,671	\$754,940	\$705,313
Class 8 - Grazing in West	0	0	0	0	0
Class 9 - Quartz Crystals	0	0	0	0	0
Total NFF Receipts	\$232,732	\$293,519	\$300,774	\$191,410	\$279,210
K-V	\$645,563	\$481,780	\$329,698	\$329,448	\$363,078
Specified Road Credits	\$86,377	\$142,874	\$-10,474	\$16,948	\$46,528
Salvage Sales	\$179,792	\$273,634	\$377,155	\$101,538	\$65,779
Total	\$1,809,922	\$1,909,511	\$1,745,822	\$1,394,283	\$1,458,907

## 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 from federal to local governments to help offset losses in property taxes due to nontaxable federal lands within their boundaries. The amount of PILT is based on population, receipt sharing payments, and the amount of federal land within an affected 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 until 2011 and then reauthorized for FY 2012. 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 3C12-17 and 3C12-18 highlight the payments made under PILT and the Secure Rural Schools and Community Self-Determination Act for the last several years.

Table 3C12-17. Payment in Lieu of Taxes (PILT) from the GWNF

County, State	2007	2008	2009	2010	2011
Alleghany, VA	\$150,295	\$240,286	\$243,345	\$117,845	\$143,777
Amherst, VA	\$47,645	\$76,239	\$76,962	\$22,143	\$33,219
Augusta, VA	\$223,709	\$357,462	\$362,266	\$209,588	\$242,672
Bath, VA	\$184,200	\$290,482	\$278,208	\$224,452	\$233,204
Botetourt, VA*	\$88,667	\$144,705	\$149,664	\$109,494	\$132,828
Frederick, VA	\$5,173	\$8,267	\$8,369	\$8,423	\$9,123
Highland, VA	\$56,551	\$90,471	\$91,526	\$37,060	\$43,892
Nelson, VA	\$28,120	\$44,864	\$45,536	\$52,794	\$53,562
Page, VA	\$84,901	\$133,786	\$136,452	\$96,251	\$103,788
Rockbridge, VA*	\$71,583	\$115,597	\$118,056	\$69,637	\$82,085
Rockingham, VA	\$200,716	\$320,280	\$325,269	\$380,881	\$386,367
Shenandoah, VA	\$79,820	\$127,621	\$129,232	\$158,435	\$161,009
Warren, VA	\$29,109	\$46,973	\$46,205	\$48,880	\$49,385
Hampshire, WV	\$5,076	\$8,056	\$8,247	\$8,435	\$8,505
Hardy, WV	\$75,002	\$119,032	\$121,849	\$124,629	\$125,658
Monroe, WV*	\$29,198	\$46,337	\$47,433	\$48,515	\$48,915
Pendleton, WV**	\$123,500	\$196,519	\$205,174	\$151,471	\$177,457
Virginia Counties from NF system lands	\$1,250,489	\$1,997,033	\$2,011,090	\$1,535,883	\$1,674,911
West Virginia Counties from NF system lands	\$232,776	\$369,944	\$382,703	\$333,050	\$360,535
TOTAL	\$1,483,265	\$2,366,977	\$2,393,793	\$1,868,933	\$2,035,446

\* - includes Jefferson NF

\*\* - includes Monongahela NF

Source: USDI, <http://www.doi.gov/pilt/>

Table 3C12-18. Payments to States under the Secure Rural Schools and Community Self-Determination Act from GWNF (does not include other national forest lands within the same county)

