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George Washington Plan Revision
George Washington & Jefferson National Forests
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Conservation Alternative - George Washington National Forest

Preface

The 1982 Rule on National Forest System Land Management Planning, Authority. Source: 47FR 43037, September 30, 1982 specifies that the "interdisciplinary team shall formulate a broad range of reasonable alternatives…to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits (Sec. 219.12, 5f). The Notice of Intent states that the agency is soliciting "comments on the need for change, proposed actions, issues and preliminary alternatives". This document, submitted on behalf of **Wild Virginia** and **Heartwood**, in conjunction with that which is being submitted concurrently as the Conservation Alternative of Steven Krichbaum, comprise a significant and important alternative, not replicated or related to any of the alternatives contained in the Notice of Intent. We, therefore, request that the Conservation Alternative be given full consideration and the full NEPA analysis be conducted on the Concurrent Conservation Alternative and its "effects on present net value (Sec. 219.12, 5f, 1)" as the alternative which "comes nearest to maximizing net public benefits (Sec. 219.12, 5f)".

Issue: Consistency with the Jefferson Plan

We submit the issue that the intention that the GWNF Plan be "consistent" with the existing Jefferson Forest Plan is neither necessary nor desirable. Although in some respects, the JNF Plan is superior to the current GW Plan,(e.g., expanding the Fish and Mussel Conservation Plan requirements to the entire JNF), the standards and guidelines in the JNF Plan are in many ways significantly weaker and more harmful than even those in the current GWNF Plan. The current Plan for the JNF is flawed in many ways and there is no reason to subjectively reduce the quality of management in the George Washington and the final results of the planning process to this "lowest common denominator." For example, the Jefferson's current desired future condition, goals, objectives, current land management areas and definitions, management prescriptions, and management indicator species would automatically preclude and subjectively limit many of the issues, goals, objectives of other possible alternatives.

The ID team should strive to create the very best plan possible that would include learning from the mistakes and limitations of the Jefferson Plan. If significant inconsistencies with a positive, effective and improved GWNF Plan exist at the conclusion of the GWNF planning process, the Jefferson should consider amending their plan to achieve any desired consistency with the GWNF Plan.

The Conservation Alternative

Expanding human population and development pressures are the landscape context for the George Washington National Forest and America's other large public land holdings. Tragically, these pressures have forced the GWNF into the unfortunate position of serving as a last refuge for an enormous variety of organisms and the interdependent ecosystems in which they live. Fortunately, these public lands are a case where we still have the tenuous luxury to plan how habitats will be maintained, rather than simply trying to salvage remnants of thoughtless development. The opportunity to develop a proactive, not reactive, strategy must not be foregone. The most comprehensive and balanced direction for America is the implementation of some sort of "wilderness" protection or light-on-the-land custodial management for as much of our public lands as is feasible.

This Conservation Alternative is a proactive alternative to the commodity-focused management and infrastructure that now dominate remnant natural areas such as the GWNF. It is based on science, cultural values, economics, and the provision of public benefits. It is also the most fiscally responsible and conservative direction. The Conservation Alternative maximizes net public benefits with respect to clean air, clean water, habitat for rare and important species, carbon sequestration, open space, resiliency, visual quality, recreation, education, scientific research and monitoring, and ecosystem services. In essence, it means to accentuate the positive (the possibility for complex, intact, self-sustaining wild forests) and eliminate the negative (human-induced disruptions and degradations to natural ecosystems) where we can.

I. Need for Change—Topic 1
Ecological Health, Restoration and Stability

The only opportunities for the protection or restoration of even moderately large unfragmented wildlands in the Central Appalachians are found at blocks of low road-density land in the George Washington, Jefferson, and Monongahela National Forests (see Mueller, R. 1991 & 1994, and Foreman, D. and H. Wolke 1989). The GWNF is the ideal forest to implement a "wilderness-corridor system" or "large habitat block & corridor system" based on models by Reed Noss, (Natural Areas Journal v. 7(1), 1987) and others as was proposed in Alternative 3, during the 1993 forest plan revision. The GWNF is large enough ("minimum dynamic area") to incorporate a natural disturbance regime and its shifting habitat mosaic (Shugart, H. and D. West 1981, and Bormann, F. and G. Likens 1979).

Commodity-focused management and infrastructure is common in remnant natural areas such as the GWNF. The GWNF is currently managed under a conflicting array of “management areas” and “prescriptions” that are counterproductive to achieving long-term conservation goals. There is a need for this ecological impoverishment to be addressed and counteracted. Restoration of the Forest a more natural steady-state condition where ecological processes create a mix of habitat types is the goal of the Conservation Alternative. Although climate change may delay or alter achievement of a natural steady state condition under some scenarios, the types of management proposed in the Conservation Alternative would increase the resilience of forest ecosystems in the face of climate change.

II. Need for Change—Topic 2 Roadless Areas, Remote Backcountry and Wilderness

The GW National Forest has less federally designated Wilderness than most other National Forests (Johnson 2001; US Forest Service 2000; SAA 1996). At the same time, the GWNF currently possesses far more roadless areas than other eastern National Forests. These roadless tracts offer the ready opportunity for Wilderness designation. Aside from its ecological and economic values, Wilderness is considered to be a very important recreational opportunity best provided for on public lands (Wilderness Society 2000). There is a need for substantially more Wilderness Areas on the Forest.

Remnants of the original Great Eastern Forest are unique, vulnerable, and precious. Unfortunately, only *ca*. 4% of our GWNF is permanently protected as designated Wilderness, far below the national average of 18% of designated Wilderness in our National Forests. Indeed, our entire Southern Appalachian region is under-represented; in the entire 37-million-acre region, only *ca*. 1.1% (428,000 acres) is currently designated as Wilderness (Loomis and Richardson 2000 at pp. 20-23; Cordell, SAMAB SAA Social Technical Report at 178-82; USDA FS Southern Research Station 2006).

Currently the Roadless Areas in the GWNF are not being managed according to the direction of the 2001 Roadless Rule. In addition, not all areas that qualify as Roadless Areas have been recognized as such. There are numerous opportunities to expand the current Roadless Inventory by recognizing these areas and by proposing strategic management actions and projects, such as road closures, decommissionings and obliterations, with the express purpose of increasing the number, size, and ecological integrity of these roadless areas. This would lead to an increase in Potential Wilderness Areas in number and in size and create an opportunity to significantly address the need for more wildernesses in the GWNF.

Currently not a single acre of the GWNF meets the USFS ROS criterion for Primitive Recreation. The GWNF has a need to create and maintain an area in the forest that comes closest to approximating this type of recreational opportunity. The GWNF has an opportunity, unique in Eastern Forests to create such an area, through the same strategic management actions and projects as mentioned above, road closures, decommissionings and obliterations, with the express purpose of maximizing the size of an intact, remote, roadless area which can come closest to approximating the primitive recreation experience.

III. Need for Change—Topic 3 Responding to Social Needs

There is a need to manage the GWNF for its highest social needs, those that are essential and equally shared by all forest "users" whether or not they ever step foot in the forest. Everyone benefits from increased levels of clean air and clean water: from the protection of habitat for rare, threatened and endangered species; from the peace, solitude and challenges that the forest can afford; from the increased knowledge and scientific awareness of forest ecology and processes. Yet the highest social need is to provide for ecological values and resources that are not available elsewhere, the potential for which would be unrealized but for public lands. Large unfragmented forest blocks with climax/old growth characteristics that provide opportunities for primitive recreation opportunities are only possible in Virginia on public lands of the George Washington National Forest.

There is a need for the GWNF to maximize net public benefits. This is to say that resources in the GWNF need to be protected and enhanced and never degraded for short-term exploitation and the costs of such actions should not be passed on to future generations. There is also a social need to avoid privatization of public resources "at all costs". It is also necessary for thriving local economies that the GWNF does not compete with private lands in providing goods and services. It is beyond the scope of the plan for the agency to take responsibility for maintaining, sustaining or providing for, any projected, existing or historical industry or community.

There is general agreement among forest users, stakeholders and managers that the forest should be maintained in a "natural" state. Although what exactly is "natural" may be debatable, one measure is the amount of cultural subsidy (technological energy and material inputs, i.e., tax dollars) required to maintain the functioning of the system as desired (see Anderson, J.E. 1991, and Sprugel, D.G. 1991). Restoration of the Forest to its natural steady-state condition where ecological processes and not machinery create a mix of habitat types is a balanced and fiscally conservative alternative to spending millions of tax dollars on large amounts of artificially fabricated and fragmented habitat.

An overarching theme of this Conservation Alternative is to protect, nurture, and restore natural conditions on the Forest to as great a degree as feasible while still accommodating myriads of low-impact recreational uses by human visitors.

IV. Desired Future Condition

"Desired conditions describe the vision for achieving the Forest Service's mission on the George Washington National Forest. They portray the aspiration ecological, social and economic conditions that have been identified through an integration of input from the public comments…received, national and regional Forest Service goals, changes and trends affecting the George Washington National Forest and the best available science for various resources and uses of the forest (GW Draft Planning Document, February, 2010)."

As such the Desired Future Condition is highly subjective. "The Forest may need to make adjustments in the desired conditions if monitoring results indicate they are not achievable in the long-term or if there is an imbalance in what the Forest is accomplishing…desired conditions are aspirations; they are not final decisions or commitments to action (ibid.)." However Desired future conditions have been created to drive the planning process for the GWNF.

The Conservation Alternative, therefore, specifies a desired future condition that speaks to the long-term ecological integrity of the 1,061,125 acres of the GWNF. It creates situations for a forest in its natural steady-state condition where ecological processes create a mix of habitat types that preserve the ecological integrity of the forest. The restoration and preservation of ecological integrity on the Forest (Angermeier, P. 1996) is the driving force of the recommendations in this Conservation Alternative.

The maintenance and restoration of large habitat blocks on the Forest, and the restoration of the Forest to its natural steady-state condition where ecological processes create a mix of habitat types which preserve the ecological integrity and connectivity must be a priority of the new Plan. Thus, a primary objective of this Citizen's Alternative is to sustain native ecological systems and diversity by allowing for the large-scale re-emergence of the natural multi-aged old-growth forests with their variegated seral stages and disturbance patches (Davis, M.B. 1996.

Because "budget levels are an important factor in moving towards the desired conditions," the Conservation Alternative maximizes net future value of the forest while significantly reducing costs. Under this alternative, the GWNF does not compete with private lands in providing goods and services and avoids any type of privatization of resources, goods and services.

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V. Issues and Actions

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1. Management Areas and Management Prescriptions

The GWNF is currently managed under a conflicting array of zones that confers different management direction to different land areas. The current Plan describes and maps 18 Management Areas (GW Plan at page 3-3) that are aggregates of 37 management prescriptions (GW FEIS at appendix page B-70).

The conflicting emphases of this zoning scheme lead to a variety of problems. The current plan contributes to the fragmentation, degradation, and loss of

habitat on the Forest by considering many places to be suitable for disruption and development. The original presettlement landscape was an interlaced mosaic with a high degree of connectivity, a situation quite unlike our contemporary America. The current system ignores the degenerating reality of our present situation that demands the maintenance and restoration of an essential component of ecological health: habitat continuity over large areas (Noss, R.F. and A.Y. Cooperrider 1994).

Management actions such as timber sales, the creation of artificial early-successional habitat, road construction and artificial fire regimes and their impacts do not occur in isolation. The impacts are overlapping in time and space, are chronic, long-term, and cumulative.

Maintaining habitat connectivity and continuity, both horizontally and vertically, is essential for keeping ecological functions and communities intact. This maintenance of broad ecosystem integrity is critical for terrestrial and aquatic species alike, and especially for those such as amphibians that are biphasic and for species that are “area sensitive”.

For example, Black Bear habitat is logged and roaded, featured off-highway vehicle routes are gerrymandered into a special biological area ostensibly set-up to conserve the Cow Knob Salamander, ATV routes are placed beside sensitive streams and special biological areas, and logging sites are placed beside popular recreation trails and adjacent to special biological areas.

It takes a great deal of human subsidy (time, energy, materials, money) to maintain or fabricate the unnatural desired conditions that are the Forest Service’s objective in many “Management Areas”. The USFS spends around $5-Billion a year of Americans’ tax dollars. In these days of deficits and stretched-thin budgets, a much more fiscally conservative approach is called for to reduce costs and projects that create the need for more management in the long run.

Actions - The FS can attain the desired future condition and greatly simplify management and save tax dollars by reducing the number of management area allocations on the Forest. This is an efficacious and achievable way to steward the Forest, providing a full spectrum of beneficial desired conditions.

Use of management area allocations that do not emphasize artificially maintained “desired conditions” will reduce the “need” for future expensive activities, such as money losing timber sales, road building and creation of early-successional habitats. Some Management Areas and Management Prescriptions used in the current GWNF and JNF Plans can serve as a basis for the revised Plan.

The Management Areas in the current GWNF Plan should be limited to: MA 1 Minimal Level Management, MA 2 Migration Corridors, MA 3 Sensitive Watersheds/Municipal Watersheds, MA 4 Special Interest Areas (including

RNAs), MA 6 Appalachian Trail, MA 8 Wilderness & Recommended Wilderness Study Areas, MA 9 Back Country/Remote Highlands, MA 10 Scenic & Recreational Rivers, MA 12 Developed Recreation Areas, MA 18 Riparian Areas, MA 20 Administrative & Communication Sites and Utility Corridors, and MA 21 Special Management Areas. Management Areas 16 ("Early Successional Forested habitats for Wildlife"), 17 ("Timber Emphasis"), and 11 ("All-Terrain/Off highway Routes") are particularly destructive and must no longer be used on the Forest.

Those corresponding Management Prescriptions from the current JNF Plan are MPs 0A Custodial Management, 1A Designated Wilderness, 1B Recommended Wilderness Study Areas, 2C WSR Rivers, 4A Appalachian Trail Corridor, 4B Designated and Proposed Research Natural Areas, 4C1 Geologic Areas, 4D Botanical and Zoological Areas, 4E1a Cultural and Heritage Areas, 4F Scenic Areas, 5A/B/C Administrative & Communication Sites and Utility Corridors, 7D Concentrated Recreation Areas, 9A2 Reference Watersheds, 9A4 Aquatic Habitat Areas, 9F Rare Communities, 11 Riparian Areas, and 12C Remote Backcountry Recreation – Natural Processes.

In the revised Plan the Forest Service should greatly increase the use of MA 1 or 0A custodial or minimal level management. All lands currently allocated to MAs 14, 15, 16, and 17 (594,000 acres) are reallocated to MA 1 or MP 0A if not placed in MAs 2, 3, 4, 8, 9, or 21 or JNF MPs 1B, 4B, 4C1, 4F, 9A2, 9A4, 9F, or 12C, or other new, equally or more restrictive MAs/MPs.

In order to attain the desired future condition for the forest, the Conservation Alternative greatly increases recommendations of Congressionally designated areas (such as Wilderness and Scenic Rivers), as well as recommended new Research Natural Areas for designation by the Chief of the Forest Service. It also greatly increases land managed as administratively designated special areas including Scenic Areas, Historic Areas, and Special Biological Areas.

2. Maximizing Net Public Benefits

The desired present and future condition of the forest is achieved when net public benefits are maximized. The Forest Plan should, therefore, be an active vehicle for achieving this desired future condition. The goal of the Conservation Alternative is to create conditions that truly maximize net public benefits in the short and long term.

The term "net public benefits" is defined in the 1982 NFMA regulations 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…"(Sec. 219.3)

Net public benefits are maximized when the public benefits derived from the provision of goods and services as outlined in the Forest Plan are higher than the public costs incurred in providing them; and when there is no conceivable other mix of goods and services (or use of resources) that could provide any higher net public benefit.

Simply put, the Forest Plan, within the constraints of its budget, maximizes net public benefit by preferring activities that generate a high net public benefit (= benefits minus costs) over those that create a lower net benefit or a loss. Net public benefit for any activity increases when costs of achieving that benefit go down and decreases when costs go up. And, as the 182 NFMA regulations specify, costs and benefits have both monetary and non-monetary components. Ecosystem benefits and costs are clearly part of those non-monetary components although there exist realistic way to compute these in dollar values. (For a generally accepted example of such analysis, see Appendix #1.)

The evaluation of net public benefit in the 1993 plan was flawed because it 1) focused on maximizing "net present value" as opposed to "net public benefit", 2) failed to consider positive ecosystem services as a benefit under its cost/benefit analysis, and 3) failed to consider the negative costs connected with alternatives that resulted in a net loss to ecosystem services.

Net public benefit cannot be maximized when activities that have a low net public benefit (or that generate a net public loss) are preferred over activities that have a higher net public benefit (large benefit, low cost). Otherwise, there would be a net public loss to society from operations and projects, which would be inconsistent with Congressional intent.

Actions-Through the NEPA process, the Forest Plan FEIS analyzes and exposes the environmental benefits and costs, as well as economic impacts, resulting from their actions, including the costs and benefits related to ecosystem services, as projected and promoted by the plan. The FEIS for the GW Forest Plan must provide detailed information about the projected budget impacts of the different programs and activities resulting from implementation of each plan alternative. It should include analysis of each alternative's effects on "present net value" and will identify the alternative that maximizes "net public benefit."

3. Fire

The burning program as currently implemented under the 1993 Plan is mostly a forced artificial regime that can harm natural forest diversity, conditions, and elements. In some locations, some plants benefit from fire or re-emerge after fire, even after many years of absence. In other biological communities, fire can

harm salamanders or other species. When prescribed burning is used inappropriately, the FS is creating an artificial management regime, which can be both environmentally destructive and costly to continue.

The Forest Service has greatly increased the acreage of “prescribed burning” (intentional fires) on the GWNF. For the nine years 1986-1994, 5,309 acres were burned on the GWNF, an average of 590 acres/year. For the ten years 1995-2004, 39,552 acres were prescribed burned on the Forest, an average of 3,955 acres/year. For the five years 2000-2004, 23,920 acres were burned, an average of 4,784 acres/year. In the two years 2003 and 2004, 14,291 acres were prescribed burned, an average of 7,145 acres/year.

It is not clear that the site-specific flora and fauna populations and natural communities found in all the expansive areas proposed for burning are in need of artificial fires. It is not clear what are the damaging effects of past artificial fires occurring on these sites. And it is certainly not clear precisely what scientific data and analyses are being used to substantiate the proposed burning at project sites.

The current plan facilitates actions that are intent on using unnatural conditions (*i.e*., an anthropogenic or culturally augmented regime) as the “baseline” upon which to base goals, objectives, and/or desired conditions. The use of a “natural historic range of vegetation and fuel composition” and “historic reference conditions” is not justified as they present a subjective and artificial baseline that resulted from intense and widespread human alteration of forest conditions (“1730s to 1900s” - DCER).

Prescribed burning operations may significantly harm biota and/or ecosystems directly, indirectly, and/or cumulatively. As does intensive logging, burning alters the microclimate of the forest floor and alters microhabitat conditions (localized structural and compositional attributes). It serves to simplify niche complexity by removing woody and leafy material from the forest floor. Cover and food used by species such as the Wood Turtle can be destroyed, diminished, or altered. And of course wildlife themselves may be incinerated.

A justification for much of the current and proposed burning is to reduce so-called “hazardous fuels”. Much of what is commonly referred to as “fuels”, forest ecologists know as woody debris. This material is the dead wood and trees that are essential for and characterize healthy forests. “Fuel” also includes the forest floor litter and humus. All this material is also commonly known as “food’, “shelter”, or “habitat” for a wide variety of organisms including vascular and nonvascular plants, invertebrates, vertebrates, bacteria, protists, and fungi (McMinn, J.W. and D.A. Crossley 1996). It is an integral part of the compositional, structural, and functional diversity of healthy forests. Fires consume woody debris (Van Lear, D.H. 1996). Litter amounts can also be

significantly lower in burned plots (Waldrop, T.A. *et al*. 2007, Greenberg, C.H. and T.A. Waldrop 2008, and Elliot, K.J. *et al*. 2004).

Diminishment, removal, or absence of woody debris, litter, and humus has a dramatic impact on organisms that depend on them for food and shelter, as well as their predators (see McMinn, J.W., and D.A. Crossley 1996). Invertebrates that live in the forest floor litter, topsoil, and "fuels", such as snails, slugs, millipedes, worms, and arthropods, are a significant component of forest diversity (see, *e.g.*, McMinn, J.W. and D.A. Crossley 1996).

In addition, woody debris contributes to soil fertility and increases moisture retention capacity throughout decomposition. Moisture retaining logs also serve as firebreaks as well as shelter for wildlife should a fire occur. This contrasts directly with induced fires that can make sites hotter, drier and more open and exposed to sun, wind, and predators. The decay process generally tends to mesify microsites, while fire tends to xerify microsites (Van Lear, D.H. 1996).

Burning can promote the spread of invasive plant species (Glasgow, L.S. and G.R. Matlack 2007b). Any fire allowed by a forest plan runs a high risk of creating consequences that are directly contradictory to direction given by the Agency as well as moving away from the desired future condition of the forest. Bulldozed firelines can pose a risk to soils and watersheds, can contribute to the spread of invasive species, and can provide access to OHVs. In addition, the FS irrationally combats natural fires at the same time it sets prescribed fires in other locations.

Actions - Under the Conservation Alternative prescribed fire may only be used in appropriate biological communities, at appropriate times of the year, at appropriate intensities, and at appropriate frequencies as documented by research. Clear goals, objectives for both the project and the subsequent regime would be part of all project level analysis. The results of monitoring of past projects on similar sites would be considered essential to the scoping process. It directs close monitoring of the cumulative effects of fires, both recent natural and prescribed, including data on particulates released in fires, declining air quality, high rates of asthma and respiratory distress, the proximity of Class 1 air quality areas and the superloading of CO2 into the atmosphere. The Conservation Alternative directs that all impacts of firelines be assessed in scoping and EA/EIS analysis.

The long term desired future condition is one where human ignitions are not necessary to mimic the natural fire regimes in the forest. Therefore, with the exception of the cases where naturally occurring fires threaten adjacent private lands, lightning ignitions should be allowed to burn while being closely observed and monitored. Prescribed burning should not normally be considered an appropriate management tool for wilderness areas.

4. Forest and Habitat Fragmentation and Edge Effects

The UDSA Forest Service Strategic Plan, FY 2007-2012, names fragmentation as a major threat to national forests nationwide. The GWNF is no exception. While the1993 plan acknowledges the need for large, continuous blocks of interior forest for some species of birds, it fails to significantly analyze the extent of fragmented habitat, the distribution of fragmentation forest-wide, and the deleterious effect of subsequent edge effects on forest habitat. It fails to recognize the unique role the GWNF has in safeguarding and expanding unfragmented landscapes and habitat.

The current plan, as well as the projects it directs, fails to pay attention to 3 types of fragmentation phenomena: forest fragmentation and edge created by timber cutting within particular parts of the GWNF over time, loss of the mature forest and old growth component within particular parts of the GWNF over time, and forest fragmentation and edge along the National Forest boundary and along road corridors, powerline corridors, gas line corridors, and in-holdings. For example, cowbird infestations may not be a major problem in the GWNF as a whole, but may be more serious along the FS boundaries.

The Jefferson Plan relies upon the use of mere “forest cover” to evaluate large-scale fragmentation (see JNF FEIS 3-122-123). Use of this rationale denies the very concept and significance of fragmentation since fragmentation is not only the amount of habitat that is lost or altered, but also the distribution of that loss or alteration. It further ignores the cumulative fragmentation that occurs at scales other than the “large” and ignores the significance of the internal fragmentation (Harris, L. and G. Silva-Lopez 1992) from roads, logging, utility corridors, and other openings that perforate the Forest. Currently, the discussion in innumerable GWNF EAs confines the analysis of affects to habitat just to "the number of acres cut.” A more realistic benchmark would include the perimeter boundaries of any landscape alteration activities and the resulting decrease in total size and distribution of original and subsequent island areas.

The effects of fragmentation are multifarious and multi-scalar (Fahrig, L. 2003; Saunders, D.A. *et al*. 1991). Habitat fragmentation or edge effects not only affect birds, but also amphibians, reptiles, herbaceous species, invertebrates, etc.; see, *e.g*., Ness, J.H. and D.F. Morin 2008, Matlack, G. 1994b, Graham, M.R. 2007, and Flint, W. 2004. For example, amphibians are particularly affected by fragmentation and/or edge effects since they “generally have lower rates of movement per generation than invertebrates, mammals or reptiles (Bowne and Bowers, 2004).” (Cushman, S.A. 2006)

Edge width or depth/distance of edge influence (DEI) is the result of the penetration distance of various environmental variables and gradients (*e.g*., soil temperature, air temperature, litter moisture, photosynthetic active radiation

effect on vegetation patterns, alien plant species invasion, and ingress by herbivores or predators) (Zheng, D. and J. Chen 2000).

Increased predation is an edge effect that is recognized to extend up to 600 meters into the forest from roads, energy corridors and cutting sites. These projects increase edge and facilitate ingress and impacts from meso-predators such as Raccoons, Skunks, and Opossums (see “subsidized predators” in J. Mitchell and M. Klemens 2000). These species are known to predate Wood Turtles and other sensitive species (Mitchell, J.C. 1994b).

In addition, “[t]he hypothesis that increasing edge habitat increases species diversity and abundance may be among the most widely accepted and broadly applied guidelines in wildlife management that has not been rigorously tested or evaluated.” (Sisk, T. and N. Haddad 2002) In addition, edge species diversity is typically maximized on forest boundaries and fragmented landscapes common on private and industry lands.

Actions – The Conservation Alternative implements a desired future condition of the forest with a significant decrease in the degree and the distribution of forest fragmentation. The Conservation Alternative considers the guiding principle of any active forest restoration to be the reduction of forest fragmentation and its distribution forest-wide. The Conservation Alternative requires NEPA analysis of forest fragmentation and edge effects in the GWNF. It restricts or eliminates at the planning level, projects that result in a net increase in the amount, range and distribution of fragmentation. Forest restoration efforts would be focused on closing and obliterating roads and expanding the number, size and distribution of unfragmented forest and habitats forest-wide.

Abundant populations of generalist predators (such as raccoons and skunks that affiliate with edge habitats) have become a concern among conservation biologists and controls may be necessary in some areas (Garrott, R.A. *et al*., 1993; Congdon *et al*., 1993; Engemann, R.M. *et al.* 2005). However, taking such actions is fraught with difficulty and has undesirable ecological consequences. The Conservation Alternative would manage landscapes in order to reduce predator impacts (Schneider, M.F. 2001) through minimizing forest edges.

5. Special Biological Areas

Currently there are many areas of special biological importance on the GWNF that lie in management areas that allow logging, road building and other types of vegetation management. Many of these are areas remain unprotected despite having been recommended by Virginia Division of Natural Heritage for Special Biological Area designation.

Some existing SBAs are of insufficient size to truly protect viable populations. For instance**,** the several SBAs north of the Kelley Mountain Roadless Area

which protect the Shenandoah Valley sinkhole ponds currently exist as islands. There is a need to protect the forest that surrounds and connects the ponds/SBAs. This would enable management of the entire area to be more consistent and comprehensive and would protect linkages between the ponds. This is the only opportunity on the National Forest to protect this type of habitat, and efforts to protect Valley sinkhole ponds on private land have been difficult, expensive, and at times impossible.

Some sensitive biological species are given no protection at all. Currently wood turtle populations in the PaddyRun/Cove Run Areas are not protected. Protection of Wood Turtles in a Paddy Run/Cove Run SBA is essential to provide for the continued existence of this species in the state of Virginia and the USFS Southern Region.

The VDNH has recommended the Forest Service designate a Peters Mountain North SBA that currently sits unprotected. This area contains one of the largest known contiguous occurrences of Appalachian oak forest in old growth condition in Virginia and perhaps in all of the central Appalachians, according to the VDNH report cited in the draft CER and linked to from that document.

Regarding the management of SBAs, SBAs are currently identified as unsuitable for timber production, timber harvesting and road construction but still allow other damaging activities like salvage logging, temporary road construction and possible wind generation sites. This is insufficient for the protection warranted in these areas.

Actions – The Conservation Alternative has a desired future condition where all rare, threatened, endangered, sensitive and keystone species are given the highest level of protection. Under this alternative all areas recommended by the Virginia Department of Natural Heritage as Special Biological Areas are protected by either wilderness study, special biological or research natural area designation. Expanded SBAs north of the Kelley Mountain and a Peter's Mountain SBA would be established. The Conservation Alternative identifies the Wood Turtle as a species of concern and creates a connected Paddy Run/Cove Run Special Biological Area. All SBAs and RNAs are, in addition to being unsuitable for timber production, timber harvesting and road construction are also unsuitable for salvage harvesting, temporary road construction, and any type of energy extraction or generation.

6. Core Conservation Areas, Buffer Areas and Migration Corridors

Special Biological Areas and Research Natural Areas, as areas that warrant special protection, are not in themselves sufficient to assure species viability of those rare, threatened, endangered, or keystone species and habitats these areas attempt to maintain. Buffer areas where only low-impact, minimum surface disturbances occur help assure the integrity of these areas and provide

possibilities for changes in range and distribution. Migration corridors are indispensable for linking these areas and providing areas of minimum surface disturbances for movement of individuals and populations that can allow change both range and distribution of populations. This is especially important with climate change conditions that can alter habitats and render them less hospitable. Corridors facilitate a responsive movement of flora and fauna to help assure species viability. The current GWNF Forest Plan does not include management prescriptions for biologically necessary core areas, buffer zones or migration corridors.

Actions – The Conservation Alternative envisions a desired future condition where the highest level of protection is given for rare, threatened, endangered and keystone species and other species of special concern. Restoration of the Forest to its natural steady-state condition where ecological processes create a mix of habitat types which preserve the ecological integrity and connectivity is a priority. It also allows for natural ecological forces and movements throughout the landscape. Special biological areas will be considered core conservation areas, each surrounded by buffer zones to help maintain the ecological integrity of these areas. Core areas and their surrounding buffers will be inter connected with migration corridors of sufficient size to allow movement among these areas.

On a landscape level, wilderness, wilderness study and roadless areas will also be considered core areas, surrounded by buffer zones and linked with larger scale migration corridors. Research Natural Areas are a natural designation for buffer areas and corridors.

7. Roadless Areas

The current plan fails to give protection to all Roadless Areas as specified under the 2001 Roadless Rule. Many areas that meet the definition and have the characteristics of Roadless Areas, or “uninventoried roadless areas,” are not included in the Roadless Inventory. The Plan has no management prescription that gives protection coinciding with the protection awarded in the 2001 Roadless Rule.

The GWNF’s current management and prescriptions for roadless areas are not consistent with the 2001 Rule. About 8,000 acres within inventoried roadless areas are proposed for “active management” which apparently means timber harvest and road construction not permitted by the Rule. In addition, the backcountry prescription assigned to most other inventoried roadless areas would allow salvage harvest also generally not permitted by the Rule. In the potential wilderness inventory for this plan revision, the GW identified about 148,000 acres of roadless areas that are in addition to the previous inventoried roadless areas. These newly identified roadless acres include seven new stand-alone areas, Archer Knob, Beech Lick Knob, Duncan Knob/Catback Mountain., Galford Gap, Little Mare Mountain., Paddy Knob, Potts Mountian./Toms Knob,

and Shaw's Ridge. It also includes new additions to existing wilderness areas, Saint Mary's Additions and Three Ridges Additions and expanded boundaries for many of the previous inventoried roadless areas.

It does not include, however all RARE 2 inventoried areas which would include additional acreage in Big Schloss and Great North Mountain. These roadless areas are not currently managed consistently with the previously inventoried roadless areas and with the 2001 Rule.

The current inventoried roadless area inventories are also flawed. When roadless areas were inventoried, non-system road beds and prisms in the forest were counted as "improved roads." The FSH in effect at the time stated that "improved roads" were "maintained for travel by standard passenger-type vehicles. . .." FSH 1909.12, Ch.7.11(3) (1992). Those roads that do not meet this definition, whether then considered as system or non-system roads, should not have been counted in the analysis.

Action – The Conservation Alternative has the desired future condition of a forest that maintains and restores of large habitat blocks on the forest, and the restoration of the forest to its natural steady-state condition where ecological processes create a mix of habitat types which preserve the ecological integrity and connectivity. Protection and expansion of the roadless inventory helps meet this desired future condition. The Conservation Alternative adopts guidelines that require that all RARE II areas, inventoried and uninventoried roadless areas retain their roadless characteristics. Permanent or temporary roadbuilding, creation of early-successional habitat and logging of any type would be nonconforming actions and steps would be taken to permanently close and obliterate roads that exist in these roadless areas. The GW should adopt a standard that all inventoried roadless areas, and all other areas meeting roadless criteria, are managed according to the 2001 Roadless Rule.

8. Wilderness and Wilderness Study Areas

The GW National Forest has less federally designated Wilderness than most other National Forests (Johnson 2001; U.S. Forest Service 2000; SAA 1996). Currently less than 5% of the GW is protected as wilderness and there are no areas north of Ramsey's Draft. The national average is 18%. Despite the huge wilderness deficit in the GW and the numerous areas that have wilderness characteristics and clearly qualify, the GWNF currently has not a single wilderness study area.

In addition the GWNF's Potential Wilderness Inventory is significantly flawed. Many areas were excluded from the inventory mainly on the basis of (1) their claimed lack of opportunities for solitude, due to (a) an asserted lack of a 2,500-acre "semi-primitive core"; (b) a shape and/or size viewed as undesirable; and (c)

to influences of “sights and sounds” from outside the areas; (2) the presence of private mineral rights; and (3) manageability concerns.

For many excluded areas, these stated reasons are factually incorrect, are based on improper or inconsistent criteria, and/or are inadequately supported. In summary, as a result of a Regional and forest-level misinterpretation of definition of wilderness in The Wilderness Act, the GW’s inventory erroneously focused on solitude, without considering recreation and other wilderness values, and then deviated even further from the Act’s intentions by attempting to quantify solitude using the ROS semi-primitive (SP) lands. Moreover, the GW then violated the Regional Forester’s 1995 guidance by requiring semi-primitive cores, rather than using them only as a guide, and by not fully examining the “on the ground” characteristics of individual areas to assess whether they possess opportunities for solitude.

The guidance and the GWNF’s inventory and evaluations also excluded areas based on “sights and sounds” from outside areas, which legislative history demonstrates Congress does not intend the Forest Service to consider in interpreting and applying the Act’s definition of wilderness, and its solitude and recreation language. The GW also excluded a number of areas that it viewed as too small, too narrow, or too irregularly shaped, despite the fact that Congress has designated as wilderness many such areas, including areas in Virginia.

Action -The Conservation Alternative has the desired future condition of a forest that maintains and restores of large habitat blocks on the forest, and the restoration of the forest to its natural steady-state condition where ecological processes create a mix of habitat types which preserve the ecological integrity and connectivity. The desired future condition of the GW is one in which all and any areas qualifying for wilderness study are so designated. This would include areas excluded from the flawed potential wilderness inventory and all Virginia Mountain Treasures areas. This fulfills the need for increased wilderness, distributed throughout the forest, covering a representation of many and different forest types and ecosystems. Through an aggressive program of proposed and active road obliterations, and inholding and adjacent land purchases within the purchase/proclamation boundaries of the GWNF, additional areas could be added to the inventory and existing ones could be increased in size.

Priorities for Wilderness Study Areas would include those areas that are the largest, the most biologically intact, that significantly increase the size of existing wilderness areas and those that would represent a significant distribution of areas throughout the forest. The entire Little River Roadless Area, Big Schloss (including Three High Heads), Ramsey’s Draft Extension, Laurel Fork, Rough Mountain Addition, Jerkemtight/Benson’s Run, Short Mountain and Mill Mountain, Saint Mary’s Additions, Shawver’s Knob Addition, Massanutten North, and Beech Lick Knob would be listed as Wilderness Study Areas. Areas also designated would include, but not be limited to, Adam’s Peak, Archer Knob, Kelley Mountain,

Big Levels, Three Sisters, Beard's Mountain, Crawford Knob, Dolly Ann, Duncan Knob, Elliot Knob, Galford Gap, Gum Run, High Knob, Little Mare Mountain, Oak Knob/Hone Quarry Ridge, Paddy Knob, Potts Mountain, Rich Patch, Shaw's Ridge and Three Ridges Additions.

Some areas in the old RARE II areas that were omitted from the potential wilderness area inventory include: the area northwest of the High Knob PWA to the FS boundary (old Dry River RARE II - 16135 ac.), a portion of Laurel Fork RARE II going inside, a portion of Toms Knob (Potts Mtn PWA) north of inholding (Barbours Creek RARE II), Jonnies Knob Virginia Mountain Treasure, Great North Mountain Virginia Mountain Treasure, portion of Big Schloss Virginia Mountain Treasure going all the way up to Anderson Ridge (36526 ac), Elliott Knob - area SE of tower (12,075 acres total), South Massanutten, and some possible areas on NE side of Rich Hole .

9. Water Quality, Drinking Water Watersheds, Riparian Areas, Soils, Sedimentation and Acidification

In the current Forest Plan, most of the attention given to water resources focuses on riparian areas. There is no attention given to the significance of considering entire watersheds.

On the GWNF intense ground-disturbing management activities continue to take place that harm or degrade riparian and aquatic conditions and biota. Riparian areas are the transition zones between aquatic and terrestrial habitat. They are the vegetated areas around all stream channels, seeps, springs, wetlands, bogs, ponds, lakes, and impoundments. They are identified by characteristic types of vegetation, soil, and land forms, as well as interactions between aquatic and terrestrial ecosystems (*e.g.*, faunal movements, shade, or additions of leaf litter and woody debris). Riparian areas vary in width depending on the size and location of the waterway. They are particularly vulnerable when associated with steep slopes or sensitive soils. In addition, numerous roads on the Forest are adjacent to and cross watercourses.

The biotic populations of some perennial streams, and intermittent and ephemeral tributaries, even if a "fishery" may be absent, may be close to or beyond threshold levels of tolerance for sediment. No standard for sediment has been set by the states (VA & WV) so the burden is on the Forest Service to set appropriate standards and to effectively monitor sedimentation rates. Various Forest Service management activities result in adding tons of sediment to Forest waters. These sediment loadings are long-term and chronic. Thousands of miles of roads are constantly contributing sediment. Timber sales typically add their loads to small first-order streams that are most vulnerable. The agency often does not know the status and trends of aquatic populations in these affected streams. In addition, the FS improperly analyses impacts, using a greater watershed for the scope of analysis and not adequately evaluating impacts to

site-specific areas.

High sediment loads impair stream populations and productivity (Henley, W.F. *et al*. 2000). For instance, fine sediment considerably impairs Trout hatching success and recruitment to populations.

“Timber harvesting can directly affect sediment transport in streams if it increases (or decreases) the supply of sediment, if it alters the peak flow or the frequency of high flows, or if it changes the structure of the channel by removing the supply of large woody debris that forms the sediment storage sites. Bank erosion and lateral channel migration also contribute sediments if productive vegetation and living root systems are removed.” (JNF FEIS 3-158) Logging often occurs at sites with steep slopes and soils with erosion concerns.

Roads greatly affect sediment loading and the timing and volume of stream discharges. In fact, roads are the chief source of human-caused sediment delivered to many of the Forest’s streams. The sediment that chronically empties into stream channels from roads is ongoing and does not stop.

Once sediment is deposited in a stream channel, its effects can persist for decades or even centuries (Frissel, 1996)." (JNF New Castle RD Enterprise TS EA-42) So a project such as a timber sale can potentially result in significant impacts to channel condition and population viability or distribution. And 10-15 years (or less) after adding sediment to a stream channel at a project area, the FS often returns to that project area and implements another project that adds still more sediment to the stream (cumulative impacts).

For logging projects on the Forest, most, if not all, of the ground disturbance typically occurs in small tributary watersheds and headwater valleys. Project implementation delivers tons of additional sediment to these tributaries. It is the effect of the sediment on the quality of these upstream and headwater tributaries and their biota that is the concern. And just because a tributary is “intermittent” does not mean it is not important habitat. That sediment increases from a project may be “immeasurable” and “insignificant” further downstream does not address the impacts to the upstream on-site tributaries and their biota.

Agency assertions that project effects will be insignificant are also based on the assumption that Best Management Practices (“BMPs”) will be properly implemented. However, the ineffectiveness and lack of enforcement of BMPs/Plan Standards and other mitigation measures on the GWNF was documented by the USDA Office of Inspector General in 1999.

The full riparian areas of permanent and intermittent streams are not necessarily protected from logging on the GWNF. Under the current Forest Plan, only the first 66 feet of the riparian areas around perennial streams are considered unsuitable for timber management. The GWNF Plan provides for a vehicle

exclusion zone" of only 33 feet around intermittent streams (GWNF LRMP 3 - 148). Ephemeral streams receive no direct protection in the GWNF Plan. And old stream channel braids that are presently dry are also open to cutting. Springs and permanent seeps are not protected. For example in the Paddy (cutting unit #2) and Slate (cutting unit #3) timber sales, logging occurred right over top of such sensitive habitats.