County	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Alleghany, VA	\$83,974	\$221,404	\$198,907	\$173,543	\$155,700
Amherst, VA	\$34,000	\$93,181	\$83,409	\$74,271	\$69,413
Augusta, VA	\$115,383	\$285,132	\$257,013	\$236,210	\$217,711
Bath, VA	\$103,078	\$170,539	\$154,841	\$134,025	\$121,495
Botetourt, VA	\$7,219	\$13,490	\$11,308	\$9,714	\$8,936
Frederick, VA	\$2,914	\$5,843	\$5,262	\$4,944	\$4,510
Highland, VA	\$34,323	\$93,504	\$87,986	\$77,813	\$70,723
Nelson, VA	\$11,117	\$5,760	\$5,566	\$5,176	\$4,812
Page, VA	\$16,082	\$60,635	\$54,515	\$47,848	\$43,215
Rockbridge, VA	\$26,433	\$61,334	\$55,699	\$48,909	\$44,212
Rockingham, VA	\$82,679	\$40,614	\$39,244	\$36,493	\$33,929
Shenandoah, VA	\$45,009	\$22,089	\$21,352	\$19,856	\$18,461
Warren, VA	\$1,689	\$1,827	\$1,766	\$1,642	\$1,527
Hampshire, WV	\$2,159	\$9,219	\$8,716	\$8,112	\$7,571
Hardy, WV	\$34,431	\$104,740	\$99,594	\$95,980	\$87,568
Monroe, WV	\$273	\$1,146	\$1,121	\$983	\$862
Pendleton, WV	\$78,998	\$120,299	\$108,231	\$75,753	\$82,321
Virginia Counties from NF system lands	\$563,900	\$1,075,352	\$935,858	\$870,444	\$794,644
West Virginia Counties from NF system lands	\$115,861	\$235,404	\$217,662	\$180,828	\$178,322
<b>TOTAL</b>	<b>\$679,761</b>	<b>\$1,310,756</b>	<b>\$1,153,520</b>	<b>\$1,051,272</b>	<b>\$972,966</b>

Source: US Forest Service All Service Receipts (ASR-10-02) Reports

## DIRECT, INDIRECT AND CUMULATIVE SOCIAL ENVIRONMENT EFFECTS

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 community 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 may need to 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, G, H and I. 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 could 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 could result in lower satisfaction levels and some visitors could have unmet expectations. Some could 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.

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.

The impacts to the social environment related to federal oil and gas leasing are discussed in Chapter 3, Section D.

## **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. The Forest Service uses IMPLAN (impact for planning analysis) software and FEAST (forest economic analysis spreadsheet tool) to estimate these impacts and contributions. IMPLAN is an economic model originally developed by the Forest Service, Federal Emergency Management Agency and the Bureau of Land Management. IMPLAN has since been privatized and is now provided by Minnesota IMPLAN Group (MIG). IMPLAN uses a database of economic statistics obtained from major government sources such as the Regional Economic Information System (REIS), Bureau of Economic Analysis, Bureau of Labor Statistics and US Census Bureau. The database in IMPLAN represents 528 economic sub-sectors. The input/output analysis is based on the interdependencies of the production and consumption elements of the economy within an 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).

The IMPLAN model identifies direct, indirect and induced effects associated with an output activity. Direct effects are those economic effects associated with economic activity (e.g., amount of sawtimber sold or recreation use) that occurs in industries tied to forest outputs. Examples of direct industries are the local hotel,

which provides lodging to recreationists or the local sawmill that processes National Forest timber. Indirect effects are economic effects associated with spending by industries that provide goods and services to the direct industries. An example is the utility company that provides electricity to the local hotel or sawmill. Induced effects are economic effects associated with household spending caused by changes in activity in the direct and indirect industries. Examples are the local grocery stores and restaurants that supply goods and services to the local economy.

Direct, indirect and induced impacts on jobs and income are estimated from six major Forest-level outputs on the GWNF: recreation use, hunting and fishing use, the amount of timber volume and type of product to be harvested, mineral extraction, payments to states (counties), and Forest Service expenditures (salaries, equipment, contracts). Due to substitution effects from competing non-government sources (such as volume of timber harvesting which may occur on private lands if national forest timber is not offered to the market to meet local demand), these jobs are characterized as being associated with local economic activity initiated by Forest Service programs and activities, rather than directly caused by these activities.

For purposes of estimating the economic impact, the counties and their independent cities that contain GWNF acreage were selected as the impact area. The most important use of the results is to compare relative economic effects among the alternatives. The results should not be viewed as absolute economic values that accurately portray the infinitely complex economic interactions of the regional economy.

Cumulative economic effects related to the GWNF's resource management programs are difficult to predict. Most of the variables shaping the economic environment are beyond the control of the Forest Service. Other industries (states, counties, private landowners, and private industry) also play important roles in providing jobs and income within the 17 counties.

## Employment

Tables 3C12-19 and 3C12-20 illustrate how the proposed resource activities for each alternative potentially affects jobs in the local economy for the GWNF. In the IMPLAN model, jobs can be part-time, full-time or seasonal. The estimates from the Minerals Program do not include the effects from development of Marcellus shale. Those estimates are provided in Chapter 3, Section D.