Riparian zones are not just buffers for aquatic habitat, but are themselves core habitat for various taxa. So the riparian zones/areas themselves need to be buffered from, for example, edge affects or recreation or roads. The upper watershed or upslope habitat can be just as important as the narrowly defined "riparian" habitat.

The GWNF provides drinking water to many thousands of residents in western Virginia. Containing headwaters of the James, Shenandoah, and Potomac Rivers, outflow from the GWNF is also a source of drinking water to millions of downstream residents of the of the Washington, DC and Richmond, VA metropolitan areas (Wild Virginia 2008).

The local need for clean water is acute. As documented in *The State of Our Water*, twenty-two localities in western Virginia obtain some or all of their drinking water from surface waters of the GWNF. Several localities rely solely on water originating in the GWNF for their domestic use. Surface waters from the GWNF provide drinking water to more than 262,000 residents in these communities (see Table 1, from Wild Virginia 2008). This figure is very conservative, as institutional (schools, hospitals, etc.), commercial, industrial, and agricultural users were not included in the estimate.

A large percentage of the GWNF land area is within these local drinking watersheds. Five reservoirs in the GWNF – Pedlar, Coles Run, Smith Creek, Staunton, and Switzer Lake – provide drinking water to nearby cities and communities. The reservoirs and their watersheds are approximately 68,086 acres in size. This represents 7.1% of the approximately 956,990 acres of the GWNF in Virginia. Approximately 357,788 acres of the GWNF comprise the watersheds for drinking water intakes on area rivers. This represents 37.4% of the GWNF lands in Virginia. The combined 425,874 acres within local public drinking watersheds represents approximately 44.5% of the total land area of the GWNF in Virginia.

There is cause for concern about water quality in the GWNF. Data from the Virginia Department of Environmental Quality in 2006 lists 6 reservoirs and 50 streams or rivers within the GWNF as impaired (Virginia DEQ 2006). Slightly more than 154 miles of streams and rivers within the GWNF in Virginia are impaired. Four of the six impaired reservoirs occur within drinking watersheds, with drinking water being directly drawn from two of them. The drinking watersheds contain more miles of impaired streams than would be expected

based on the land area they occupy. Four of the six impaired reservoirs occur within drinking watersheds, with drinking water being directly drawn from two of them (the Pedlar and Staunton Reservoirs). The drinking watersheds contain more miles of impaired streams than would be expected on the land area that they occupy. However, none of the reservoirs are impaired for use as a public water supply.

While many of the causes of impaired waters are beyond the control of the Forest Service, the large presence of impaired waters in the GWNF means that more should be done to protect water quality. Acidic waters and waters not fully supporting aquatic life are the two most common impairments in the streams and rivers. Though acid deposition is a major source of the problems, other stresses are likely at work too. As the Environmental Assessment for the Cubville Project (and numerous other Forest Service documents) explains, "On National Forest System land, sedimentation is the primary factor in water quality degradation. Sedimentation may be introduced into stream channels from soil disturbing activities such as timber harvesting and road construction." (p. 19, USDA Forest Service 2007a). The Conservation Alternative emphasizes management that mediates the acidic degradation to soils by reducing or eliminating the loss of topsoil and compaction of soils from timbering, road-building and off road use.

Benthic macroinvertebrate assessment impairments can be related to sedimentation. Other stresses can also contribute to this impairment. Unfortunately, data from DEQ lacks sufficient detail to ascertain the role of sedimentation in the impaired waters of the GWNF.

The current Forest Plan does very little to address drinking water resources. The plan identifies drinking water reservoirs, but does not address the watersheds within which the reservoirs occur. No other public drinking water sources are identified or discussed, and no watershed maps are included in the Plan. Management Area 18C is defined as riparian areas adjacent to and 1 mile upstream of seven listed "municipal water supplies (Lynchburg Reservoir, Coles Run Reservoir, Mills Run Reservoir, Clifton Forge Reservoir, Skidmore Reservoir, Staunton Reservoir, and Elkhorn Lake)." (USDA Forest Service 1993)

Under the current plan, management of the GWNF does not differ significantly between drinking watersheds and other areas of the forest. Of the total land area in the drinking watersheds, 34.4% is "suitable for timber production" compared to 34.8% of the land area outside the drinking watersheds. Road and trail densities on the GWNF reveal no consistent differences or pattern when comparing drinking watersheds to the rest of the forest (Wild Virginia 2008).

Managing for watershed protection produces many benefits beyond drinking water protection. Reservoirs function for longer periods of time due to decreased sedimentation. Many aquatic species, terrestrial species, and natural communities benefit from sound ecological watershed management. Outdoor

recreational opportunities, scenic resources, biological diversity, and other forest features are enhanced as well.

Brook trout (*Salvelinus fontinalis*) is a good example of a species that would benefit from stronger water quality and watershed management. The Eastern Brook Trout Joint Venture (EBTJV) has documented the decline of brook trout and the streams and watersheds that support them in the eastern U.S. Virginia is important to the long-term viability of native brook trout populations, as it has a greater number of subwatersheds (usually containing 25-75 miles of streams) with intact brook trout populations than any state south of New York (EBTJV 2006). The GWNF (along with Jefferson National Forest and Shenandoah National Park) is home to many of the remaining trout streams in the state.

There are 700 miles of "cold-water" streams on the GWNF in VA, with 635 miles being trout streams (class I-IV). There are only five exceptional wild Trout streams (class I) occurring in the GWNF in VA, totaling only 13 miles. Forest management can impact the quality of these trout streams in a number of ways. The EBTJV (2006) identifies high water temperature as the greatest disturbance to brook trout populations in Virginia. The report also lists poor land management, degraded riparian habitat, grazing, and stream fragmentation (e.g., roads and culverts) as threats. All these threats are present to some degree in the GWNF. Poor land management and degraded riparian habitat can result not only in higher water temperature (with fewer trees to provide shade to streams) but increased sedimentation as well.

Grazing allotments in the GWNF also pose significant problems. As the draft Comprehensive Evaluation Report of February 2007 states, "*Efforts to fence cows out of Shenandoah River have failed and cows continue to cause bank erosion and resulting sedimentation in the grazing allotment(s)*." (USDA Forest Service 2007b, p. 28) Obviously, this situation is highly undesirable and needs to be resolved.

Impaired waters are a significant presence in the GWNF. All impaired waters are impacted by physical stresses, sometimes multiple stresses from multiple sources. Eliminating or minimizing stress will increase the resilience of these aquatic systems.

Action – The Desired Future Condition of the forest as put forth in the Conservation Alternative is a forest that maintains and improves the integrity of all drinking water watersheds and riparian areas.

Under the Conservation Alternative, all the Forest's streams, perennial, intermittent, and ephemeral, and their associated terrestrial habitat are strictly protected from harmful developments such as logging and road building. The strictly protected zone extends at least 200-300 feet out from both sides of a stream channel or the entire defined site-specific "riparian area", whichever is

greater; they are not suitable for logging, road construction, or other development. Expansive no-disturbance protective zones are applied to all the Forest's perennial, intermittent, and ephemeral streams. Road decommissioning and obliteration to restore watershed integrity are a priority.

Riparian Guidelines are created under the Conservation Alternative requiring precise field delineation of all riparian areas. These guidelines ensure the protection of conditions upslope of the riparian area that contribute to the integrity of the defined "riparian area", protect ephemeral and intermittent channels and provide more rigorous protection of riparian areas in areas with high road density or more intensive management activities. The Conservation Alternative provides standards and guidelines requiring the proper site-specific consideration and analysis of the effects of sedimentation. The cumulative impacts of sedimentation are fully and fairly examined in the EIS for the revised Plan.

Forty localities and organizations have adopted resolutions calling on stronger protection of drinking water resources and watersheds in the GWNF. Five requests that are common and consistent among the resolutions are listed below. The Conservation Alternative meets these objectives by 1) formally identifying all watersheds that provide drinking water to local communities. 2) Forest Service staff would be directed to communicate more effectively with communities obtaining drinking water from watersheds and reservoirs within the GWNF. 3) It would implement a program to improve data gathering and collection efforts in order to better describe and assess water quality and watershed conditions. 4) The Conservation Alternative establishes management objectives of for entire watersheds in order to maintain, protect, and enhance water quality. 5) It would set out and implement a plan to coordinate with local communities, other agencies and the public to develop policies and management plans for drinking water watersheds.

All Inventoried Roadless Areas and all possible Wilderness Study Areas identified in the revision process would be managed in accordance with the 2001 Roadless Area Conservation Rule. By eliminating most ground-disturbing projects and activities in these areas, watershed and water quality protection will be greatly strengthened. Sedimentation rates will not be elevated, thus eliminating "the primary factor in water quality degradation" in national forests.

Using the Roadless Area Conservation Rule to manage Roadless Areas would further protect local drinking watersheds. In particular, greater protection would be extended to the North Fork Shenandoah River (through Beech Lick Knob and Big Schloss PWAs) and the six communities that obtain water from it – Winchester, Strasburg, Woodstock, Broadway, Middletown, and Frederick County. Lexington, Clifton Forge, and Front Royal would also benefit, as areas of their drinking watersheds occur within PWAs.

No new roads, including temporary roads and re-opening of roads that have not been used in recent years, would be allowed in drinking watersheds. Absent a truly compelling need, no new roadways would be created.

Road closings and decommissionings (i.e., the restoration of original slope, topography and hydrologic conditions, removal of invasive species if present, revegetation) is very desirable for watershed and forest restoration. A much higher goal (in terms of miles/year) would be established.

Enhanced methods of monitory water quality would be established. The current system of macroinvertebrate sampling in streams forest-wide, augmented by sampling for the Virginia Trout Streams Sensitivity Study, is good. No direct monitoring of sedimentation currently takes place in the GWNF, however. As "the primary factor in water quality degradation" in national forests, affecting both aquatic wildlife and drinking water resources, more information and monitoring of sedimentation would be implemented. Sedimentation monitoring would be required for all surface disturbing projects and activities on the forest.

The Conservation Alternative would include strategies and a framework for addressing impaired waters. Several other national forests, including the Monongahela, White Mountains, Green Mountains, Wayne and Allegheny, have a significant number of streams impacted by acid deposition, just as the GWNF does. Each of these forests is addressing the problem of acidic streams, and the GWNF would as well. Treating Saint Mary's River with limestone sand, as has been done in the GWNF, is a good example of taking action to improve impaired waters.

The Conservation Alternative eliminates the use of grazing allotments and considers them an incompatible use of land in the GWNF. Trout streams on the GWNF receive expanded and strengthened protections in the revised Plan. All benefits under the Conservation Alternative with regard to increased water quality will be factored in to computation of the net public benefits.

10. Old Growth and Climax Forests

There is little true old growth forest remaining in the GWNF. As a result of past and ongoing depredations, old growth forest habitat is now considered "critically endangered" in the Southeast, with old growth surveyors and analysts estimating that little more than one-half of one percent of the forest cover in the southeastern US is in old growth condition (USDA FS 2002 at p. 20; see also, Noss, R. *et al.* 1995 at p. 50). Gradually maturing forests are just beginning to fill in the gaps between these sparse, tiny old growth patches.

Despite this depauperate and devastated landscape context, old growth is regularly cut down on the GWNF and considered "suitable for logging." For instance, old growth acreage of "dry-mesic oak" is currently considered to be

“suitable” for logging. This “forest type group” (OGFT #21) is the most prevalent on the Forest, making up 678,000 acres or 64% of the Forest (see FEIS App. H – 3).

Despite the extreme rarity of eastern old growth, the current plan infers there is an “adequate” amount to cut. This has somehow been subjectively determined in light of the fact that there is no meaningful attempt to identify old growth “on the ground” by doing old growth analysis as part of all projects on the forest.

Old growth has been a topic of intense conflict during the last decade in the GWNF. There is a clear need for a change in the GW Plan direction that allows the cutting of some forest types of old growth. There have been numerous examples of areas have been demonstrated to correlate with the FS definition which your own personnel and analysis has failed to identify, such as at Hematite, Hoover Creek, Signal Corp Knob, the Hamilton Draft area, or Marshall Run.

There currently exists no analysis or plan for allowing climax forest conditions to return to ecologically significant areas of the forest, distributed geographically. Climax conditions include, but are not limited to, old growth. Climax conditions present a true “no manage” alternative to create desired future conditions. They present a natural mosaic of stable and resilient forest. The GW has no areas that can be so defined but only old growth areas have the potential of creating eventual climax communities. Currently wilderness areas have the only possibility of creating this forest type and are of insufficient size and are insufficiently distributed throughout the forest

Action – The Conservation Alternative creates situations for a forest in its natural steady-state condition where ecological processes create a mix of habitat types that preserve the ecological integrity of the forest. It creates the situation for a large and continual increase in old growth areas over the next 10-15 years. All acreage that meets GWNF FEIS age criteria or the Region 8 Old Growth Guidance criteria, whether it consists of a complete “stand” or not, is designated as unsuitable for timber harvest or other intensive ground disturbance. The currently unreasonable requirement for the number of large or old trees per acre is reevaluated and revised according to best conservation practice and scientific information. The ages of the oldest trees will be accurately identified, and improperly determined timber inventory data that does not gauge the true age of a site must be discarded.

The Conservation Alternative calls for the conscientious identification of small, medium, and large tracts of old growth as Core Conservation Areas and their potential for forest wade distribution and connectivity through the use of linkages and corridors will be evaluated and implemented. Areas with climax forest potential are identified as are surrounding buffer areas. Each are given their own

management prescription and are unsuitable for timber or vegetation management or ground disturbance.

11. Invasive Species

Nonnative Invasive Species are a serious ecological threat to virtually every square inch of the GWNF but the existing plan fails to address ways to prevent their further spread while working to reduce and eliminate their presence and harmful impacts.

Goal #2 of the USDA Forest Service Strategic Plan for Fiscal Years 2004-2008 states on page 9: “Reduce the impacts from invasive species. Outcome: Improve the health of the Nation’s forests and grasslands by reducing the impacts from invasive species.”

“Invasive species—particularly insects, pathogens, plants, and aquatic pests—pose a long-term risk to the health of the Nation’s forests and grasslands by interfering with natural and managed ecosystems, degrading wildlife habitat, reducing the sustainable production of natural-resource-based goods and services, and increasing the susceptibility of ecosystems to other disturbances such as fire and flood.” Aside from effects on the natural ecosystem, these invaders also detract from visual quality along roadsides, which may affect tourism.

“Habitat fragmentation (the division of forest and grassland habitat into smaller, more isolated patches) limits containment and eradication of invasive species.”

“The best defense against invasive species is either preventing their introduction or aggressively eradicating newly detected pest species.”

There are several external factors outside the control of the Forest Service that might affect progress toward this long-term objective, including the following: “Increasing demands on the agency’s human and financial resources and the resulting reduced ability to work with and through other jurisdictions and stakeholder groups; accelerated susceptibility and mortality of forest trees from drought, insects, and pathogens; and introduction of new species of insects, pathogens, and invasive plants into the United States.”

Forest Service data from the Wayne National Forest Plan Final Environmental Impact Statement (USDA Forest Service, Wayne National Forest, Final Environmental Impact Statement for the 2006 Land and Resource Management Plan, ttp://www.fs.fed.us/r9/wayne/planning/2006_docs/final_eis_docs/index%20to%20feis.html)states that: “Worldwide, NNIS are considered to be the second-leading threat to biodiversity; only habitat loss is a greater threat. NNIS plants are estimated to infest 100 million acres in the United States, and invade an

additional three million acres annually. Estimated damages and losses due to NNIS are $137 billion per year. This figure includes losses to commercially important sectors (e.g., agriculture and livestock), but not the more intangible, non-market impacts, including impacts to natural ecosystems. NNIS are the primary threat to 49 percent of all imperiled or federally listed species.

The spread of invasive species such as Asian Stiltgrass, Garlic Mustard, Multi-flora Rose and Ailanthus is occurring throughout the Forest. These plants may reduce the abundance, species richness, and/or diversity of native flora, fauna, and fungi. These impacts in turn can have cascading negative effects upon native species of biota. The direct, indirect, and cumulative impacts upon native flora and fauna from these invasives may be or become significant.

The presence of non-native invasive plants continues to increase in the GWNF. According to the Shenandoah Valley Chapter of the Virginia Native Plant Society, these populations include, but are not limited to the 10 most common NNIS observed in areas of the North River Ranger District: Ailanthus altissima - Tree of heaven; Elaeagnus species (angustifolia, pungens, umbellata) - Russian olive, Silverthorn, Autumn olive; Ligustrum sinense – Privet (Chinese and European); Lonicera species - Honeysuckles, 4 species (bush and vine); Lonicera japonica - Japanese honeysuckle; Rosa multiflora - Multiflora rose; Lespedeza species - includes Shrubby lespedeza; Celastrus orbiculatus - Oriental bittersweet; Microstegium vimineum - Japanese stilt grass, Nepalese browntop; and .Alliaria petiolata - Garlic mustard.

Non-native invasive plant species tend to invade and establish themselves in areas where disturbance has occurred, such as vegetation removal, canopy opening, or soil exposure. NNIS often occur along roads and trails where there is concentrated soil disturbance, and in other areas with bare or disturbed soil, including trailheads, parking lots, developed and dispersed recreational sites, popular fishing locations, and other heavily used areas. Once they are established in an area, they can continue to spread along areas of continued disturbance, such as roads, trails (both official and illegal user-created trails), and streams. NNIS are transported into new areas by a number of means, including people, vehicles and machinery, animals, birds, wind, water, fire, and rain.

Timber management and harvesting techniques help spread NNIS plants through use of heavy machinery, canopy removal, earth disturbance and the movement of forest products on skid trails, logging roads. Herbicide use and timber stand improvement activities for oak regeneration or other management purposes will create increased light environments within the forest that can increase NNIS risks.

Forest Service activities that have as their intended management objectives the creation or management of habitat for wildlife, endangered species, visual

quality, recreation or biodiversity often have the secondary effects of enhancing habitat for the introduction and spread of NNIS.

Roads are fragmenting agents that increase forest edge habitat. Road construction, maintenance, and use provide continuous soil disturbance, and often act as corridors for NNIS dispersal. NNIS have some of their highest densities along permanent, administrative and temporary roads as well as old logging roads, landings and wildlife openings.

Fires can facilitate introduction and dispersal of many NNIS. Prescribed fires in particular involve the following activities that can facilitate NNIS establishment and dispersal, such as: soil disturbing activities during fire line construction and from emergency roads cut through the forest to stop a prescribed burn that moved outside its boundaries; vegetation and canopy reduction through burning; the reduction of soil protecting litter. Areas on the Forest that have been burned repeatedly are overrun with invasives (such as at the Shenandoah River on the Lee RD, as observed by Krichbaum, S. 2007). Studies found the alien herb Garlic Mustard (*Alliaria petiolata*) persisted and had greater abundance in burned plots (Bowles, M.L. *et al*. 2007). Also the NNIS risks of Mechanical Hazardous Fuel Removal will increase when construction of temporary trails and roads for motorized equipment access are needed.

The effects of NNIS on drainage areas, streams and tributaries can be very significant and are often overlooked in project analysis. With the high runoff from disturbed areas, NNIS are spread throughout the riparian areas and can negatively impact native riparian and wetland species. For example, Asian Stiltgrass (*Microstigeum vimineum*) is increasingly problematic in the Eastern United States; recently it has invaded numerous sites on the GWNF (Krichbaum, S., personal observation). It rapidly invades after canopy disturbance, frequently at moist forests and stream banks (habitat for species such as the Wood Turtle), and displaces native vegetation (see Oswalt, C.M. *et al*. 2007).

The hemlock wooly adelgid continues its spread and has already significantly damaged significant areas of the Forest (*e.g*., Skidmore Fork and Ramseys Draft). The current plan has no mention of this biological catastrophe and no plan to actively and explicitly deal with halting its spread.

Action – The Desired Future Condition of the forest is one where the spread of NNIS is monitored and restricted or eliminated to the maximum extent possible. It contains an active strategy for protecting the integrity of rare native plant communities. The Conservation Alternative sets direction for control, repression and elimination of NNIS. All precautions are taken to prevent disturbances that can introduce NNIS to remote, interior, roadless and other areas where they have previously been absent. Reducing ground disturbances of all kinds and meticulous cleaning of vehicles, machinery and tools are also important strategies to prevent new NNIS encroachment.