Overall, the current management of the George Washington National Forest influences a very small part of the area's economy with respect to total jobs (584 jobs, 0.27%). Therefore, the differences between alternatives would not generate a noticeable effect. However, there is a number of small logging companies that could be individually affected by the changes in timber outputs associated with each alternative. There are several counties where timber-related jobs represent more than 10% of that county's total employment (Alleghany, Highland, Rockbridge and Hardy).

Of the jobs that forest activities do influence, the money spent by the GWNF on salaries, contracts, materials, equipment and other items has the greatest impact (over 50%). Recreation, including hunting and fishing, comprises another 20% of jobs affected. There are several counties where the travel and tourism employment is greater than 10% of that county's total employment (Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren, and Hampshire).

Table 3C12-19. 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	Alts H and I
Recreation <sup>1</sup>	78	79	67	83	74	83	80	80
Wildlife and Fish <sup>1</sup>	52	53	44	55	49	55	54	54
Timber	88	106	0	199	60	38	106	110
Minerals <sup>2</sup>	0	0	0	0	0	0	0	0
Payments to States/Counties	64	64	64	64	64	64	64	64
Forest Service Expenditures	351	321	299	332	318	314	322	322
Total Forest Service Mgt	633	623	474	733	565	554	626	630

<sup>1</sup> Recreation and Wildlife and Fish estimates represent non-local use only.

<sup>2</sup> The employment estimates from the GWNF that include the effects of developing Marcellus shale are provided in Chapter 3, Section D.

Table 3C12-20. Employment by Major Industry by Alternative (Average Annual, Decade 1, jobs contributed)

Industry	Local Economy Total	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Agriculture	10,972	65	74	5	123	44	31	74	75
Mining <sup>1</sup>	857	1	1	1	1	1	1	1	1
Utilities	624	1	1	1	1	1	1	1	1
Construction	18,967	6	6	5	6	5	5	6	6
Manufacturing	31,775	11	14	2	33	8	6	14	15
Wholesale Trade	5,497	12	11	8	13	10	11	12	12
Transportation & Warehousing	11,289	12	12	8	14	10	10	12	12
Retail Trade	20,129	64	58	44	65	53	55	58	59
Information	1,842	2	2	2	2	2	2	2	2
Finance & Insurance	7,367	9	8	6	10	8	7	8	8
Real Estate & Rental & Leasing	7,834	13	12	8	14	11	10	12	12
Prof, Scientific, & Tech Services	7,282	13	11	8	13	10	10	11	11
Mngt of Companies	1,404	1	1	0	1	0	0	1	1
Admin, Waste Mngt & Rem Serv	8,796	10	10	7	12	9	9	10	10
Educational Services	3,270	3	3	2	4	2	2	3	3
Health Care & Social Assistance	17,102	26	22	14	28	20	19	22	23
Arts, Entertainment, & Rec	3,587	23	22	18	24	21	23	23	23
Accommodation & Food Services	14,430	65	62	50	68	58	62	63	63
Other Services	11,892	13	12	7	16	11	10	12	12
Government	32,337	284	282	279	283	281	281	282	282
Total	217,252	633	623	474	733	565	554	626	630

<sup>1</sup> The employment estimates from the GWNF that include the effects of developing Marcellus shale are provided in Chapter 3, Section D.

## Labor Income

Labor income is employee compensation (value of all wages and benefits) plus the income to sole proprietorships. The average annual labor income for the first decade for each resource program expenditure is given by alternatives in Table 3C12-21. Impacts to the local economy industries are shown in Table 3C12-22. For a description of the industrial sectors, see the Chapter 3, Section C Economic Affected Environment section.

As with employment, the current management of the George Washington National Forest influences a very small part of the area's economy with respect to total labor income (\$17,796,000, 0.21%). Therefore, the differences between alternatives would not generate a noticeable effect. However, within several industries, there is a greater influence. Within the Agriculture, Forestry, Fishing and Hunting industry, Alternatives A, B, E, F, G, H and I provide activities from the timber program, hunting and fishing that contribute to about 2% of the total labor income for that particular industry. Since there is no timber program in Alternative C, there would be less than 1% contribution to labor income. Alternative D raises the income to 4% of the total labor income for that industry because of the higher volume of wood products generated. The Arts, Entertainment and Recreation industry and the Government and Public Administration industry each have about 1% of their total labor income from GWNF activities.