Under the Conservation Alternative, management actions are based on good quality, detailed, and site-specific information. The spread and impacts of NINS on the forest are actively monitored and suppressed. Sound professional judgment is required as well. Simply designating a species as non-native and invasive can be somewhat subjective, depending on how long a species has been established in the region. Species also vary in their “invasiveness”, or ability to invade new areas and establish themselves. Negative impacts to native species and ecosystems also vary with species, and sometimes with the length of time a NNIS has been established. All these factors, combined with site-specific characteristics, must be considered when controlling NNIS. Without a comprehensive analysis and approach, potential remedies, such as intensive herbicide use and/or physical removal of NNIS, may do more harm than good.

Given that the most common management activities that occur in the GWNF all have the potential for facilitating the spread and establishment of populations of NNIS, the Conservation Alternative includes significant reductions in projects which cause vegetation disturbance, soil disturbance and habitat fragmentation, including timber projects, salvage sales, creation of early-successional habitat and wildlife openings, road construction or reconstruction and prescribed fires. When these types of projects are carried out, consideration is given to confining them to specific geographic areas, since confining potential NNIS problems to specific areas, as opposed to wide dispersal across the GWNF, makes combating them more practical and effective.

The Conservation Alternative emphasizes management actions that would reduce the risk of the introduction and spread of NNIS. These actions include significant road closures, decommissionings, obliterations and the manual removal of NNIS from established areas, especially newly colonized areas and areas of recent vegetation and soil disturbing activities. Methods are incorporated into all project analysis, planning, implementation, and monitoring to prevent spread of current NNIS infestations and to prevent new invasions.

12. Climate Change and Carbon Sequestration

Global Climate Change is one of the most serious environmental, social, and economic threats the world is facing today. Global climate is influenced by changes in land cover. Large-scale conversions of forestland into agricultural land or urban development reduce carbon storage and the potential for sequestration and thus contribute to the build-up of carbon dioxide in the atmosphere. Global warming can affect forests by introducing new invasive plants, insects, and animals that expand their range as temperatures increase. Also, the forest could be put under increased stress from extreme weather events, changed weather patterns and seasons (warmer winters, for example), and increased likelihood of drought and forest fires.

Changing climate affects areas as forest types change, species find areas to establish populations outside their present or historical range and as weather patterns change which can effect all ecological parameters (for instance, air and water quality and temperature, increased intense weather events-drought or deluge-, etc). The retention and restoration of full altitudinal gradients is of crucial importance in order to accommodate faunal and floral population/community shifts upslope to cooler conditions in response to climate change. (Graham, R.W. 1988).

The warming of the atmosphere is linked to increased concentrations of greenhouse gases, including increases in carbon dioxide from changes in land management. Even though forests in the U.S. have acted as net carbon sinks since the 1950s, the annual additions to the sink (sequestration) appear to be declining. The Environmental Protection Agency lists the following forestry practices that can sequester carbon or preserve carbon storage: afforestation, reforestation, avoided logging, and longer harvest-regeneration cycles.

Obviously, planned logging and burning and taking out vegetation for other reasons do not increase the capacity of the GW as a carbon sink. "In fact, young forests rather than old-growth forests are very often conspicuous sources of CO2 because the creation of new forests (whether naturally or by humans) frequently follows disturbance to soil and the previous vegetation, resulting in a decomposition rate of coarse woody debris, litter and soil organic matter that exceeds the NPP (net primary production) of the regrowth." Luyssaert et. al. 2008. Old-growth forests as global carbon sinks. Nature, Vol 455|11

The 93 Land Resource Management Plan, Record of Decision, and Final Environmental Impact Statement contain no reference to Climate Change. They neither addresses the GW's potential for carbon storage and sequestration and their potential economic value nor analyze potential impacts from global warming on the forest. The 93 Forest Plan does not analyze net public benefit with regard to storing and sequestering carbon, although clearly the delivery of these services are limited in the long run by declaring hundreds of thousands of acres of the forest suitable for timber production.

Action - Climate is a "forest product". Standing forests contribute to carbon storage, air quality, water quality and recharge, humidity and rain patterns. In addition to being efficient regulators of air, water, humidity, and participation and effective wind buffers, large areas of restricted management afford the best long term resiliency and protection of lands and land values given radically changing weather parameters. In response to ongoing and potential climate change a priority goal and objective for the Conservation Alternative is to restore and maintain broad elevational core habitat and corridors throughout the Forest.

Clear and explicit prescriptions, objectives standards and guidelines are created that accommodate faunal and floral population/community shifts upslope to cooler conditions in response to climate change.

Identification and mapping of patches and corridors of mature and old-growth forest (contiguous forest containing "core" conditions of mature and/or old-growth forest supplying expansive elevational gradients and anthropogenically unbroken/unfragmented physical links between relatively large patches containing "core" conditions of mature and/or old-growth forest) is accomplished. These cores/corridors are considered not suitable for logging, road building, drilling, mining, wind turbines, or development. They are priority areas for watershed restoration activities (*e.g.*, decommissioning, recontouring, and revegetating of selected roads).

Preferred higher elevation habitat can be lost or fragmented by rising temperatures or changing weather patterns. Such higher elevation habitat is preferred by various species. For instance, surveys in Virginia public forests identified ten species of elevation-sensitive birds (Lessig, H. *et al*. 2008).
The Conservation Alternative ensures that there is no loss of or degradation of habitat within the broad elevational "corridors". Moreover, "corridors" will not be too narrow so as to avoid being overrun with edge effects.

The EIS for the Conservation Alternative will discuss ways in which forest management could contribute to a reduction in greenhouse gases and to maximize carbon sequestration. The Conservation Alternative will strive to meet these conditions.

13. Roads

The GW is overbuilt with roads. The GW lists approximately 3,000 miles of permanent roads. This is vastly understated as this includes only roads in maintenance levels 3, 4 and 5. When all uninventoried permanent roads, all temporary roads, and all roads in maintenance level 1 and 2 are included, the figure is closer to 6000 miles. If placed end-to-end the roads would stretch from your office in Roanoke clear across the United States, all the way to the Pacific Ocean at San Francisco, California *and back again*.

Despite the incredible number of roads in the GW, it should be noted that roads are not a measure of access to the forest, but ease of access. Virtually every square inch of the forest, with the exception of administrative buildings and the Warwick Mansion during "closed" hours, is totally accessible. There are virtually no areas where access is restricted.

80% of the GW is within 1/2 mile of an existing road. This infers that some of the rarest and most special lands in the GW are those areas that have the lowest

road densities and areas that are the farthest in linear distance from existing roads.

The road density standards that currently exist only apply to “open” permanent Forest Service system roads meaning that the Forest Plan allows an unlimited mileage of “closed” and “temporary” roads to be constructed. There is no clarity on the difference between “unimproved” roads and “improved” ones. It is not at all clear what roads are counted toward calculating road densities to identify NF sites to be added to the roadless areas inventory and/or evaluating said areas. Plus, perimeter roads do not count in the calculations. Further, there is no standard that requires road density Standards to actually be met within any set time (see MA and Forest-wide Standards at the LRMP 3 – 4-158).

After seventeen years of “striving” on the GWNF, the FS is still not meeting road density standards on hundreds-of-thousands of acres. Given the inaccuracy of the mileage figure, the average road density of the GW is obviously greater than the 1.55 miles per square mile, closer to 3.0 miles per square mile. This is six times the trail density of approximately .5 miles per square mile.

Many, if not most, of the 6000 miles of roads serve no purpose and are clearly unnecessary in the GWNF. The FS has not identified, as directed, the minimum road system needed.

At present only two Management Areas on the Forest, MAs 14 and 15, have road density Standards; so 53% of our GWNF has no existing Plan standards limiting road density. Road density exceeds Standards on approximately 300,000 acres, or around 28%, of our GWNF. The Forest-level “roads analysis” conducted in 2003 is inadequate for making management decisions regarding the road system on the forest and insufficient for addressing issues and concerns raised by the public.

It is impossible to discuss roads without also discussing the fragmentation, edge effects and sedimentation that accompanies them. Roads are the most significant cause of forest fragmentation within and upon the George Washington National Forest. Roads also create edge effects. One of the most prominent of these is the proliferation and spread of non-native invasive species. Roads more effective at spreading invasives than transporting human beings. While people are temporary visitors, invasives become permanent residents. This is also considered one of the most significant issues to be addressed in the Forest Service Strategic Plans.

Just as roads increase access for invasives, they create barriers to migration of native flora and fauna. The islands that roads and their edges create isolate populations and reduce the viability of many populations. In times of changing climate they prevent many species from being able to move through the forest,

creating “death traps” for many species with small ranges such as reptiles, amphibians.

There is a significant lack of information in the GW regarding road amounts, densities, edge effect zones, and fragmentation. These are basic baseline data essential for the agency to benchmark and measure its performance, essential for successful implementation of the agency’s strategic plan, and essential for accountability to the public. Further, this baseline data is necessary for setting and validating objectives, desired conditions, guidelines, goals, standards, prescriptions, and/or allocations for the Forest. Without this gathering and analysis and monitoring of baseline data, the FS is unable to ensure that it is meeting its mandates regarding diversity, natural forest conditions, viability, and public accountability.

Roads are expensive to engineer and build and even more expensive to maintain as permanent roads. They increase the need for law enforcement by expanding the area that can be accessed by legal and illegal vehicles. The ecological damage that is done to the forest yearly is directly proportional to miles or acres of access and has never been estimated but is ecologically significant.

Action – The Conservation Alternative would include information and EIS analysis of a clear, current and accurate roads analysis on the GWNF. Ambiguities regarding definitions, road densities and all impacts, including fragmentation, edge effects, sedimentation, invasives, and human impacts concurrent with motorized legal and illegal access, poaching and law enforcement, would be clarified and analyzed. Candidates for road closures, decommissionings and restorative obliterations would be prioritized based on ecological integrity parameters and restoration goals. All road closures would be considered to be additions to or remain as part of the existing trail system.

Given the massive inventory and distribution of existing roads in the GW, it is inconceivable that there would be *any* acceptable objectives for new road construction. At the very least Certainly no new roads of any maintenance level, permanent or temporary should be built in: drinking water watersheds, Virginia Department of Natural Resources/Natural Heritage Biological Sites, existing or potential Roadless or Wilderness Study Areas, watersheds containing populations of native brook trout, areas with already low road densities, Virginia Mountain Treasure and remote interior or core conservation areas.

Under the Conservation Alternative, comprehensive guidelines would be established for performing site-specific road analyses at all project areas with roads that will be used to implement the project, regardless of the project area’s location or of whether road construction or reconstruction are planned as part of a site-specific project.

The Conservation Alternative would limit any money targeted for roads to maintaining the existing road system, with priorities given to roads that are absolutely essential for links between communities or provide existing access for private lands and inholdings and implementing road closures, decommissionings and obliterations. These actions would achieve the Desired Future Condition by preserving and enhancing the ecological integrity and health of the forest.

An objective for the Conservation Alternative is to set a goal for this Forest Plan is to achieve conditions where the density of open Forest Service roads is no more than 0.8 miles per square mile across the entire Forest. This moves the forest in the direction of achieving the Desired Future Condition. The objective over the next 15 years should be to reduce the total road mileage on the Forest to 1984 levels (1330 miles). This work will provide many jobs to local communities. To accomplish this watershed rehabilitation work, reallocate monies presently spent on administering timber sales.

14. Primitive Recreation

In the 1993 Forest Plan, the potential for primitive recreation opportunities was not adequately considered. The Forest and Rangeland Renewable Resources Planning Act of 1974 directed the Secretary of Agriculture to prepare a Renewable Resources Assessment in 1975 with updates in 1979 and each 10th year thereafter. These assessments are to include "an analysis of present and anticipated uses, demand for, and supply of the renewable resources, with consideration of the international resource situation, and an emphasis of pertinent supply, demand and price relationships trends".

“The sense of creativeness, refreshment and pleasure which the recreationist has while recreating or having a good time can be viewed as the recreationist realizing satisfactory experiences. The recreationist attains these satisfactory experiences by participating in preferred recreation activities in preferred surroundings or settings. Therefore although the recreation resource manager manages settings, he or she does so to provide opportunities for recreation experiences and the benefits those experiences produce for individuals and society. Those experiences are influenced by many factors: the settings, the activities, other resources present, activities by managers, and by the values, expectations and other characteristics of the recreationists. These factors interrelate to define outdoor recreationists' needs and the way these needs are met by management action.

Managing for recreation requires different kinds of data and management concepts than does most other activities. While recreation must have a physical base of land or water, the product - recreation experience - is a personal or social phenomenon. Although the management is resource based, the actual recreational activities are a result of people, their perceptions, wants, and behavior.

The word opportunity is defined as a combination of circumstances favorable for a purpose. The purpose or goal of the recreationist, as discussed above, is to realize satisfying experiences. This is done by participating in preferred activities in preferred environmental settings. Thus, recreation opportunity is the availability of a real choice for a user to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired.

While the goal of the recreationist is to obtain satisfying experiences, the goal of the recreation resource manager becomes one of providing the opportunities for obtaining these experiences. By managing the natural resource, and the activities that occur within it, the manager is providing the opportunities for recreation experiences to take place. "(USFS ROS Users Guide -1982)

ROS inventory identifies and defines the ROS classes using six criteria: size, naturalness, remoteness, social encounters, access and distance from road. These six criteria reflect the types of settings and experience opportunities the recreationist would expect to encounter. Primitive Recreation is defined by areas with very high degree of remoteness and naturalness; very little or no motorized use within area; 5000 ha or more in size; 3 miles or more from a 'rough' dirt or gravel road.

Eastern forests are so heavily roaded that there is not a single primitive recreation area available in any eastern National Forest. The GWNF has the most and best potential in the east to provide primitive recreational opportunities.

Action – It is not beyond the scope of the GWNF Forest Plan revision process to consider the full range of the ROS and thoroughly analyze any areas that would quality as most closely fulfilling or approximating the criteria for primitive recreational opportunities in the GW. The opportune time for such analysis is during the Roadless and Wilderness Study Inventory analysis. The Conservation Alternative promotes a desired future condition where primitive recreational opportunities are provided which most closely approximate the criterion for primitive recreation as found in the ROS.

The Conservation Alternative identifies the Shenandoah Mountain complex of wilderness, roadless, potential wilderness and Virginia Mountain Treasure areas as having the greatest primitive recreation potential in the forest. All of these areas combined represent and include approximately 300,000 acres. Specifically, Little River's 29,000+ acres fulfill all of the 12 Criteria and factors of primitive recreation with the only exception that the core of the areas lies just less than 4 miles from any roads.

This fact notwithstanding, the EIS for the Revised Plan should identify Little River Roadless Area as the area in the GWNF that most completely meets the definition and most closely fulfills the recreational opportunities of primitive

recreation. The Conservation Alternative would recommend the entire 29,000 acre for Wilderness Study, giving it a level of protection that allows no activities within the area which would diminish or compromise the primitive quality of this area. Moreover, the Conservation Alternative directs planners to make creative proposals for creating primitive recreation opportunities on Shenandoah Mountain by proposing specific, strategic and reasoned road closures and decommissionings, obliterations and land acquisitions which would create a contiguous, roadless potential wilderness area which would fulfill all criteria for primitive recreation in the George Washington National Forest.

15. Semi-primitive, Non-motorized Recreation

Visitors to the GWNF come to experience the natural beauty of the forest. Most people come to the GWNF to picnic, hike, camp, view birds and other wildlife, view and photograph scenery, pick mushrooms, nuts and berries, bike, fish, or hunt. By the Service's own analysis, the future demand for semi-primitive non-motorized recreation is expected to greatly exceed supplies. Yet under the 1993 Plan, recreational opportunities and scenic beauty have been lost, diminished and damaged.

Around 70 miles of the world-renowned Appalachian Trail traverse the Forest. The estimated income and jobs contributed to local economies from recreation and wildlife on the National Forests is over 30 times that derived from logging these Forests (Niemi and Fifield at 21). A similar relationship (around 30:1) holds for the extrapolated value of unroaded and wild areas (*id*.). Yet the Forest Service budget priorities reflect otherwise, with around 40% of expenditures on the Forest going to timber sales and roads. (M&E Reports numbers and FEIS cite)

Some GWNF lands provide a sense of remoteness, stillness, and solitude. Such opportunities are rare and precious, especially in such close proximity to the highly populated and developed urban areas of Northern Virginia, Richmond and Baltimore. Currently these semi-primitive non-motorized lands comprise only 14% of the Forest.

The Forest Service defines recreational opportunities by the amount of roads an area has, or its distance from them. There are over 53,000 miles of roads in Virginia and over 160,000 miles of roads in the Southern Appalachian region.

Recreational use of designated Wilderness has increased substantially over time; in the South, visitation of National Forest Wilderness in 1996 was 5 times what it was in 1975 (Loomis & Richardson 2000 at 9). This implies a continuing strong demand for the types of non-motorized recreation opportunities afforded by roadless areas and other wildlands. Visitor use of Wilderness Areas on southeastern National Forests is forecasted to grow by about 1% per year for the next fifty years (Loomis & Richardson 2000 at 11). It is clear that the demand for

backcountry dispersed recreation opportunities is increasing in an environment of diminishing supply (Roadless Area CR FEIS 3-215).

Action – The Conservation Alternative significantly increases the amount of semi-primitive non-motorized and semi-primitive non-motorized 2 acreage on the forest. A listing and map with all the Forest's trails clearly identified is provided in the public documentation, including which trails allow mountain biking. The Conservation Alternative requires that timber sales not be placed next to trails and other important recreational areas on the Forest.

16. Developed and Motorized Recreation: Off Road and All Terrain Vehicle Opportunities

Supplies of developed or motorized forms of recreation are estimated to be already well sufficient to meet demand. The 1993 Plan, however, allows and facilitates the construction of additional roads that increases the current surplus of motorized access while destroying or degrading remote features in short supply. (See the numbers in GWNF and JNF FEISs).

The current plan includes consideration of the Archer area on Great North Mountain in Augusta County. This despite the fact that ATV use in the GWNF is incompatible with any other use of the forest and creates more (and well documented) ecological damage than any other public use of the forest.

The GWNF's Chief Law Enforcement Officer has stated that illegal ATV use is the "number one threat" facing our GWNF and that illegal motorized trespass is an ongoing problem that is not under control (GW-JNFs 2004 M&E Report at p. 19). However, the current plan does not consider the degree to which its own roads and logging trails facilitate illegal OHV use. Neither is it assessed at the project level. The cumulative effects of illegal accesses facilitated by administrative, temporary or seasonally gated roads has never been sufficiently analyzed.

Illegal motorized trespass or evidence of such has been observed by citizens at the Potts Mountain Pond and Maple Flats special biological areas; within streams, such as Sours Run; within areas of known habitat for at-risk wildlife (such as Wood Turtles); within unroaded areas at Crawford Mountain, Big Schloss, Slaty Mountain, and Great North Mountain; and in many other so-called "protected" areas on the Forest. The existing Peters Mill Run ATV is located in dangerous proximity to Peters Mill Run, a special biological area.

Action - The Conservation Alternative actively promotes the restoration and preservation of ecological integrity on the forest in achieving its desired future condition. The FEIS examines and evaluates the option of eliminating any use of ATVs and ORVs on the forest with the exception of permanent roads. The

Conservation Alternative identifies ATV areas as an incompatible use of the forest and closes and creates a restoration plan for Peters Mill Run ATV. This will encourage private forests and lands to provide ATV opportunities for private financial recreational opportunities and community income which will not be in direct competition with the once "free" access provided in the GWNF.

As the road system in the forest shrinks, so will the opportunity for illegal and ecologically destructive ORV/ATV use in the forest. This will also make the existing levels of law enforcement on the forest more effective and efficient.

17. Timber Production

The forests of the George Washington National Forest are beautiful, diverse and unique. Because they lie south of the glacial expanse of the last ice age, they contain a broader diversity of species than any forests to the north. The majority of these lands are relatively dry and remote ridges and slopes, neither as fertile nor as wet as most of the lands in Virginia. Yet the current GWNF Forest Plan continues to perpetrate a commercial logging program that is neither ecologically nor economically beneficial to the forest, the public or to the forest landowners in the Commonwealth.

Commercial logging in National Forests is extremely controversial and is opposed by 70% of the American public (US-Forest Service 1986; Market Strategies, Inc. and Lake, Snell, Sosin, Perry, and Associates 1998; GW-J survey?). Most Americans are not even aware that their National Forests are not protected from commercial logging (Mellman Group 1999). The National Forest Management Act was adopted to require the conservation of soils, watersheds, recreation, and wildlife and place limits on the use of even-aged and other "regeneration" cutting. Yet the agency considers such cutting to be virtually required for "forest health" and "multiple-use".