Table 3C12-21. Labor Income by Program by Alternative (Average Annual, Decade 1, thousands of 2012 dollars)

Resource	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Recreation <sup>1</sup>	\$2,030	\$2,061	\$1,754	\$2,173	\$1,945	\$2,169	\$2,104	\$2,105
Wildlife and Fish <sup>1</sup>	\$1,417	\$1,439	\$1,204	\$1,515	\$1,351	\$1,512	\$1,468	\$1,468
Timber	\$2,426	\$3,011	\$0	\$5,845	\$1,674	\$1,049	\$3,011	\$3,114
Minerals <sup>2</sup>	\$12	\$9	\$1	\$9	\$8	\$7	\$8	\$8
Payments to States/Counties	\$2,593	\$2,593	\$2,593	\$2,593	\$2,593	\$2,593	\$2,593	\$2,593
Forest Service Expenditures	\$16,544	\$12,058	\$8,793	\$13,608	\$11,540	\$11,010	\$12,123	\$12,126
Total Forest Management	\$25,021	\$21,171	\$14,345	\$25,743	\$19,111	\$18,339	\$21,308	\$21,416

<sup>1</sup> Recreation and Wildlife and Fish estimates represent non-local use only.

<sup>2</sup> The income estimates from the GWNF that include the effects of developing Marcellus shale are provided in Chapter 3, Section D.

Table 3C12-22. Labor Income by Major Industry by Alternative (Average Annual, Decade 1, thousands of 2012 dollars)

Industry	Local Economy Total	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Agriculture	\$80,850	\$1,678	\$1,941	\$82	\$3,287	\$1,143	\$777	\$1,941	\$1,979
Mining	\$38,630	\$23	\$21	\$15	\$21	\$21	\$20	\$21	\$21
Utilities	\$94,102	\$143	\$127	\$93	\$156	\$116	\$113	\$128	\$129
Construction	\$672,359	\$206	\$191	\$161	\$216	\$182	\$179	\$192	\$193
Manufacturing	\$1,811,431	\$506	\$687	\$108	\$1,577	\$409	\$277	\$688	\$730
Wholesale Trade	\$318,870	\$668	\$632	\$478	\$729	\$578	\$602	\$640	\$643
Transportation & Warehousing	\$583,277	\$501	\$477	\$329	\$596	\$423	\$424	\$482	\$486
Retail Trade	\$554,733	\$1,619	\$1,454	\$1,126	\$1,626	\$1,356	\$1,405	\$1,473	\$1,476



Industry	Local Economy Total	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Information	\$99,742	\$103	\$96	\$76	\$111	\$89	\$89	\$97	\$98
Finance & Insurance	\$301,333	\$356	\$323	\$237	\$385	\$294	\$287	\$325	\$326
Real Estate & Rental & Leasing	\$95,068	\$176	\$158	\$124	\$180	\$147	\$145	\$158	\$159
Prof, Scientific, & Tech Services	\$313,297	\$540	\$450	\$344	\$515	\$423	\$412	\$452	\$453
Mngt of Companies	\$96,587	\$38	\$38	\$25	\$50	\$33	\$32	\$38	\$38
Admin, Waste Mngt & Rem Serv	\$199,359	\$222	\$209	\$164	\$244	\$193	\$192	\$210	\$211
Educational Services	\$110,361	\$101	\$86	\$60	\$104	\$78	\$75	\$87	\$87
Health Care & Social Assistance	\$693,082	\$992	\$831	\$576	\$998	\$757	\$727	\$836	\$840
Arts, Entertainment, and Rec	\$44,490	\$303	\$300	\$248	\$322	\$281	\$308	\$306	\$306
Accommodation & Food Services	\$255,180	\$1,070	\$1,025	\$832	\$1,117	\$960	\$1,032	\$1,042	\$1,044
Other Services	\$380,415	\$398	\$357	\$239	\$443	\$316	\$303	\$359	\$361
Government	\$1,739,943	\$11,768	\$11,768	\$9,031	\$13,066	\$11,310	\$10,939	\$11,832	\$11,835
Total Forest Management	\$8,483,108	\$25,021	\$21,171	\$14,345	\$25,743	\$19,111	\$18,339	\$21,308	\$21,416

<sup>1</sup> The income estimates from the GWNF that include the effects of developing Marcellus shale are provided in Chapter 3, Section D.

## Budget to Implement the Forest Plan

Table 3C12-23 displays the expected annual appropriated budget needed to implement each alternative. These figures do not include additional funds from special projects, grants, agreements, trust funds (like Knutson/Vandenberg funds or Roads and Trails funds), or federal highway funds. Alternatives G, H and I were modeled at a level of timber harvest of 54 MMCF and a level of prescribed burning of 16,000 acres. If these Alternatives are modeled at the low end of the range for prescribed fire (12,000 acres), the total budget would be \$228 M\$ less. If these alternatives are modeled at the high end of the range for prescribed fire (20,000 acres), the total budget would be \$228 M\$ more. If these alternatives are modeled at the low end of the range for timber harvest (31 MMCF), the total budget would be reduced by \$920 M\$.

Table 3C12-23. Annual Budget to Implement the Forest Plan

Program Area	Program Costs (thousand dollars, annual average cost)								
	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Cost Pools (Administration)	\$1,900	\$1,912	\$1,900	\$1,900	\$1,900	\$1,900	\$1,900	\$1,900	\$1,900
Timber	\$2,270	\$889	\$2,769	\$0	\$4,289	\$1,849	\$1,409	\$2,769	\$2,769
Roads/Engineering	\$3,045	\$1,612	\$1,839	\$1,632	\$1,949	\$1,812	\$1,764	\$1,839	\$1,839
Recreation	\$6,269	\$3,200	\$3,631	\$3,700	\$4,208	\$3,631	\$3,807	\$3,702	\$3,705
Wildlife	\$1,573	\$457	\$637	\$382	\$700	\$637	\$637	\$637	\$637
Soil, Water, Air & Veg Mgmt	\$1,581	\$292	\$709	\$709	\$709	\$735	\$709	\$735	\$735
Fire	\$1,114	\$1,740	\$1,955	\$1,214	\$1,527	\$2,183	\$1,955	\$1,955	\$1,955
Lands	\$1,537	\$251	\$427	\$427	\$427	\$427	\$427	\$427	\$427
Range	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10
Minerals	\$218	\$220	\$209	\$190	\$228	\$190	\$209	\$190	\$190
Planning, Inventory, Monitoring	\$358	\$611	\$400	\$400	\$400	\$490	\$400	\$400	\$400
Total Appropriated Budget	\$19,874	\$11,194	\$14,485	\$10,564	\$16,347	\$13,863	\$13,226	\$14,564	\$14,567

A<sup>1</sup> represents the actual implementation level of the 1993 Revised GWNF Plan

## Economic Efficiency

Present net value (PNV) is the measure used to calculate the economic efficiency of managing a national forest. 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.

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 and wildlife), we have presented values in the present net value calculations. (See also Appendix B for more information on calculating the present net values). 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.

Revenues and costs were calculated for various resource management activities for all alternatives. Recreation values were calculated from Forest Service National Visitor Use Monitoring estimates for the GWNF.

Timber sale revenue was calculated based on historic GWNF timber sale bid values and estimates of volume. Minerals revenue was based on a 15 year average (March 1997-Feb 2012) using U.S. Energy Information Administration (2012) data for natural gas. Costs were developed based on each resource area's budgeted costs estimated for each alternative. Costs and revenues were estimated for five decades of plan implementation and discounted to present values. The present net value of these revenues and costs are displayed in the table below for each alternative as decadal totals.

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.

The recreation and timber programs generate the majority of the federal receipts. At the current time, recreation fees are returned directly to the Forest. The cumulative PNV for the timber sale program ranges from -\$19,136 in Alternative A to \$39,294 in Alternative D. The Knutson-Vanderberg Act (K-V) collection from timber sales allows additional timber stand improvement work and wildlife habitat improvements to be accomplished on the Forest.

Table 3C12-24. Cumulative Decadal Present Net Values of Benefits and Costs (millions of dollars, 4% discount rate cumulative to midpoint of 5th decade)