There are approximately 16 million acres of timberland in Virginia and 12 million in West Virginia; so the amount of land in the GWNF currently considered to be "suitable" (currently 350,000 acres) represents a little more than 1% of the timberland in the two states. The amount of timber cut coming off the GWNF makes up less than 1% of the timber cut in the state of Virginia.

Taxpayers heavily subsidize the National Forest timber sale program. That is, the logging is a money loser. The receipts do not cover the expenditures. And it operates in competition with private landholders. Nationwide, it has been estimated that the National Forest timber program loses over a BILLION dollars a year, and this estimate is conservative (Hanson, C. 2000). In other words, the profits are privatized (by the timber industry) and the costs are socialized (by US taxpayers).

The timber sale program is "below-cost" on the George Washington-Jefferson National Forests. No timber program in the GWNF can be justified economically. This is true in fact and in theory as the 1993 Plan was unable to create any alternative that resulted in any net profit to the timber sale program. It also notes that given “the relatively small volume of timber offered” that it could easily be “substituted with a comparable volume off other lands.” (Comments and Responses, Appendix 1, I-143, 145) Moreover, the amount of payments to counties in lieu of taxes (PILT) are not dependent on or variable with the existence of a timber program (ibid. I-140).

The commercial timber program is not compatible with any recreational or scenic uses of the forest. Because of it, the number and length of roads in the forest continues to increase, leading into more remote, isolated and sensitive areas of the forest. The ecological impacts from increased edge effects, increased runoff and sedimentation, decreased water storage capacity and groundwater recharge rates, destruction of the understory, ground cover and soil integrity, the heating and drying of the landscape, the removal of carbon-storage capacity and the increase and spread of non-native invasive species is well documented.

Action – The Conservation Alternative envisions a desired future condition where the forest moves towards a natural steady-state condition where ecological processes create a mix of habitat types that preserve the ecological integrity of the forest. Conservation Alternative maximizes net future value of the forest while significantly reducing costs by eliminating the management prescription “suitable for timber production.”

By removing the commercial incentive for logging, cutting activities, including salvage logging, would be limited only to those that are scientifically proven to be absolutely necessary for the viability of threatened and endangered species, to maintain existing administrative, camping, or picnic areas or for public safety.

18. Early Successional Habitat

Natural disturbances small and large are constantly happening throughout the Forest, forming a shifting mosaic of habitats (see Shugart, H. and D. West 1981, and Harris, L.D. *et al*. 1996). Natural disturbances include, but are not limited to, fire, ice storms, blow downs, age mortality, drought, slides, flood conditions, and insect predation.

With the sporadic nature of natural disturbances (see JNF FEIS 3-107, 109), early successional habitat is naturally random, patchy or spotty and species are adapted to this. Though episodic, natural canopy gaps are a regular occurrence here, their rates varying depending on the scale of natural disturbance events in a particular year and the forest type studied. On the GWNF canopy gaps are said to annually form from natural disturbances at the rate/extent of "0.4 to 2.0% of the land area" (GW-JNFs Indiana Bat EA-20). This means that in any ten-year

period (this is the increment used by the agency to define age classes and wildlife habitat), up to 4-20% of any project area may have natural early successional habitat conditions. These natural processes and conditions provide desirable and suitable habitat for grouse, deer, turkey, bear and other species.

Neither at the planning nor at the project level is the contribution of natural processes considered to maintaining wildlife habitat and early successional habitat. The FS planners and projects fail to properly consider, inventory, analyze and monitor natural early successional habitat patches, particularly those under two acres in size (the scale of many canopy gaps). Neither are road systems, grasslands, balds, shrublands, utility corridors, or lands that are regularly grazed or mowed considered. As a consequence, the GWNF managers constantly use a false "need" to fabricate such habitat as a rationale for timber harvest especially in mature and old-growth forests and on forest lands which are important for scenic, recreation or conservation values.

The even-aged structure that the GWNF managers desire replicates conditions which are in many ways an artifact of past abuses. The maturing and recovering GWNF naturally contains all developmental stages of forest growth due to regeneration at canopy gaps created by disease, fire, snow & ice, lightning, insect outbreaks (including gypsy moths), tree senescence, windthrow, beaver, drought, flooding, and other small-scale natural disturbances (Braun, E.L. 1950, Rentch, J.S. 2006). A disturbance regime of small-scale, within-stand gap processes dominate the natural forests in this region (Rentch, J. 2006, Runkle, J.R. 1985, Runkle, J.R. 1991a). A forest can be "intact" or "contiguous" yet have numerous canopy openings due to a variety of natural disturbances (see, *e.g.*, McCarthy, J. 2001). In fact, this is the natural state of wild old growth forests in this part of the country (Davis, M.B. 1996).

The 1993 GWNF FEIS noted that the absence of manual management for early successional habitat would identified supply game populations far in excess of viable populations; in the case of bears it was said to support the greatest numbers, for turkeys the second greatest. This is despite the fact that planning and projects fail to fully and fairly consider and analyze the early successional habitat on private lands in proximity to the GWNF and its contributions to sustaining wildlife populations. There is no justification for increasing habitat or populations of deer as populations have never been higher and in Virginia more people are injured in deer related accidents that of any non-domesticated species.

Action – The Conservation Alternative creates a desired future condition where natural processes create natural canopy and forest openings that create a mosaic of multi-storied and multi-aged forests with sufficient habitat for viable populations for all native and endemic species that require early successional habitat. With the possible exception of the necessity to protect populations of rare, threatened, or endangered species, and maintaining developed recreation

areas, managing for early successional habitat is considered an incompatible use of the forest.

19. Rare and Sensitive Species

The current GW forest plan does not give sufficient protection to rare and sensitive species. Neither is it sufficiently concerned with the protection of their unique habitats. Under the current forest plan, many special interest areas continue to allow timber management and salvage logging. The threat that this management prescription presents for the species in question is obvious and deleterious.

Since the current Plan was adopted in 1993, scientists with the Division of Natural Heritage of the Virginia Department of Conservation and Recreation (DCR) have identified additional areas with significant biological values, including 146 new stand-alone sites as well as extensions to existing special interest areas, and they recommend that 111 of these new sites be designated as special interest areas (L. Smith pers. com. 2007, and see Wilson 2000 and Smith 1991). In addition, many other undesignated threatened and endangered areas exist: some have yet to be officially discovered, and some have been identified by scientists or citizens but have yet to be officially recognized. Areas that are likely to have populations of sensitive species are normally not analyzed or inventoried, even at the project level despite internal requirements to do so. “When adequate population inventory information is unavailable, it must be collected when the site has a high potential for occupancy by a threatened, endangered, proposed, or sensitive species." See Std. 240 at GWNF LRMP 3 - 149. Furthermore, the GWNF includes a significant amount of acreage in West Virginia that has yet to be surveyed for special biological sites.

For example, at the project level, it is typically claimed that “[t]here is potential unoccupied habitat for the Indiana Bat (*Myotis sodalis*)within the project area . . .” (see, *e.g.*, 2005 GWNF JRRD AHTS BE). However, meaningful and scientifically valid measures are not taken so as to ascertain with any reasonable probability if the habitat at project sites is actually “occupied” by the bats. Areas that may are not monitored or inventoried at the project level. As a TES species, surveys for the Bats are required at project areas (see GWNF LRMP Std. 240), yet site-specific population inventory information is absent from the GWNF FEIS and Monitoring Reports. Adequate population inventory information is not available and not being obtained for most project sites. So not only is it uncertain whether the agency is complying with the allowable ESA Incidental Take, but meaningful compliance with the Plan is undocumented.

The Pine Snake (*Pituophis melanoleucus*) is one of the rarest reptiles in Virginia. Habitat of the types known to be used by Pine Snakes (upland pine and pine-oak forests) commonly occur on the Forest, and in addition such sites are commonly

the project areas for intensive activities such as timber sales. Yet inventories and monitoring are absent from project analysis in these areas.

Although the current Plan requires project-level surveys for sensitive species, these required surveys rarely happen. Impacts to the Yellow Lampmussel (*Lampsilis cariosa*), the Brook Floater (*Alasmidonta varicose*) and the Green Floater (*Lasmigona subviridis*) are not considered at the project level, although sites on the GWNF contain habitat for this mussel. "The green floater occupies very small to small streams, places where other mussels often are not found." According to Terwilliger, " it has declined dramatically in Virginia, probably as a result of habitat loss and water quality degradation." The Floater is "very rare" in Virginia (Terwilliger, p. 270). The species may be even more rare than described. For example, it is listed as an endangered species in neighboring North Carolina. The Green Floater is at risk here and in other locations throughout its range. Yet at various sites (*e.g*., Shady Mountain, Hamilton Knob) surveys of streams for this species were not performed, nor were viability analyses.

"When adequate population inventory information is unavailable, it must be collected when the site has a high potential for occupancy by a threatened, endangered, proposed, or sensitive species." See GWNF Plan. This information, required for a well-informed well-reasoned decision and to comply with the Plan, has not been gathered here for this species.

Action - The Conservation Alternative projects a desired future condition where the habitats of rare, threatened, endangered, sensitive and locally rare species are inventoried, monitored, maintained and protected. It adheres to the directive to collect population inventory data on sensitive plant and animal species. This standard/guideline is revised to read "When adequate population inventory information is unavailable, it must be collected when the site has a high potential for occupancy by a threatened, endangered, proposed, sensitive, or locally rare species, or species of concern."

The Conservation Alternative contains explicit goals, objectives, guidelines, desired conditions, and standards that strictly protect these populations and their respective habitats. The management prescriptions for SBAs and RNAs would define them as unsuitable for road (re)construction, timber management, salvage logging or mineral/gas/energy development. Any roads of any level, including unauthorized roads, would be closed. A high or very high scenic integrity objective should be met or exceeded across all scenic classes for SBAs and RNAs. Trails would be targeted to be rerouted from such areas and in the short term, trails would be limited to pedestrian use.

Under the Conservation Alternative, all areas recommended by Virginia Division of Natural Heritage for Special Interest Areas, with the exception of those in designated wilderness, are designated as special biological research natural

areas. The Shenandoah Crest SBA is expanded north and south and down slope to include areas down to 2500 feet in elevation to incorporate newly found locations of Cow knob Salamanders. Roads and OHV routes that fragment Cow Knob Salamander populations and habitat (Flint, W.D. 2004) are decommissioned/removed/revegetated in the Shenandoah Crest SIA/SBA..

The following areas would be designated as special biological or research natural areas to protect its integrity and sustainability:

The Peters Mountain/Snake Run Ridge area on the James River Ranger District contains what is perhaps the largest tract of old growth in the central Appalachians.

The upper slopes of Little Mountain (Hoover Creek) on the James River and Warm Springs Ranger Districts contain a significant tract of old growth forest.

Areas south of US Rt. 250 at the Elliot Knob and Crawford Mountain Roadless Areas and all the way to Northeast Peak in Jerkemtight Roadless Area have also been identified as harboring populations of Cow Knob Salamanders (William Flint presentation at October 2007 Virginia Herpetological Society meeting; see also Graham, M.R. 2007) They have also been found on the Lee RD at the Hawk Campground area (recent) and Great North Mountain (historic) (see WVDNR 2005 at 5E – 10).These areas would be given SBA protection.

The area of Three Mile Mountain/Riles Run, SW of Columbia Furnace on the Lee Ranger District is is an area of exemplary biodiversity and has the presence of rare species. Around 70 years ago this site was identified on GWNF maps as a “natural arboretum” that included every tree species then known to occur on the Forest.

All populations of the Swamp Pink would be protected as currently, only “the majority of the Forest’s Swamp Pink habitat is in Wilderness or SBAs” (DCER-52). For example the “Swamp Pink populations that are currently in MA6 along the Coal Road would benefit from a change to SBA designation . . .” (*id*.). This area also contains populations of the Tiger Salamander (*Ambystoma tigrinum*). Therefore the entire Coal Road corridor should be designated an SBA or as an expansion of Maple Flats, Loves Run, and Big Levels SBAs which would serve to connect these areas.

The Conservation Alternative addresses the potential for plan or project implementation to result in significant impacts (direct, indirect, and/or cumulative) to the distribution and/or viability of the Green Floater, Brook Floater, and Yellow Lampmussel. It ensures that special aquatic surveys needed to detect these mussels and the James Spinymussel occur at all project areas within their range where there is suitable habitat. It also ensures that habitat for these mussels is strictly protected from loss and/or degradation.

The Conservation Alternative puts in place meaningful and scientifically valid measures to ascertain if potential habitat at project sites is actually "occupied" by the Indiana Bats. Surveys for the bats are implemented at project areas (see GWNF LRMP Std. 240) and Monitoring Reports are regularly and seasonably updated..

Under the Conservation Alternative Pine Snake habitats are strictly protected. Conservation Alternative explicitly addresses the potential for project implementation to result in significant impacts (direct, indirect, and/or cumulative) to the distribution and/or viability of the Pine Snake. It ensures that special surveys needed to detect the Pine Snake occur at all project areas within its range where there is suitable habitat.

The Conservation Alternative contains Objectives, Guidelines, Desired Conditions, and Standards for the restoration and strict protection of the Wood Turtle's (*Glyptemys insculpta*) habitat and populations. . Wood Turtle habitat in Paddy Run and Coves Run are designated as Special Biological Areas and the existing roads in these areas are closed.

Wood Turtles use terrestrial habitats far from wetlands for extended durations and maintain associations with wetlands of different types over the course of a year (such as seeps and intermittent streams). In recognition that riparian areas and watercourses exist as a continuum (DCER – 30, Pringle, C.M. *et al*. 1988, and Gregory, S.V. *et al*. 1991), there is a need to protect the full range of ephemeral, intermittent, and perennial streams as well as seeps, springs, and other wetlands. The boundaries for designating special biological areas and/or protected buffer/riparian/stream-associated habitat zones would generally (depending on topography, habitat type, and land use) encompass those areas within 350 meters of both sides of the occupied waterway (*i.e*., encompassing core habitat). In this way much of the habitat mosaic critical to all of the Turtle's life history needs is included and its ecological integrity sustained and buffered (see, *e.g*., Roe, J.H. and A. Georges 2007, Semlitsch, R. D., and J. R. Bodie 2003, and Burke, V.J. and J.W. Gibbons 1995).

At the planning level, under the Conservation Alternative, strict precautionary protection measures are created and implemented given the dearth of data pertaining to past and current demographics, mortality, and recruitment and the absence of population viability analyses.

20. Management Indicator Species

The selection and use of Management Indicator Species on the forest are currently inadequate to scientifically assess the effects and adverse impacts of management activities on the forest.

There are currently 23 MIS identified in the GWNF. The present MIS, except for some TES species, are all large mobile vertebrates. The use of these species does not accurately gauge the impacts to small site-sensitive species of limited mobility such as salamanders. Management plans must insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land (NFMA). Expanding and diversifying the focal species and ecosystems receiving attention is necessary in order to accomplish the necessary multiple-scale conservation on the Forest (Poiani, K.A. *et al*. 2000).

MIS that can be used to assess the effects of ground disturbing activities are particularly absent from the list. The large, mobile, and/or generalist indicator species (*i.e.* Black Bears, White-tailed Deer, bats, Wild Turkeys, Pileated Woodpeckers, Ovenbirds, and Worm-eating Warblers) currently used by the FS are of limited, even misleading, use for gauging impacts of management activities.

There are currently no non-native invasive species included in the list of management indicator species. The presence of these organisms is perhaps the most directly related to management activities of the forest than those currently listed. The spread of invasive species such as Asian Stiltgrass, Garlic Mustard, Multi-flora Rose, Autumn Olive and Ailanthus is occurring throughout the Forest. Their range and population has expanded corresponding with management and canopy and ground disturbing activities. These plants may reduce the abundance, species richness, and/or diversity of native flora, fauna, and fungi. These impacts in turn can have cascading negative effects upon native species of biota.

Non-native invasive plant species tend to invade and establish themselves in areas where disturbance has occurred, such as vegetation removal, canopy opening, or soil exposure. NNIS often occur along roads and trails where there is concentrated soil disturbance, and in other areas with bare or disturbed soil, including trailheads, parking lots, developed and dispersed recreational sites, popular fishing locations, and other heavily used areas. Once they are established in an area, they can continue to spread along areas of continued disturbance, such as roads, trails (both official and illegal user-created trails), and streams. The direct, indirect, and cumulative impacts upon native flora and fauna from these invasives are significant, yet they are not considered a group of species worthy of MIS status.

Small creatures such as salamanders, skinks, and invertebrates with limited mobility (and avoidance ability) can be very sensitive to on-site disturbances such as roads and timber operations (see, *e.g*., Herbeck, L.A. and D.R. Larsen 1999, Marsh, D.M. and N.G. Beckman 2004, Semlitsch, R.D. *et al*. 2007, Graham, M.R. 2007, and Flint, W. 2004). Salamanders are significant

components of forest ecosystems (Burton, T.M. and G.E. Likens 1975; Hairston, N.G. 1987). They perform many ecological functions (Davic, R.D. and H.H.Welsh 2004) and are considered “keystone species” (Davic, R.D. 2003). Numerous salamander species occur on the GWNF (Mitchell, J.C. and K.K. Reay 1999; Petranka, J.W. 1998). Their size, physiologies, and habits greatly restrict their ability to avoid direct disturbance from logging equipment, motor vehicles, prescribed fires, or falling trees. They are vulnerable to further harm indirectly from alteration of habitat conditions by logging, burning, and road building operations. And the life history requirements and characteristics of such species greatly restrict their abilities to "recolonize" areas (see, *e.g.*, Cushman, S.A. 2006).

Current MIS fail to analyze microsite understory conditions with which may not be precisely indicated by overstory forest typing (Ford, W.M. *et al*. 2002). Analyzing and monitoring salamander populations at proposed burning and logging sites and a more thorough analysis of the burning and logging programs and their effects is only possible when there is an appropriate MIS for such analysis. The inclusion of Cow Knob Salamander and Tiger Salamander as MIS, two rare with very limited range, is of questionable utility as indicator of overall forest management. The absence of representative distributions of salamanders as MIS does not allow for the accurate monitoring and assessment of management impacts to salamander populations.

Management activities may also incur direct and indirect impacts to pollinators (Cane, J.H. 2001) and spore/seed dispersers such as ants (Ness, J.H. and D.F. Morin 2008, Whigham, D.F. 2004, and Matlack, G.R. 1994a) and turtles (Jones, S.C. *et al*. 2007).

Fungi, herbaceous flora, and invertebrates, such as snails, slugs, millipedes, worms, and arthropods, that live in the forest floor litter or topsoil or are associated with the presence of large woody debris are a significant component of forest diversity (McMinn, J.W. and D.A. Crossley, Jr. 1996). These organisms are also important food for species such as Wood Turtles. Yet these species are significantly absent from the list of MIS.

Arthropods, although significant indicators of forest health, are absent from the list of MIS. Logging can influence the abundance and species composition of arthropods (Shure, D.J. and D.L. Phillips 1991; and Greenberg, C.H. and T.G. Forrest 2003). Slug densities and land snails are positively correlated with the presence of coarse woody debris (Kappes, H. 2006, and Caldwell, R. 1996). “It thus may be expected that slugs, especially the stenoecious forest species, are highly sensitive to climatic fluctuations originating from canopy gaps or from disturbance of the leaf litter layer.” (Kappes, H. 2006)

These concerns for site-sensitive biota are not confined to fauna, but extend to flora as well. MIS should not be limited to species that live in the overstory for

analysis of the effects of overstory removal. Overstory removal can also have very long-term affects on the reestablishment of forest herbs (which in turn serve as food for various species) (Duffy, D.C. and A.J. Meier 1992, Meier, A.J. *et al*. 1995, Vellend, M. 2004, Kahmen, A. and E.S. Jules 2005, and Vellend, M. *et al*. 2006), which can be further complicated by the appearance of invasive species. They can be harmed directly by logging that alters site conditions and indirectly by edge effects that allow invasion by exotics and other harms (*e.g*., alteration of microclimate and microhabitat conditions). Recovery from these harms can take many decades (see, *e.g*., Duffy, D.C. and A.J. Meier 1992, Matlack, G.R. 1994a, Meier, A.J. *et al*. 1995, Vellend, M. 2004, Vellend, M. *et al*. 2006, Bratton, S.P. and A.J. Meier 1998, and Primack, R.B. and S.L. Miao 1992).Overstory age is a strong determinant of understory floral composition (Whitney, G.G. and D.R. Foster 1988).

There are no current MIS which truly and accurately measure the effects of management on aquatic species. The surrogate species used to monitor the Forest (such as Trout or Sunfish) do not exist in many of the streams affected by management activities on the Forest. In addition, some of the species assessed by the FS, such as aquatic macro-invertebrates, apparently are not effective at indicating or detecting degradations. And species for indicating the health of intermittent and ephemeral stream habitats and populations are lacking. As a consequence, there are no MIS in such project areas with which to survey, inventory, and monitor so as to estimate, gauge, analyze, and assess the affects of present or future projects and existing or proposed roads upon aquatic populations and communities.

Even if trout or sunfish are not present, streams and waterways in project areas have aquatic populations and communities living in them. These species, populations, and communities are dependant upon the aquatic habitat in these streams. And there may be populations of Locally Rare species in these streams. Various beneficial uses that we gain from project area streams are dependent upon the existence of these aquatic species, populations, communities, and diversity. Further, there are no indicator species that are monitored in intermittent and ephemeral streams, many of which exist in project areas.

Use of “demand and harvested” (hunted wildlife) species as MIS is also problematic. It is illogical and misguided to base habitat manipulation policy and the effects of those manipulations upon populations that are being directly manipulated through other actions (*i.e*., hunting mortality) that have nothing to do with habitat manipulations themselves. Such data cannot be dependable in the presence of this undeterminable variable.

Action – The Conservation Alternative promotes a desired future condition in which naturally occurring conditions of the forest are protected, nurtured and restored. Having accurate and scientifically legitimate management indicator species is essential for determining baseline conditions and for projecting and

monitoring the effects of management activities on the forest.

The Conservation Alternative would significantly expand the list of management indicator species to include those whose presence, range and populations may fluctuate with soil disturbing and canopy removal projects. These would include Non-native invasive species (such as Asian Stiltgrass, Garlic Mustard, Multi-flora Rose, Autumn Olive and Ailanthus Altissima, see list on pg.), representative salamander (in addition to Tiger and Cow Knob salamanders), arthropod, and invertibrate species, reptiles and locally rare species, small predator species (such as raccoons) and representative plant and aquatic species (besides Wild Trout and Sunfish).

Under the Conservation Alternative, scientifically based standards, guidelines and protocols are initiated and implemented for monitoring and avoiding harmful effects to site-sensitive species. In order to protect the Forest's diversity, sustained yield, and population viability/distribution, the effects of prescribed burns, logging, roads, and other management actions on sensitive habitat, including intermittent and ephemeral streams, these effects must be explicitly and fully addressed by the GWNF planners in the EIS and Plan revision.

21. Wildlife Management

There is a high density of White-tailed Deer (*Odocoileus virginianus*) on the GWNF. Deer are a well-known indicator species for early successional habitat and forest fragmentation. The Forest Service's timber sales and other habitat manipulations maintain and facilitate inflated populations of this common species. The habitat manipulations and the associated numbers of common Deer are detrimental to other Forest species and conditions. These harms to forest health occur regardless of the motives or purposes of the alterations

The logging and other "vegetative manipulation" done on the forest inflate White-tailed Deer populations by fabricating more browse. There is already a very high density of Deer on the Forest, recently estimated at 31/square mile (DCER - 45). In Virginia, the White-tailed Deer population has increased 400% (Donaldson, B.M. 2005). Deer are the most dangerous wild animal to human safety in the country (*id*.). High Deer populations harm flora and fauna, including rare species (*e.g*., sensitive plants and ground-nesting birds) (see JNF FEIS 3 – 137, references). High Deer densities also reduce tree seedlings and are a prime contributor to declining oak populations (Rooney, T.P. *et al*. 2004). When the vegetation management or timber management are justified as "management" for Bear or Turkey or Grouse or Golden-winged Warbler, the effects on deer populations are not regularly considered.

Action – In order to create the desired future condition of the forest under the Conservation Alternative, white tailed dear populations are managed through the increased interior and unfragmented forest habitat. The GWNF will work

proactively with the VDGIF to ensure smaller, healthier Deer herds by encouraging the evolution of forest stands into old growth and the restoration of interior forest habitat conditions wherever possible through the designation of special areas such as Wilderness Study Areas, core conservation areas, National Recreation Areas, special biological and special management areas, and roadless and unroaded areas.

The Conservation Alternative most closely approximates Alternative #3 as analyzed in the 1993 GWNF FEIS. This alternative was clearly estimated to supply viable and sufficient game populations. In the case of bears it was said to support the greatest numbers, for turkeys the second greatest, for deer, the lowest of any alternative. This positive analysis confirms the effectiveness of the Conservation Alternative in creating the desired future condition of the forest.

22. Forest Diversity

The GWNF recognizes that "Eastern Riverfront Hardwood communities (Bottomland Hardwoods) are not common" on the Forest (*id*.). These rare ecosystems continue to be repressed by management that emphasizes mowing, haying and grazing in areas that would support eastern riverfront hardwood communities.

Trees of the species found here, such as White, Chestnut, and Northern Red Oaks, Black Gum, hickories, and maples are known to commonly attain high ages, when allowed. These are important components of forest diversity. At present on the GWNF there is an extreme disbalance in the distribution of age-class forest acres. There are generally very little or zero acres represented in the 131-140, 141-150, 151-160, 161-170, 171-180, 181-190, 191-200, 201-210, 211-220, 221-230, 231-240, 241-250, 251-260, 261-270, 271-280, 281-290, 291-300, 301-310, 311-320, 321-330, 331-340, 341-350 years-old age classes at project areas. Mature or old growth acreage of these types is extremely scarce. For example, there are only 2239 acres (0.2% of the Forest) of "white pine-hemlock", "Forest Type 4", on the entire GWNF (FEIS H-3).

It is not reasonable to ignore all these age classes and lump them together (such as 140+ or 150+ in numerous scoping letters and EAs) when discussing and analyzing "distributed" or "balanced age class", and forest diversity objectives.

The current GWNF Plan does not sufficiently protect the Forest's diversity as it allows special forest conditions to be harmed. These sensitive sites include springs, seeps, rocky outcrops and slopes, scree, talus, steep slopes, places with poor growing conditions (low "site indexes"), and unusual or rare forest types. Unfortunately, the current Plan allows these sites to be harmed during management activities such as logging.

The GWNF uses oaks to rationalize intensive management activities such as timber sales. The agency claims that if there are fewer numbers of oaks on the GWNF then it is unhealthy. The GW also claims that oaks need intensive even-age logging to maintain themselves on the forest. The agency seems unwilling to reasonably address reason, science, and empirical evidence. The assumption that oaks will disappear without timber sales and that wildlife will disappear without unnaturally high numbers of oaks is clearly unjustified, unsupported and incorrect.

Action – The Conservation Alternative promotes a desired future condition of the forest where natural processes dominate and rare and uncommon habitat are restored through the elimination of management practices that impede their ecological emergence. Practices that perpetuate unnatural populations of forest species, types and age classes are abandoned. The Conservation implements restoration of these eastern riverfront hardwood communities by eliminating the incompatible uses of the forest by livestock grazing, mowing (the exception being Hidden Valley and other developed recreation sites), or haying.

The Conservation Alternative ceases the use of constrained and constricted age classes and lumping of such. It requires the explicit use of older age classes, including those enumerated above, in analyses, monitoring, inventory, and decision-making, particularly as regards issues of diversity and “balance”.

Under the Conservation Alternative special and vulnerable places including springs, seeps, rocky outcrops and slopes, scree, talus, steep slopes, places with poor growing conditions (low “site indexes”), and unusual or rare forest types are strictly protected under the new revised GWNF Plan. It creates explicit standards, guidelines, and objectives to accomplish this. These specialized habitats are not considered “suitable” for logging, timber production/harvest, road construction, drilling, mining, or other harmful disturbance. The protective no-disturbance buffer around springs, seeps, rock outcrops, and rocky slopes is at least a tree-height in extent so as to protect their integrity (*e.g*., protect them from increased temperatures). A VDGIF biologist recommended that springs and seeps be protected "by a minimum of 100 feet on each side (preferably 200-300 feet)" (GWNF JRRD Johnson Mountain timber sale project file). Steep slopes (40% or over) will not be suitable for logging or other intense ground disturbance. Places with site indexes below 70 will not be suitable for logging or other intense ground disturbance. Because of their significance to maintaining NFMA mandated Forest diversity, rare forest types are not suitable for logging or other intense ground disturbance.

The Conservation Alternative calls for the Forest Service to fully and fairly consider scientific knowledge and empirical evidence regarding regeneration of oaks, to monitor oak reproduction in natural canopy gaps, and to fully inventory the numbers of such gaps and the amounts of oaks present (see, *e.g*., Clinton, B.D. 2003, Lynch, J. and J. Clark 2002, Beckage, B. *et al*. 2000, Miller, G. and J.

Kochenderfer 1998, and Johnson, P. 1993). Maintaining artificially inflated numbers of oaks is not a “desired condition” in the Conservation Alternative.

Because of their significance to maintaining NFMA mandated forest diversity, under the Conservation Alternative rare forest types are not suitable for logging or other intense ground disturbance.

23. **Ecological Restoration**

Ecological Restoration is vital to meeting the National Forest Management Act and MUSYA requirements to conserve and sustain soils, watersheds, wildlife, ecosystems, and biodiversity. The Current GW Plan lacks any significant ecological restoration goals and objectives. When the FS does mention restoration, it often refers to maintaining or fabricating cultural landscapes that are dependent on anthropogenic inputs for their structure, composition, and/or function. This is not ecological restoration in the valid sense of the concept. See DellaSala, D.A. *et al*. 2003. Forest restoration begins with comprehensive transportation planning that identifies and funds upgrading, maintenance, or decommissioning forest roads.” Jim Burchfield and Martin Nie. September 2008. “National Forests Policy Assessment: Report to Senator John Tester”. College of Forestry and Conservation, The University of Montana, Missoula, MT). Ecological Restoration is more than saving the pieces; it protects the integrity of the natural processes that maintain and successionally alter the existing forest which, to a significant extent, is the result of artificial and poorly managed landscapes.

It is not apparent that the GWNF planners are performing the comprehensive roads analysis and transportation planning necessary to meaningfully analyze, create targets, goals or objectives and to prioritize necessary restoration actions regarding unnecessary, unauthorized and ecologically damaging roads.

Projects under the current plan take a “heavy handed” approach to restoration. One of the fundamental guiding principles of ecological restoration is to have as little impact as possible. Ecological restoration allows natural processes to restore as much as possible. Ecological restoration is a close-to-nature approach, a level of intervention to the point where forest self-renewal processes operate. For example: “Where old-growth riparian forests are not currently available, mature riparian forests offer a source for future old-growth structure, provided forest management practices are employed that either maintain or enhance, rather than retard, stand development potential (Keeton 2004).” (Keeton, W. *et al*. 2005)

The current plan does not recognize the need to rehabilitate past damage from ill-conceived and poorly implemented projects. Instead, harmful activities

continue to be allowed under the guise of restoration (such as intensive logging in the riparian areas of North River).

Many streams on the GWNF are deficient as regards loadings of large woody debris. Leaf litter and woody debris such as branches and boles falling into streams is ecologically important for in-stream health, habitat niches, and productivity. Large woody debris ("LWD") creates pools, provides critical cover, and serves as a basis for food webs. Invertebrate groups generally known as shredders and collectors feed on and break down this organic matter. Species such as Wood Turtles and Brook Trout can greatly benefit from the cover and pools provided by LWD and the prey that is associated with this material (Wallace, J.B. *et al*. 1996). The structural integrity provided by woody debris helps stabilize the stream environment by absorbing the energy of flowing water and reducing the severity of erosion (Austin, S. undated).

Around 37% of 223 miles of streams surveyed 2001-2004 on the GWNF did not meet LWD desired conditions (Table 18 at G-24 in M & E Report 2005). Fifty percent of the 392 miles of streams surveyed in our George Washington National Forests from 1995 to 2005 did not meet desired levels of large woody debris necessary for healthy stream systems (GWNF DCER 2007 at pg. 26). In the most recent year of stream surveys, taken solely in the North River RD, 78% of all streams were deficient in large woody debris. As regards this impoverishment, the past is prologue.

Large woody debris plays an important role in structuring stream habitats (Welsh, H.M. *et al*. 1998). For example, at Wood Turtle stream sites in VA and WV many pools are either directly formed or significantly influenced by LWD (Krichbaum, S. pers. obs.). The pools formed by debris dams are small-scale nutrient catchment basins that strongly influence community structure (Pringle, C.M. *et al*. 1988) (*e.g*., the provision of potential Wood Turtle prey organisms).

Past cutting on the GWNF removed many of the trees that would have served as sources of LWD (Doloff, C.A. 1996). The LWD that potentially falls into small streams generally found on the Forest comes from the trees that are growing there on site around the streams; it is not transported to a site from miles away as happens on larger rivers. Protection of the riparian forest around streams is critical for this reason. However, the direct zone of influence as regards trees falling into or shading streams may include much more than just what is technically identified as the "riparian area". Unfortunately, portions of "riparian areas" as well as streamside zones of influence continue to be logged on the GWNF (see FEIS 3 – 149).

Studies have found that streams flowing through older forests receive the greatest variety of food for detritus-processing organisms (Austin, S.). Streams draining late-succesional and old-growth riparian forests display a gradual, but significant increase in LWD loadings (Hedman, C.W. *et al.* 1996; Keeton, W.S. *et*

al. 2007). Trout were found to always use segments that had the most LWD. “In the absence of high fishing pressure, streams with large amounts of LWD appear to support higher trout density and biomass than streams with little or no LWD." (Flebbe, P. and C.A. Dolloff 1995)

LWD is also important in terrestrial ecosystems (McMinn, J.W. and D.A. Crossley 1996). Because of the past and ongoing intensive logging and other human-caused disturbance that has taken place, there is actually an impoverishment of dead wood (“large woody debris” or what are sometimes referred to as “fuels”) on the great majority of forest sites in the GWNF and elsewhere in the East (Dolloff, C.A. 1996, and DCER).

The current plan also authorizes grazing in floodplains and watersheds which is incompatible with restoration goals and objectives for watershed protection.

Action - Ecological restoration stays close to nature and uses the lightest level of intervention possible to bring the ecosystem to the point where forest self-renewal and successional processes can naturally occur. Large-scale reestablishment of unmanipulated forest conditions is perhaps the greatest single improvement that we can implement to support biodiversity and ecological integrity. (See Noss, R. 1990b; Noss, R. 1991; and Noss, R. 1995.) The desired future condition under the Conservation Alternative includes the passive ecological restoration of large blocks of forest where large-scale reestablishment of unmanipulated forest conditions predominate in order to maximize opportunities for ecological resiliency, the ability for ecosystems to survive and maintain their integrity in the presence of small or large scale change.

Ecosystem Resiliency Analysis would include identification and mapping of patches and corridors of mature and old-growth forest (contiguous forest containing “core” conditions of mature and/or old-growth forest supplying expansive elevational gradients and anthropogenically unbroken/unfragmented physical links between relatively large patches containing “core” conditions of mature and/or old-growth forest). These cores/corridors are considered not suitable for logging, road building, drilling, mining, wind turbines, or development. They are priority areas for watershed restoration.

Under the Conservation Alternative, priorities for road closings for restoration would include roads that are in drinking water watersheds and riparian areas, Virginia Department of Natural Resources/Natural Heritage Biological Sites, existing Roadless or Potential Wilderness Areas as well as roads that create boundaries for Roadless or Potential Wilderness areas, areas which would qualify for Roadless or Potential Wilderness designation if those specific roads were closed either by reducing road density or increasing the boundary areas, watersheds containing populations of native brook trout, roads which cross permanent (culverted) or ephemeral streams, areas with lower road densities and remote interior areas.

In the Conservation Alternative, the use and maintenance of down large woody debris in streams riparian areas is implemented forest-wide and riparian buffer areas are expanded to 100ft. In order to lessen the effects of acid rain and deposition on the forest and brook trout and aquatic species, surface disturbances, the removal of trees, vegetation, boles and down woody debris are strictly restricted.

The desired future condition of the forest under the Conservation Alternative returns the grandeur of the American Chestnut to the forest. Prior to introduction of the chestnut blight, Chestnut was a dominant canopy species throughout many of the lands of the GWNF (see Braun, L. 1950). It had a tolerance for a wide range of site conditions and its growth and reproduction characteristics gave it a competitive edge over many species. Its widespread occurrence also confirms the lack of a significant natural fire regime here. (see Q. Bass material previously submitted to the GW-JNFs' managers during the revision of the JNF Plan) Through the cooperative efforts of The American Chestnut Foundation a blight-resistant hybrid suitable for planting is currently available.

There are many miles of currently open, closed, and temporary roads, "wildlife openings", and recent even-age logging sites on the Forest that could and should be used as planting sites to reintroduce American Chestnut. Various roads can be decommissioned, recontoured and revegetated with Chestnut. Similarly, the vegetation at various game openings and recent logged-over sites needs to be manipulated so as to reintroduce Chestnut at these sites. By using existent roadbeds for Chestnut restoration, several restoration goals (providing for remote habitat and recreation, interior forest, helping to impede the influx of invasive species, decrease road densities and road maintenance expenditures, improve watershed quality) can be accomplished in one action. New logging is not needed to restore the Chestnut to the GWNF.

Because grazing and "utilizing cattle may conflict with trying to have intact riparian corridors and high water quality (DCER – 138), the Conservation Alternative eliminates grazing in moving to achieve its desired future condition. The Conservation Alternative restores riparian areas by relocating camping areas, trails and roads away from streams in areas such as North River and Paddy Run and by reforesing riparian pastures at Jackson and Shenandoah Rivers.

The Conservation Alternative includes actions targeted to halt the loss of hemlocks to the whooly adelgid. It implements strategies to eradicate and prevent introduction of invasive species by eliminating most ground disturbing activities, roadbuilding and reconstruction and canopy removal projects.

The Conservation Alternative directs the promotion of increased beaver populations to protect and enhance water quality and aquifer recharge. It also

strives to maintain significant suitable habitat requirements that would allow for the possible return or reintroduction of extirpated species such as cougar and elk.

24. Energy: Biomass

Biomass refers to living and recently dead biological material that can be either converted into fuel or used as fuel directly for industrial electricity production. Converting standing forests into fuel is potentially devastating to the forests of Virginia and should be set aside in favor of more positive solutions to energy problems. Given that all energy problems can be solved through conservation and increased efficiency, using the forest of the GW to increase energy supply would create incentives to use more energy and exacerbate and work contrary to efforts for conservation and increased efficiency.

Energy generation through incineration is a viable energy alternative for the Commonwealth although it is not renewable by any definition of the word. Woody biomass is the least efficient method of energy generation as it necessitates more burning of any other fuel per kw energy generated and creates more air, water and landfill pollution per kw of energy generated.

While the demand for wood products from the George Washington National Forest is relatively small, allowing biomass production on the GWNF would put increased demands the forests to provide a supply of sourcing material for biomass incineration. These demands would happen at the expense and to the detriment of recreation, wildlife, soils, water quality and primitive recreation. Many incinerator companies require guarantees on the amount of biomass a community must send to an incinerator for that reason. Once the biomass incineration route is taken, communities are trapped burning up their valuable natural resources.

Actions - The desired future condition as set forth in the Conservation Alternative is one where privatization of resources is an incompatible use of the forest. Sourcing for woody biomass on the GWNF is incompatible with all other uses of the forest and reduces the net future value of the forest. Therefore, biomass production and sourcing for biomass, under the Conservation Alternative, is prohibited and determined as so in the Forest Plan.

The desired future condition under the Conservation Alternative is one where the forest provides amenities and resources not available on private and industrial lands. The Commonwealth has no shortage of regions, industries, businesses and landowners eager to participate in government subsidized biomass projects. Because the Conservation Alternative embodies a desired future condition where federal lands and agencies do not compete with private lands in providing goods and services, it is considered an incompatible use of the forest and is prohibited by the Forest Plan.

25. Wind Energy

Our native flora and fauna are threatened not only by climate change, but also by the accelerating degradation and destruction of their habitat. The science is clear on this point. Wildlife will have the best chance to adjust to a changing climate if we protect the habitat that they have left, and limit and eliminate non-climate environmental stresses such as habitat fragmentation, over-harvesting of timber, invasive species, disruptive human activities and pollution. Thus, it is imperative that global climate change be addressed in ways that do not further eliminate, reduce or degrade wildlife habitat.