Resource Program	Alt A	Alt A <sup>1</sup>	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
<b>Present Value Benefits by Program:</b>									
Range	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1
Timber	\$36	\$17	\$71	\$0	\$145	\$36	\$21	\$62	\$67
Minerals <sup>1</sup>	\$1	<\$1	\$1	<\$1	\$1	\$1	\$1	\$1	\$1
Recreation	\$1,162	\$1,162	\$1,181	\$1,007	\$1,242	\$1,111	\$1,244	\$1,205	\$1,206
Wildlife	\$661	\$661	\$668	\$562	\$713	\$640	\$698	\$684	\$684
<b>Total Present Value Benefits</b>	<b>\$1,860</b>	<b>\$1,842</b>	<b>\$1,921</b>	<b>\$1,569</b>	<b>\$2,101</b>	<b>\$1,788</b>	<b>\$1,964</b>	<b>\$1,952</b>	<b>\$1,958</b>
<b>Present Value Costs by Program:</b>									
Range	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1	<\$1
Timber	\$55	\$23	\$69	\$0	\$106	\$47	\$36	\$69	\$69
Roads/Engineering	\$73	\$80	\$46	\$43	\$48	\$46	\$45	\$46	\$46
Minerals	\$5	\$5	\$5	\$4	\$6	\$5	\$5	\$5	\$5
Recreation	\$151	\$84	\$91	\$99	\$107	\$91	\$97	\$93	\$93
Wildlife	\$38	\$12	\$16	\$10	\$17	\$16	\$16	\$16	\$16
Soil, Water and Air	\$38	\$8	\$18	\$19	\$17	\$18	\$18	\$18	\$18
Protection/Forest Health	\$27	\$46	\$49	\$32	\$38	\$55	\$50	\$49	\$49
Lands	\$37	\$7	\$11	\$11	\$10	\$11	\$11	\$11	\$11
Planning, Inventory, Monitoring	\$9	\$16	\$10	\$11	\$10	\$12	\$10	\$10	\$10
<b>Total Present Value Costs</b>	<b>\$433</b>	<b>\$281</b>	<b>\$315</b>	<b>\$230</b>	<b>\$356</b>	<b>\$302</b>	<b>\$288</b>	<b>\$317</b>	<b>\$317</b>
<b>Cumulative Total Present Net Value</b>	<b>\$1,427</b>	<b>\$1,561</b>	<b>\$1,606</b>	<b>\$1,339</b>	<b>\$1,745</b>	<b>\$1,486</b>	<b>\$1,676</b>	<b>\$1,635</b>	<b>\$1,641</b>

<sup>1</sup> The present net value calculations for the GWNF that include the effects of developing Marcellus shale are provided in Chapter 3, Section D.

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## 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 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.

## 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 federal 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 3C13-1). About 117,000 acres of the Forest are identified on this map as having Class 3 (Fair) or higher ratings for wind resource potential. 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 (except for wilderness and recommended wilderness), though management area guidance would limit road construction and clearing activities in some areas.

Alternatives B, D, F, G, H and I 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 under Alternatives B, F, G, H and I:

- Wilderness
- Recommended Wilderness Study Areas
- Eligible Scenic River Corridors
- Eligible Recreation River Corridors
- Appalachian Trail Corridor
- Research Natural Areas
- Geologic Areas
- Special Biological Areas
- Key Natural Heritage Community Areas
- Cultural Areas
- Mount Pleasant National Scenic Area
- Recommended National Scenic Areas
- Scenic Corridors and Viewsheds (Alts H and I only)
- Developed Recreation Areas
- Blue Ridge Parkway Scenic Corridor
- Shenandoah Mountain Crest – Cow Knob Salamander Area
- Indiana Bat Protection Areas
- Remote Backcountry Areas

Alternative D is similar to Alternatives B, F, G, H and I 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.

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

## DIRECT, INDIRECT AND CUMULATIVE EFFECTS

A total of about 117,000 acres of land on the GWNF has been identified as having fair (Class 3) to outstanding (Class 6) wind power potential (see Figure 3C13-1). Table 3C13-1 displays the amount of land identified as Class 3 or above that would be unsuitable for wind energy development under each alternative.

Table 3C13-1. Acres of Land in Wind Class 3 or Greater that is Unsuitable for Wind Energy Development

Metric	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G	Alts H and I
Total Acres in Class 3 or Greater	117,000	117,000	117,000	117,000	117,000	117,000	117,000	117,000
Total Acres Unsuitable for Wind Energy Development	8,000	70,000	117,000	53,000	117,000	76,000	78,000	82,000

Alternative A allows for the most potential to develop wind energy, since it contains no direction regarding this development. Of the alternatives that address wind energy, Alternative D provides for the most opportunities for development. Alternatives C and E provide no opportunities for development.

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

Table 3C13-2. Potential Wind Energy Development

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
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 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.

## 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 3C13-3 provides an estimate of the acres and volume that would result from clearing for wind energy development.

Table 3C13-3. Volume (CCF) of Pulpwood and Acres Cleared that would Result from Wind Development

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alts G, H and I
Openings, acres		57		172		57	57
Transmission, miles		4		11		4	4
Road construction, miles		7		20		7	7
Total Acres Cleared		68		203		68	68
Total Volume Produced (ccf)		680		2030		680	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.