The current forest plan includes consideration for potential wind energy development on the GWNF. This assumes that under some conditions, wind energy could be seen as a possible use of the forest.

The development of industrial wind facilities, which generally requires 2-5 acres of cleared land for each industrial sized wind turbine, transmission-line corridors, and corresponding access roads will result in the loss, degradation, and fragmentation of forest habitat; erosion and sedimentation of streams; potential continuing, long-term wildlife fatalities and injuries, and noise and light pollution of surrounding areas.

The lack of reliable information regarding the impact of industrial wind development on migratory bird and bat populations along the ridge-tops of the Alleghany Highlands is reason enough for serious concern and should give plenty of reason for caution and careful study.

The GWNF is habitat for many globally unique, rare, threatened or endangered plant and animal species and communities, for which our public lands are becoming the last refuge from human development. Development projects on ridge-top forests can prevent wildlife from moving to higher elevations in response to global warming. In addition, the fragmentation of habitat can speed up the rates of warming in our forests making it difficult for many species to adapt to warmer temperatures, and hinder the ability of wildlife to migrate to other latitudes or longitudes in response to a changing climate. In this scenario extinction may be the inevitable result for many of our native flora and fauna.

Action – The desired future of the forest under the Conservation Alternative includes the maintenance and restoration of large habitat blocks on the forest, and the restoration of the forest to its natural steady-state condition where ecological processes create a mix of habitat types which preserve the ecological integrity and connectivity. Because of the negative effects of wind energy production on the forest, it is considered an incompatible use of the forest.

26. Oil and Gas Energy Leases

The oil and gas leasing decisions made in the 1993 plan fail to protect public benefits and ecological values in the GWNF. Private lands in Virginia and West Virginia provide ample opportunities for oil and gas leasing and extraction activities. On the other hand, only public lands can guarantee the provision of wild forests, pristine waters, at-risk species habitat, and opportunities for quiet, backcountry recreation. Surface occupancy for oil and gas leasing and extraction activities would degrade these and other public benefits.

Many inventoried roadless areas, uninventoried roadless areas or Mountain Treasure areas are open for development with little to no protection. Several of these areas contain karst terrain, steep slopes, special biological areas, and rare species locations and habitat. Surface and subsurface mining and drilling activities are is not compatible with protection of those resources. Areas containing karst features need additional protections because of the lack of natural filtration of ground water. Once an area is committed to oil and gas leasing with surface occupancy and is leased, options for future protection are likely foreclosed and the Forest Service's ability to protect other resources in those areas is severely limited.

Not only did the 1993 Plan FEIS not adequately consider the impacts of oil and gas leasing, but, moreover, circumstances have changed and new information has arisen since then, necessitating further analysis. The 1993 EIS pre-dated the Fish and Wildlife Service's Biological Opinion on the Indiana Bat, the forest-wide Fish and Mussel Conservation Plan, the Cow Knob Salamander Conservation Agreement, and the listing of new species under the ESA. Habitat for these listed species are located within many of these CSU areas and by law require the highest protection. Leasing decisions must be reevaluated in light of those developments.

The 1993 EIS only addressed approximately 2,000 acres in the western-most portion of the Laurel Fork Roadless Area in any level of detail. GWNF has not updated its reasonably foreseeable oil and gas development scenario to reflect new information from the USGS and others concerning potential development in Marcellus Shale formations in the Appalachian Basin. Most of the GWMT Allegheny Mountain Cluster containing 41,718 acres (not including the Laurel Fork area), as well as portions of the Northern Shenandoah Mountain Cluster containing over 58,000 acres, are located in or near areas believed by the 1993 Plan EIS to have moderate to high potential for natural gas development. These leases would likely entail hydro fracturing or hydrofracking that causes huge ground and surface water pollution through the release of deep toxic minerals and other chemicals used in the hydrofracking process.

The gas in the Marcellus Shale is held like bubbles in a brick of Swiss cheese. To extract it, a mixture of water, sand and chemicals is shot into the earth with such force it fractures the rock, releasing the bubbles to the surface. When the gas

surfaces, so does the water that is laden with natural toxins from the shale, including many suspected cancer-causing compounds. These effects have not yet been analyzed at the planning/EIS level.

There was no site-specific analysis of any lands other than Laurel Fork in the 1993 EIS. To illustrate the deficiency, the Jefferson National Forest (JNF) 2004 FEIS contained 51 pages of analysis on the direct, indirect, and cumulative impacts of federal oil and gas leasing within the NF, while the 1993 EIS only contained ten pages and the 2007 CER contains six. The GW's decisions will be unchanged for the next 10-15 years and informed public comments are essential to ensure those decisions are made correctly.

The 1993 EIS failed to have any sediment model or analysis with regard to surface occupancy. By comparison the JNF FEIS modeled increases five decades into the future. The EIS also did not discuss the effects on geologic resources, karst formations and caves. Concerning air quality, the primary air pollutants from natural gas wells are nitrogen oxides (from construction phase) and Volatile Organic Compounds (from production phase). There were no calculations of emissions or analysis of the reasonably foreseeable development scenario. The EIS listed the impacts as insignificant without explanation.

Action - The desired future condition of the forest under the Conservation Alternative is one that in the long term considers mineral, gas and oil extraction, including hydrofracking, an incompatible use of the forest. The Conservation Alternative examines the possibilities inherent in withdrawing consent for leases across the Forest wherever possible along with other varying amounts of withdrawal. Under the Conservation Alternative no new leases would be offered and those that are considered nonnegotiable which do allow surface occupancy, would be renegotiated with the intention of limiting them to no surface occupancy.

27. Air Quality

There are various mandates that the GWNF has with respect to air quality. Forest management activities in the GWNF are subject to the General Conformity regulations of the Clean Air Act. Activities must not impede a state's progress toward attainment of National Ambient Air Quality Standards. The adjacent Shenandoah National Park, whose air can be impacted by management activities on the GWNF, is a Class 1 Air area. Areas in the James River and Lee Ranger Districts are within or adjacent to ozone and fine particulate "non-attainment areas" (see map in USDA FS 2007 GWNF Draft Comprehensive Evaluation Report at pg. 106). However, the agency apparently moves ahead with burn projects on the Forest without making any significant analysis regarding compliance with these regulations and conformity determinations (see, *e.g.*, the project file and DM for the 2007 Lee RD burn project). Such decisions are not compliant with federal law, regulation, policy, guidelines, and/or standards.

One of the ecosystem services that forests can provide is the improvement of air quality by filtering out particulates and toxic compounds from the air. According to the Environmental Protection Agency's website on "Vegetation and Air Quality","Common pollutants that trees and vegetation can remove include nitrogen oxides, sulfur oxides, particulate matter, and ground-level ozone.**"** Research shows that large trees remove considerably more pollution than smaller ones: a healthy tree with a trunk-diameter of 30 inches removes about 70 times more pollution than a tree with a three-inch trunk." Therefore, the GW can increase forest capacity to improve air quality by letting trees get big and old and by leaving them standing.

For net public benefits to be maximized on the forest, the air purification benefits from net forest growth on the GW (additional growth of standing trees over ten years minus what is logged, destroyed by natural disturbance, or turned into roads, trails and energy sites) have to outweigh additional air pollution effects on human health and effects on wildlife from prescribed burning, ORVs, ATVs and single occupancy vehicles in the neighboring communities. Particulate matter in the air can have serious health impacts, which lead to increased health costs and to economic consequences, such as lost workdays. It is clear that the 92 Plan does not maximize net public benefit with regard to air purification services and would limit the provision of this service over decades to come.

Action – The Conservation Alternative projects a desired future condition where air quality standards result in the highest net public benefits. The Conservation Alternative has standards and guidelines that ensure values that meet or exceed compliance guidelines with all air quality regulations. It maximizes air quality by significantly restricting controlled burn projects and by ensuring that conformity determinations are part of all project level analysis.

28. Scientific Research, Data and Monitoring

The 1993 GWNF Forest Plan pays very little attention to monitoring of projects on the forest. What little monitoring that does exist is insufficient to determine if objectives have been met and if issues and adverse consequences raised in the scoping process by the public are being realized.

Scientific Research and the resulting data generation is an important function of the USFS. Yet so little essential information is available that analysis is often limited. In the absence of on site documentation of the results of past projects on the forest in meeting objectives (including maximizing net public benefits), information is often limited to relevant research in peer reviewed scientific journals. This information is routinely ignored and dismissed in scoping comments.

Action – The Conservation Alternative envisions a desired future condition of the forest where increased knowledge of forest processes and ecosystems and research and monitoring have a high priority. Detailed ecological monitoring of all projects would be implemented on objectives and on site specific and cumulative impacts on issues raised during the scooping process.

All of the previous monitoring recommendations included in the Conservation Alternative would be implemented. The planning process would include an assessment of the change in net public benefits since implementation of the 1993 Forest Plan.

29. Wild & Scenic Rivers

There are waterways on the Forest that qualify for designation as Wild, Scenic or Recreational Rivers, but they have not been formally recommended as such to Congress. Some waterways have outstandingly remarkable values that have not been recognized by the Forest Service. Additional stream mileage may qualify for designation.

For the 1993 Plan the Forest Service evaluated eligible waterway segments for possible recommendation as federally protected Wild, Scenic, or Recreational Rivers. Although many of these are superlative and should be designated, the FS has made no recommendations to Congress to gain this protective status for the fourteen waterways found to be suitable for designation.

Action – The Conservation Alternative projects a desired future condition where all waters which qualify for protection as wild and scenic rivers are recommended for this designation. The Conservation Alternative would evaluate and recommend as inclusions to the Wild and Scenic River system all waters that the Commonwealth of Virginia have officially designated as Exceptional State Waters (see http://www.deq.virginia.gov/wqs/exceptional.html): Brown Mountain Creek, Laurel Fork, Ramsey's Draft, Pedlar River, and North Fork Buffalo River.

Additional waterways, all of which have sections on the GWNF, would be evaluated for inclusion as Wild, Scenic, or Recreational Rivers, including Trout Run, Waites Run, German River, Wilson Creek, Mill Creek (of Maury River), Mill Creek (of Cowpasture River), Potts Creek, Stony Creek (north of Bayse impoundment), Benson Run, Big Marys Creek, Stuart Run (with Buck Lick and Bolshers Runs), Jim Dave Run, Little Back Creek, Crow Run (with Little Crow Run Passage Creek Seg. B, Cowpasture River Seg. C, the upper part of Cedar Creek, and St. Marys River Seg. B.

30. Scenic and Visual Quality

There are many areas that receive high amounts of regular use for which the GWNF pleasing scenery. The appearance of the forest is a significant national

and regional issue and very important to the public. Yet, at present, most of the forest-636,000 acres-have a “low” to “moderate aesthetic objective”. Many relatively high traffic areas which function as scenic corridors are not recognized as such.

In addition, Dispersed Recreation Areas such as North River and Hidden Valley are important Special Areas that are valued mostly for its visual and scenic character, yet, under the 93 forest plan, these areas are designated as suitable for timber harvest/production. Timbering activities would significantly harm the dispersed recreational values and opportunities and visual quality of these sites.

Action – The Conservation Alternative envisions a desired future condition that maximizes net public benefits by protecting all scenic corridors and dispersed recreation areas with a high visual quality objective. In addition to those mentioned at pg. 35 of the DLRMP, **“**Scenic Corridors” would include Old Parkersburg Turnpike (rt. 688), Marble Valley - Big River Road (rt. 600 in NRRD), Wolf Gap Road (rt. 675), Passage Creek Road (rt. 678), Rt. 340, Shenandoah – Warm Springs Mountains roads (WV rt. 3 – WV rt. 21 – VA rt. 614), Allegheny Mountain road (rt. 600 in WS/JR RDs), Hematite Road (rt. 159), Boiling Spring road (rt. 18), Vesuvius Road (rt. 608), Sherando road (rt. 664) (route numbers from 1993 GWNF Plan map).

31. Shenandoah Mountain

Shenandoah Mountain is the largest and most important single “special area” on the Forest. Stretching 60 miles in length and 15 miles in width, Shenandoah Mountain occupies almost 400,000 acres of public lands on the North River Ranger District in Augusta, Bath, Highland, Rockbridge, and Rockingham Counties, Virginia and Pendleton County, West Virginia. The Shenandoah Mountain area includes, at its core, Little River, Ramsey’s Draft and Bald/Ridge/Lynn Hollow/Ramsey’s Draft Extension, Gum Run, Skidmore Fork, Hankey Mountain, Shaw’s Ridge, Oak Knob, Dry River, and Broad Run; Hogpen Mountain, Feedstone Mountain, Dunkle Knob, Little Cow Knob, Kretchie Mountain, Wildcat Ridge and Beech Lick Knob to the north; and Signal Corps Knob, Jerkemtight/Benson’s Run, Crawford Mountain, Elliot Knob, Archer Knob, Walker Mountain and Sideling Hill to the south.

The crown jewel of the Central Appalachians, Shenandoah Mountain constitutes perhaps the largest single contiguous tract of National Forest in the eastern United States. As such it is of national significance as one of the largest relatively intact wildlands of any kind in the entire East.

Here are Wild Trout streams and quality Black Bear habitat, as well as endemic species such as the Cow Knob Salamander and Shenandoah Mountain Millipede. Here too are tracts of old growth forest and rare habitats such as shale barrens. In addition to these ecological benefits, the complex of roadless lands

that exists on Shenandoah Mountain is an unparalleled backcountry recreational resource in the region. Dazzling beauty abounds.

Shenandoah Mountain possesses probably the greatest amount of roadless areas and back-country recreational lands to be found in any single area between the Great Smoky Mountains National Park and the Adirondacks. Here are four clusters of Mountain Treasures with twenty-four individual Treasures totaling around 260,000 acres. Included in these Treasures are 112,000 acres in nine roadless areas previously “inventoried” by the Forest Service. Here too is the glorious Ramseys Draft Wilderness Area, as well as eight Forest Plan designated Special Interest Areas – Biological and the Laurel Run Research Natural Area.

Shenandoah Mountain contains the greatest concentration of old growth on the George Washington National Forest and in the Central Appalachians, with perhaps around 75,000 acres in this condition (see maps at pp. 210-11 of Southern Appalachian Assessment Terrestrial Technical Report and USDA FS "Stands 150 Years And Older CISC" map and CISC “old growth trend” at App. G-58 of 2004 GW-JNFs Monitoring Report).

On Shenandoah Mountain are headwaters of the James and Potomac Rivers, and of the legendary and beloved Shenandoah River. Segments of the North River and Cowpasture River qualify for inclusion into the National Wild and Scenic River System. Watersheds and impoundments on the Mountain supply the drinking water for tens of thousands of people in Staunton, Harrisonburg, and elsewhere.

Over 200 miles of hiking trails traverse the area. The 20-mile North Mountain Trail, the 25-mile Wild Oak Trail, a component of the National Trails System, and the 40 miles long Shenandoah Mountain Trail provide outstanding recreational opportunities.

Yet, under the 1993 Forest Plan, Shenandoah Mountain is managed under a menagerie of differing management area prescriptions with conflicting emphases that do not adequately conserve the special values and conditions found here. Management decisions and actions damage the Mountain’s significant ecological, social, recreational, economic, and spiritual values.

Action – Under the Conservation Alternative**,** in projecting a desired future condition that maximizes primitive recreation opportunity, unfragmented habitat, scenic quality and net public benefits, the entirety of Shenandoah Mountain is allocated to management prescriptions that fully and consistently preserve and restore its special values and conditions. In recognition of its critical significance and to effectuate conservation goals it is considered and studied for designation as a National Conservation Area. The entire area is designated as not suitable for timber harvest, road building, grazing, or mineral/gas/wind development. The

desired future condition for the SM Conservation Area will be an all-aged forest mimicking conditions of pre-European settlement. The Conservation Area will be forever wild with minimal development; of course, present developed recreational sites such as Todd Lake and Brandywine will be retained. Land uses here will be compatible with the maintenance of the species most sensitive to human-caused disturbance. Low-impact dispersed recreation will be the emphasis. The North River riparian area will be rehabilitated. NCA designation will increase the potential for remote backcountry non-motorized recreational experiences in a region close to our largest population centers, a region in which the demands made upon wildlands are ever growing. All of these management emphases will result in direct economic benefit to local communities.

Conclusion - A Final Note on Desired Future Condition

A mature forest moving towards climax, containing a natural mosaic of small openings, diverse habitats and species. Fewer roads, fewer exotics, more old growth. More wilderness. Native trout, freshwater mussels and neotropical migrant populations on the rise. Pure water, less sedimentation, higher drinking water quality. The largest roadless, primitive area in the east, Shenandoah Mountain. Lowest management costs. More scientific research , monitoring and educational opportunities. Large protected areas with corridors and linkages for wildlife and flora migration. Closed canopies. Increasing wood turtle habitat and populations. No commercial extraction so all benefits effect everyone equally. Local industrial and private landowners managing their forests for open market conditions, and high quality timber, prices not depressed from cheap timber from the GW or Jefferson. A forest that truly provides amenities and services not available elsewhere. Maximized net public benefits. This is our desired future condition…it is all of ours.

Our thanks to Steven Krichbaum whose generous, dedicated and detailed research and vision have guided every step of this Conservation Alternative. We also thank Dr. R. F. Mueller and Ernie Dickerman and all of those others who have led he way.

Respectfully submitted,

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Appendix #1 -Evaluation of Net Public Benefits

The following tables that show components of public costs and public benefits that might be included in a Net Public Benefit determination is exerpted from: Glaser, Christine and Moskowitz, Karyn, *Economic Analysis of the 2006 Wayne National Forest Plan*, Green Fire Consulting Group, LLC, Bloomington, IN, www.greenfireconsulting.com, May 2008, pg. 19, 21.:

Table 1: Monetary Costs and Benefits (expressed in $)

Monetary Costs (in $): Forest Service Expenditures **Resulting from Plan Implementation**	**Monetary Benefits (in $): Forest Service Revenues** **Resulting from Plan Implementation**
For example: • Forest Service personnel expenditures • Expenditures related to timber program (sale preparations, timber stand improvements, road building) • Expenditures related to fighting NNIS • Expenditures related to building and maintaining trails	***For example:*** • Recreation fees • Timber revenues
	Tax Dollars— Making Up the Shortfall Between Revenues and Expenditures

Table 2: Examples of Non-Monetary Costs and Benefits (expressed in qualitative or quantitative terms)

Non-Monetary Costs: Inputs, Negative Effects (Expressed in Quantitative or Qualitative Terms)	**Non-Monetary Benefits: Outputs, Positive Effects** (Expressed in Quantitative or Qualitative Terms)

Resulting from Plan Implementation	**Resulting from Plan Implementation**
For example: • Species habitat degraded or lost • Tons of soil eroded • Acres of soil compacted • Acres of land infested with Non-Native Invasive Species (NNIS) • Scenic quality impaired • Endangered species habitat degraded • Air quality impaired • Recreational value of land diminished • Water quality diminished • Historic/cultural features destroyed	***For example:*** • Species habitat improved or restored • Recreational value of land improved • Mines reclaimed • Water quality improved • Water flow stabilized (reducing flooding downstream) • Air quality improved • Eroding soils stabilized • Soil compaction broken up • Acres of land protected from NNIS infestation • Historic/cultural features identified and protected

Table 3: Monetary and Non-Monetary Costs and Benefits Combined—Leading to a Net Public Benefit

PUBLIC COSTS **Resulting from Plan Implementation**	**PUBLIC BENEFITS** **Resulting from Plan Implementation**
Forest Service Expenditures (in $) ***(Expenditures are covered partly by revenues, partly by Congressional appropriations)***	**Forest Service Revenues (in $)**
	Public Benefits

Public Costs **Expressed in Quantitative or Qualitative Terms** ***For example:*** • Species habitat degraded or lost • Tons of soil eroded • Acres of soil compacted • Acres of land infested with NNIS • Scenic quality impaired • Endangered Species habitat degraded • Air quality impaired • Recreational value of land diminished • Water quality diminished • Cultural/historic sites destroyed	**Expressed in Quantitative or Qualitative Terms** ***For example:*** • Species habitat improved or restored • Recreational value of land improved • Mines reclaimed • Water quality improved • Water flow stabilized (reducing flooding downstream) • Air quality improved • Eroding soils stabilized. • Soil compaction broken up • Cultural/Historic sites identified and preserved.
NET PUBLIC BENEFITS From Plan Implementation	

Appendix #2 - Biomass

There are basically two types of biofuel production which could potentially be considered as sourced from the GWNF: cellulosic ethanol and direct incineration. Both have potential to devastate Virginia's forests.