## Wildlife and Threatened & Endangered & Sensitive Species

Potential effects on wildlife include the long-term occupation of the ridgelines with openings, roads and turbines. Ridgelines are used by many birds and bats during migrations and during resident activities. Studies have documented that wind energy facilities can cause mortality in birds and bats USFWS (USDI 2012). Generally, studies in the West have reported lower rates of bat fatalities than facilities in the East. High passage rates for birds and bats along the ridgelines in western Virginia indicate a high potential for fatalities from wind turbines.

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

Alternatives C and E would have no wind power development and would not create disturbed habitat that would promote NNIP infestations. Alternative B, F, G, H, and I 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. Alternative D would create three times the ground disturbance over Alternatives B, F, G, H, and I. Aggressive control treatments for NNIP could mitigate the impacts of the ground disturbing activities. While control would most likely utilize mechanical methods (e.g. mowing), herbicides may also be used to control NNIP that result from disturbances related to wind power development. The potential to for treated plants to develop resistance to herbicides and non-target impacts would exist on those herbicide treated acres and are described in more detail in the vegetation section of this EIS. These impacts related to wind power development would be greatest for Alternative D, much less for Alternatives B, F, G, H, and I, and no impact for Alternatives C, and E.



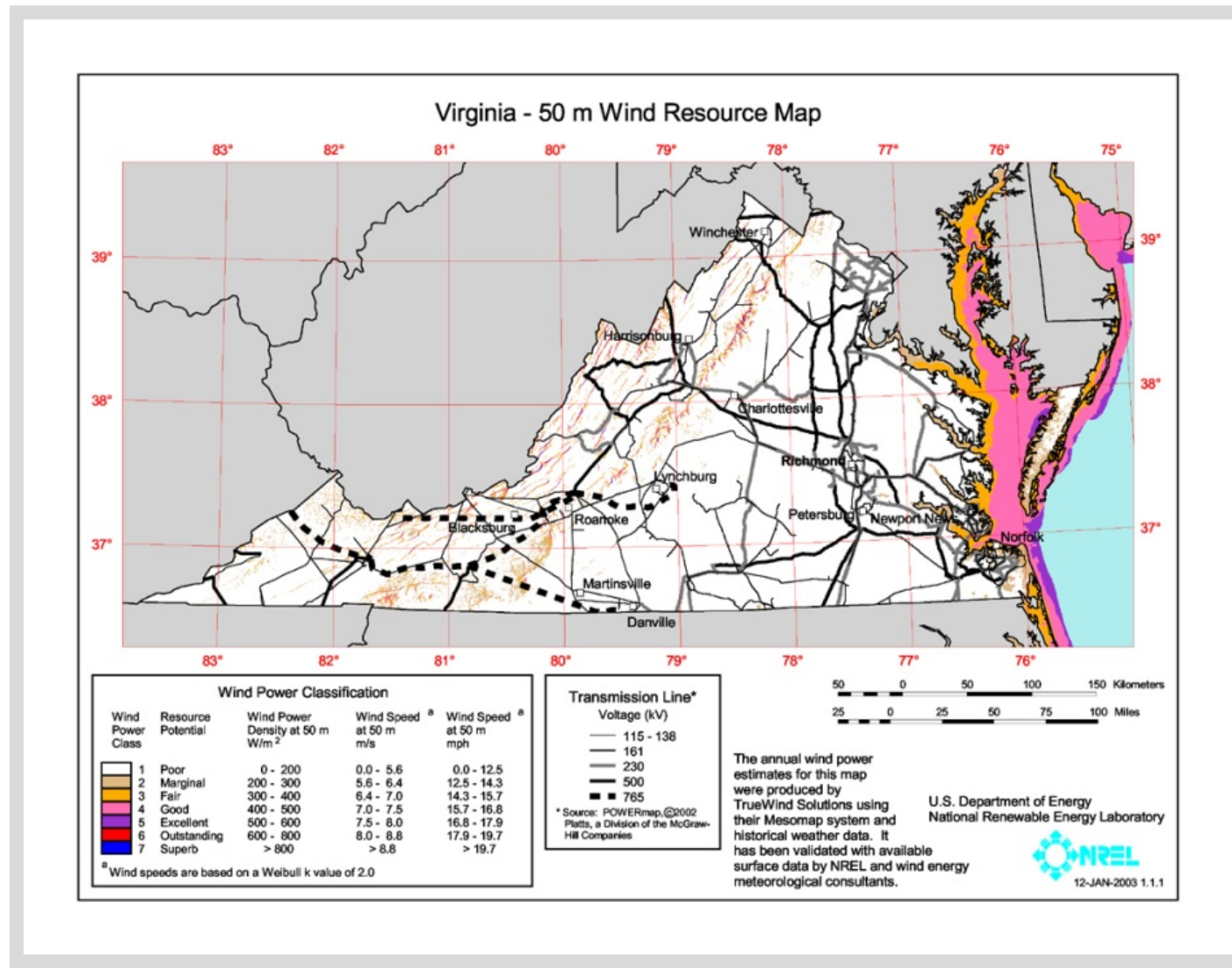


Figure 3C13-1. Virginia Wind Energy Potential

## C14 - OTHER EFFECTS

### Unavoidable Adverse Effects

Forest Plans do not produce unavoidable adverse effects because they do not directly implement any management activities that would result in such effects. The Forest Plans do, however, establish management emphasis and direction for implementation of activities that may occur on National Forest System lands in the planning period. If and when those activities occur, the application of Forest-wide and Management Area Prescription standards would limit the extent and duration of any resulting environmental effects. However, some unavoidable effects could still occur. These potential effects are described by resource area throughout Chapter 3 of the EIS.

### 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. Examples of irretrievable resource commitments associated with project-level are:

- Opportunities for non-motorized recreation, solitude, and primitive or wilderness experiences would be foregone when projects are implemented for other purposes
- Timber volume outputs would be foregone on land determined as not suitable for harvest.
- Opportunities to maintain or produce a specific vegetation condition are foregone for some period of time so that another vegetation condition may be produced in its place, such as through silvicultural prescriptions and the use of herbicides
- Commodity outputs would be reduced or foregone on areas where specific uses are implemented, such as developed recreation areas
- Non-commodity values, including scenic resources, may be reduced or foregone in areas where commodity uses are implemented
- To the degree that an action preserves or encourages the development of mature and old-growth habitat, opportunities to develop early structural habitat would be reduced (The reverse is also true, to the degree that an action preserves or encourages the development of early structural habitat, opportunities to develop mature and old-growth habitat would be reduced.)

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.

## Energy Requirements and Conservation Potential

Energy is consumed in the administration of natural resources on the Forest. The main activities that consume energy are timber harvest, restoration activities including mechanical vegetation treatments and prescribed fire, recreation use, road construction and reconstruction, range use, and administrative activities of the Forest Service and other regulatory agencies. Energy consumption is displayed in Tables 3C7-1 through 3C7-4.

Several opportunities exist under all alternatives to provide for energy conservation or conversion from less plentiful fuels to more plentiful fuels. For example, car-pooling and combining trips saves fuels and wear and tear on the Forest fleet. The use of electronic communication devices for sharing information rather than scheduling meetings at one location saves energy spent on travel. Improving energy efficiency of government buildings can conserve energy. More energy-efficient equipment for all activities like timber harvesting, road construction and reconstruction, or road maintenance can be required. More energy-efficient management methods can be explored and implemented as well.

## Prime Farmland, Rangeland and Forestland

No prime farmland, rangeland, or forestland has been identified in the planning area. Forest Plan revision or the Forest Plan would not directly affect such lands; although implementation of the Plan could have indirect effects. Regardless of the alternative selected for implementation, NFS lands would be managed with sensitivity to the values of any adjacent private or public lands.

## Effects on the Human Environment

Effects on the human environment are documented throughout Chapter 3 of this EIS. Further documentation can be found in the project record. Effects related to Environmental Justice are found in the Social and Economic Environment section of Chapter 3.

## Conflicts with Other Agency or Government Goals or Objectives

Contact, review, and public involvement with other federal and state agencies have generally indicated no irresolvable conflicts between this Forest Plan revision effort and the goals and objectives of other governmental entities.

Several County Boards of Supervisors submitted comments opposing wilderness designation in their counties. The selected alternative did include some Recommendations for Wilderness Study in those counties. Since wilderness designation is a congressional action, these counties will have future opportunities to influence a final decision.

Several County Boards of Supervisors submitted comments opposing wind energy development. Decisions on wind energy development would have a site-specific analysis and a separate decision that will be open to participation by these governments.