CELLULOSIC ETHANOL

Cellulosic ethanol is made by breaking down woody fiber and converting the byproduct into fuel. Because of the difficulties in separating lignin and other unconverted carbon compounds from cellulose and hemicellulose which is then broken down into sugars and fermented, producing cellulosic ethanol from forests is grossly inefficient. It takes much more energy to create cellulosic ethanol than can be utilized from the fuel itself. This has not prevented businesses from seeking large government financial subsidies and guarantees as economic incentives to jump into an economically and energetically unsustainable process. According to a former EPA scientist, "because natural forests contain the highest amount of cellulose per acre and because the infrastructure and labor force needed for logging and chipping exists where significant harvests are already underway, regions already known for their forest products are likely to dominate in [cellulosic ethanol] feedstock provision." (Laumer, J, 2007)

Already, a significant amount of logging in the GWNF supports the pulp and paper industry. "Imagine this already unsustainable level of forest management combined with large-scale consumption for use in the production of cellulosic ethanol. Clearcutting will increase well beyond current levels, threatening more of our endangered forests. Loggers would have strong financial incentives to remove any and all vegetative matter available including stumps. A greater level of conversion would [be likely to] occur, including the loss of natural forests to become fast growing tree plantations for use in production. More chemicals will be used and wildlife habitat will be lost at a much faster pace. Can we really afford to implement this ..?(Quaranda, S, 2009.)

DIRECT INCINERATION

Burning forests to produce electricity threatens to destroy and further diminish many of America's and the world's forests. Direct incineration biomass refers to living and recently dead biological material that can be used as fuel for industrial electricity production. Congress is currently weighing the possibilities of sourcing plant material from natural forests for biomass electricity production. Businesses are currently looking at potential sights for biomass incinerators in the Commonwealth of Virginia.

All forms of biomass are not sustainable. They are ecologically destructive, they have a net energy loss, and there isn't enough biomass in America to make significant amounts of energy because essential inputs like water, land, fossil fuels, and phosphate ores are limited.

Wood is a nonrenewable resource. Old-growth forests had very dense wood, with a high energy content. The few pockets of old growth on the GWNF are rare and valuable for what and the habitat they help create. Secondary forests do not come back with the vigor of the preceding forest due to soil erosion, soil nutrition depletion, and mycorrhizae destruction (Luoma 1999).

Wood from second and third and fourth growth forests are of lower quality with significantly lower energy content. And wood from fast-growing plantations is so low-density and low calorie it's not even good to burn in a fireplace. These plantations require energy to plant, fertilize, weed, thin, cut, and deliver. The trees are finally available for use after 20 to 90 years – too long for them to be considered a renewable fuel (Odum 1996). Nor do secondary forests always come back with the vigor of the preceding forest due to soil erosion, soil nutrition depletion, and mycorrhizae destruction (Luoma 1999).

There's not enough wood to fuel a civilization of 300 million people in the US. Over half of North America was deforested by 1900, at a time when there were only 75 million people (Williams 2003). Most of this was from home use. In the 18th century the average Northeastern family used 10 to 20 cords per year. At

least one acre of woods is required to sustainably harvest one cord of wood (Whitney 1994).

Protection and regeneration of forests, soils, freshwater, climate and biodiversity are urgent imperatives in the George Washington National Forest and creating new incentives and demands for the removal of any
natural plant material from the GW is misguided and will further degrade our values, our resources, and our ecosystems.
A single 50-megawatt biomass plant burns about 650,000 tons of trees a year, over a ton of wood a minute. 13,000 tons of biomass are required per megawatt of generation annually. (Massachusetts Department of Energy Resources, 2007)

Because natural forests contain the highest amount of cellulose per hectare, and because the infrastructure and labor force needed for logging and chipping exists where significant harvests are already underway, regions already known for their forest products are likely to dominate (Quaranda, 2009)

Biomass combustion competes with other industries that want this material for construction, mulch, compost, paper, and other profitable ventures, often driving the price of wood higher than a wood-burning biomass plant can afford.

BIOMASS AS INEFFICIENT ENERGY PRODUCTION

Wood is a less energy rich material than coal. More cellulose must be burned to release a comparable amount of energy to coal. In fact, biomass energy averages only 24% efficiency. Thus, 76% of the energy in wood is wasted while 100% of the wood burned generates pollution. MEEA, 2009)

Processing materials with different physical properties is energy intensive, requiring sorting, handling, drying, and chopping. Combustion plants need to produce, transport, prepare, dry, burn, and control toxic emissions. Collection is energy intensive, requiring some combination of bunchers, skidders, whole-tree choppers, or tub grinders, and then hauling it to the biomass plant. There, the feedstock is chopped into similar sizes and placed on a conveyor belt to be fed to the plant.

It’s hard to optimize the pyrolysis, gasification, and combustion processes if different combustible fuels are used. Efficiency is lowered if material with a high water content is burned, like fresh wood. Different physical and chemical characteristics in fuel can lead to control problems (Badger 2002). When wet fuel is burned, so much energy goes into vaporizing the water that very little energy emerges as heat, and drying takes time and energy.

AIR QUALITY

Burning biomass for energy emits large amounts of air pollution and endangers human health. Biomass incinerators produce hundreds of tons of nitrogen oxides and volatile organic compounds, two ingredients of the ground-level ozone dangerous to human respiratory health and the environment (Environmental Protection Agency, www.epa.gov/particles/).

Biomass burning also produces tons of fine particulate matter, a pollutant associated with asthma, heart disease and cancer for which no safe level is known. Biomass emits as much matter per KWH as coal, and more than either natural gas or fuel oil. Particulates are considered more responsible for global warming than CO2 alone. This is bad for the climate and really bad for humans, animals and all things that like to breathe.

Biomass burning emits 1.5 times as much carbon monoxide (considered a toxic air pollutant) and 1.5 times as much carbon dioxide (the most important and damaging of greenhouse gasses) as coal. (Massachusetts Environmental Energy Alliance, 2009)

Yet, despite being as dirty as coal, biomass incineration is formally designated along with wind and solar sources as “clean energy” in the American Clean Energy and Security Act of 2009, HR 2454, making biomass incineration qualified for renewable energy credits.

Biomass conversion, like all incineration -- is a doomed technology. These processes generate hazardous emissions and toxic ash or residue, are very expensive, compete with recycling programs, and destroy valuable resources.

Combustion pollution is expensive to control. Some biomass has absorbed heavy metals and other pollutants from sources like coal power plants, industry, and treated wood. Combustion can release chlorinated dioxins, benzofurans, polycyclic aromatic hydrocarbons, cadmium, mercury, arsenic, lead, nickel, and zinc. Combustion contributes to global warming by adding nitrogen oxides and the carbon stored in plants back into the atmosphere, as well as removing agriculturally essential nitrogen and phosphate (Reijnders 2006)

NEPA, LIFE CYCLE OF RESOURCES AND ENVIRONMENTAL IMPACTS

The planners and project managers on the GW have a responsibility to look at the entire live cycle of forests and their potential uses in planning and decision making. If the GWNF is to consider the use of our forest for biomass production, such consideration should include detailed analysis of these effects such as would be included in an Environmental Impact Statement required by NEPA, which would include “cradle to grave” impacts at every step of the process. If the GWNF plan were to allow production for woody biomass, it would be responsible

for all of these impacts and all of those noted here. They all need to be considered in detailed analysis.

The answer to the question about burning dead trees as biofuel--the forest desperately needs that biomass to regrow and be healthy. If take the dead trees out we are reducing the health and thereby the carbon soaking potential of the next forest. Indeed as others have noted the declining forest might have as much to do with a merely a less healthy woods due not only or even necessarily because of global warming but because we humans took one, two, three or more round of timber out thereby making a less and less healthy ecosystem, just a like garden that is never fertilized, one that gets sick, susceptible to pests, and finally fails miserably. This lie that the timber industry and some big greens have gotten into the public mind that forests are renewable is a real problem--something grows back but not the forest that was cut, and eventually nothing happy at all.

VEGETATION MANAGEMENT

When the proposed plantation landmass or prices to plantation sharecroppers proves inadequate, this leads to whole tree chipping (tops and all), incursions into remaining native forests, expansions of plantation lands, increased clearcutting on lands otherwise selectively cut, creates markets for all junk trees, and encourages in-woods chipping which can ultimately lead to stump harvests to try to meet the demands of the burner. Biomass energy production will encourage clearcutting, conversion of native forests to biomass farms, and promote nutrient draining short rotation biomass production.

FORESTS AND CARBON

The use of biomass incineration is a far cry from being “carbon neutral.” In addition to increasing greenhouse gasses, the carbon released takes decades to re-sequester, a fact recognized by the Intergovernmental Panel on Climate Change (IPCC, 2008). Young trees that grow back after logging sequester just a fraction of the carbon that’s been removed and even after 25 years after cutting, new growth on a site is less than half of what was removed (Hubbard Brook Long Term Ecological Research, www.hubbardbrook.org).

THE MYTH AND THEORY OF RENEWABILITY

Trees may be renewable, but forests are not.

Whenever timber removal or vegetation management is practiced, the assumption is, in theory, that a forest will grow up to replace the one cut. While an individual seedling tree may or may not have the potential to replace a removed tree, subsequent forests fail to replicate, match or approach the quality of the forest which it is, in theory replacing. In addition, future health and productivity of ALL forests is unclear. Studies are showing that some forests are

beginning to not soak up CO2 due to rampant tree death. Complex components of a forest ecosystem, soil, fungi, microorganisms and decomposers will not likely recover in several lifetimes.

WATER

A large scale biomass plant requires close to a million gallons a day for cooling. Hundreds of thouseands of gallons of this water are vaporized in the cooling process. Plant cooling needs and water takings are greatest in the summer when high temperatures already reduce river flows and stress native fish. In addition, impacts of water takings will worsen as climate warming and droughts further stress our rivers and water resources.

Biomass operations contaminate local rivers and water supplies. Heavily contaminated 'boiler water" rinse water gets pumped back into rivers at unnaturally high temperatures. This and all cooling water is taken from nearby sources. To minimize transportation costs, biomass plants are located near their sourcing areas. Therefore, decisions regarding biomss sourcing from the GWNF would directly impact the very streams and water sources which find their headwaters in the GWNF.

Of course, clearcutting, vegetation clearing and roading which would accompany any biomass sourcing will simultaneously compact and erode soils, increase sediment loss and loads in streams and significantly impair the water quality and temperature of streams in the GWNF.

SOILS

Soil science should be factored into decisions about biofuel production.

In forests as well as farms, erosion is happening ten to twenty times faster than the rate topsoil can be formed by natural processes (Pimentel 2006). Soil forms an integral part of the environment. All plants depend on it as a reserve of nutrients for healthy functioning, thus making soil essential for the production of food, crops, forests, maintaining biodiversity and for the landscape. Major nutrients contained in fertile soil are phosphorous, potassium, nitrogen, calcium, magnesium and sulfur. Dissolved, they are taken up through the roots of plants, incorporated into plant biomass and finally returned to the soil when plants die or shed.

The forest desperately needs its own source of biomass to regrow and be healthy. If take the dead trees out we are reducing the health and thereby the carbon soaking potential of the next forest. Indeed as others have noted the declining forest might have as much to do with a merely a less healthy woods due not only or even necessarily because of global warming but because we humans took one, two, three or more round of timber out thereby making a less

and less healthy ecosystem, just a like garden that is never fertilized, one that gets sick, susceptible to pests, and finally fails miserably.

Logging slash left to decompose on site is not wasted wood. It provides an excellent source of carbon and nutrients for forest soil, badly needed after the extraction of large quantities of biomass in the form of logs. Tree tops in particular are very rich in nutrients. If logging slash is used for green energy, it may give rise to the "vacuum cleaner" effect. Instead of going into a site and hauling out logs, timber operators would be encouraged to "vacuum" up and remove *all* woody material. Chipping trees for electric power generation is a terrible, low value waste of a resource that should be treated as precious. Forest land is far more valuable unused than it is if used for wood chips.

Bioenergy production from forests and forest residues can affect the naturally balanced nutrient cycles leading to degradation of soil fertility. Removing nutrients when trees are harvested especially in the case of rapid-growing soft woods (with low btu content) and complete removal of logging residues ultimately interrupts the natural process by which decomposing plant matter would replenish soil nutrients and effectively makes the soil less fertile. Adverse affects on the community of microoganisms responsible for nutrient cycling or chemical and physical changes in the soil causing nutrients to be converted into compounds less usable to trees also contribute to the decreased soil fertility.

The most prudent course, clearly, is to continue to recycle most crop residues back into the soil, where they are vital in keeping organic matter levels high enough to make the soil more open to air and water, more resistant to soil erosion, and more productive" (Sampson 1981).

SOIL AND CARBON

Soils contain twice the amount of carbon found in the atmosphere, and three times more carbon than is stored in all the Earth’s vegetation (Jones 2006). Given that climate change could increase soil loss by 33% to 274%, depending on the region (O'Neal 2005), and the increased sedimentation and erosion of biomass sourcing areas, the ability of soils to sequester carbon would be significantly reduced and impaired by any biomass sourcing in the GWNF.

SOIL AND NATIONAL SECURITY

Soil is the bedrock of civilization (Perlin 1991, Ponting 1993). Biofuels are not sustainable or renewable. Why would we destroy our topsoil, increase global warming, deplete and pollute groundwater, destroy fisheries, and use more energy than what’s gained to make ethanol or electricity which cointinues to be used inefficiently? Why would we do this to our children and grandchildren?

Perhaps it's a combination of pork barrel politics, an uninformed public, short-sighted greedy agribusiness corporations, jobs for the Midwest, politicians getting too large a percent of their campaign money from agribusiness (Lavelle 2007), elected leaders without science degrees, and desperation to keep an unsustainable economy on life support (Bucknell 1981, Hirsch 2005).

But this madness puts our national security at risk. Destruction of topsoil and collateral damage to water, fisheries, and forests will result in less healthy communities, both human and biological. Diversion of precious dwindling energy and money to impossible solutions is a threat to our nations' future.

CONCLUSION

Given the costs, economically and environmentally, it is unbelievable that biomass production could be considered for the forests of Virginia and the George Washington National Forest. "But that is the way the market works. The "free" market never pays it's true costs. We do with our taxes, subsidies, and health" (Danny Haldeman, e-mail correspondence, 06/15/09).

The shear volume of needed land to make biofuels economically viable will have massive impacts on our forests. Every current agrofuels scam is reverberating around the world and making global climate change worse, affflicting indigenous folks and local communities around the world whether through land theft or water quality and availability and food prices, and doing absolutely nothing to abate our use of fossil fuels.

For all of the above stated reasons, the GWNF plan should specify all land off limits and inappropriate for biofuels production.

Appendix #3 – Oak Decline and Oak Regeneration

The Forest Service uses oaks to rationalize intensive management activities such as timber sales. The agency claims that if there are fewer numbers of oaks on the GWNF then it is unhealthy. The FS also claims that oaks need intensive even-age logging to maintain themselves on the Forest. The agency seems unwilling to reasonably address reason, science, and empirical evidence. The assumption that oaks will disappear without timber sales and that wildlife will disappear without unnaturally high numbers of oaks is clearly unjustified, unsupported and incorrect.

Disturbances and moisture, edaphic, and topographic gradients are important factors in oak persistence (McEwan, R.W. and R.N. Muller 2006; Lawrence, D.M. *et al*. 1997; Mueller, R.F. 1996; Johnson, P.S. 1993; Zahner, R. 1992). "Given the proper conditions for regeneration (i.e., canopy disturbance), oaks will

successfully seed into subxeric and mesic sites and can obtain canopy positions on those sites." (McEwan, R.W. and R.N. Muller 2006; see also Clinton, B. 2003) Most of the GWNF is relatively dry compared to other places in the East and there is certainly no "absence of disturbance".

In this region, over time a more diverse mixture of tree species (not so dominated by oaks) can be expected to naturally develop and exist, particularly at more mesic sites (Braun, L. 1950). However, this natural development has been impeded and truncated, in the past and continuing into the present. Many of the lands constituting the GWNF were subjected to numerous human generated disturbances in the recent past, such as post-European-settlement logging, fires, agricultural activities, and introduction of the Chestnut blight. To various degrees and extents, these past anthropogenic actions have altered the composition of the vegetation. As a result, at various sites the present-day forests of the GWNF may contain an unnaturally high proportion of oaks. Thus far, the Forest Service has been intent on perpetuating this artificial condition.
The reason for this is clear: Oaks are the primary commercial tree species on the GWNF. The "need" to regenerate oaks by intensive logging is a primary rationale for most timber sales and prescribed burns. However, oaks are not fire dependant. And on the GWNF it is not just intensive even-age logging by itself that results in the regeneration of oak stands. Oak stands result from even-age logging followed by timber stand improvement followed by precommercial thinning followed by crop tree release followed by commercial thinning (usually with applications of herbicides along the way). The exact order or nomenclature or number of these applications may vary, but regardless, it is this accumulation of various "management" actions, costing lots of tax-dollars and which constantly remove other species and/or manipulate proportions of species, that may ultimately result in a preponderance of oaks at sites subjected to even-age logging.

The agency has thus far failed to fully and fairly consider and explicitly disclose all of this in its public disclosure, evaluation, and selection of a purported "need" (or objective or goal or desired condition) to use intensive even-age cutting to maintain oak stands on the Forest. Nor are all the costs of these "management" actions properly/explicitly accounted for in the economic analyses for individual timber sales (in this way, the below-cost nature of sales and the subsidization of private timber industry profits are hidden from the public). Natural disturbance regimes that operate on the Forest have maintained oaks in the past and can reasonably be expected to do so in the future.

Appendix #4 – Restoration Opportunities for Road Closures, decommissionings and Obliterations

There are opportunities for decommissioning, closing, and revegetating roads in VMTs and PWAs. For example, the Peters Mountain road (FSR #175) in the Snake Run Ridge MT, currently closed to public motorized use, is a good

candidate; also, western portions of road #173 (Benson Run) in the Jerkemtight VMT, the Potts Mountain “road” between Toms Knob MT and Barbours Creek Wilderness Area (there are chronic and expensive problems involved with abuse of this route), portions of “road” #387/trail #488 at the ridge crest of Walker Mountain (the portion at the middle/north end of the Mountain Treasure past the route #488 closure at the Back Draft Trail intersection), and portions of roads #93, 371, and 400 in the Big Schloss MT.

Some suggested candidate road segments to be evaluated for decommissioning, closure, recontouring, revegetating, and conversion to non-motorized trails (road numbers from 1993 GW Plan maps) include the following: In Scaffold Run MT (WSRD) FSR 258A and 258C; in Warm Springs Mountain MT (WSRD) FSR 358; in Short Mountain MT (WSRD) the Lick Run road; in Laurel Fork MT (WSRD) FSR 457 and the Slabcamp road; in Mill Mountain MT (JR and WSRDs) FSRs 362 and 1923; in Beards Mountain RA (JR and WSRDs) FSR 361, 361C, 361E
In Jerrys Run MT (JRRD) FSR 698; in Snake Run Ridge MT (JRRD) FSR 277 (the portion past the juncture with 277A that crosses two wild Trout streams, Crow and Little Crow Runs) and FSR 175 (Jingling Rock); on the JRRD the Potts Mountain “road” between Toms Knob MT and Barbours Creek Wilderness Area (there are chronic and expensive problems involved with abuse of this route); in Longdale MT (JRRD) road 271E; in Fore Mountain MT (JRRD) FSR 448 and 448A ; in Kelley Mountain MT (PRD) FSR 162B (Kennedy Ridge)
In Three Sisters MT (PRD) FSR 510 (stem off of Poplar Cove towards Bennetts Run); in St. Marys WA addition A (PDR) road # 42-A; in Dry River MT (NRRD) Miller Run road (WV 68); on the NRRD FSR 225 and/or 225B that separates Gum Run and Oak Knob RAs (Maple Spring); in Oak Knob potential WA (NRRD) road 62 above Hone Quarry impoundment; in Dunkle Knob MT (NRRD) the Dice Run and Stony Run roads; on the NRRD FSR 72C that separates the Feedstone Mountain and Wildcat Ridge MTs; in the Beech Lick Knob MT (NRRD) FSR 235 and the Root Run “road”; in Wildcat Ridge MT (NRRD) “road” 597 at Rader Mountain; in Walker Mountain MT (NRRD) “road” 387 at the ridge crest of Walker Mountain (the portion at the north end of the Mountain Treasure past the road closure at the Back Draft Trail intersection; this is a trail, not a road passable by passenger vehicles); in Benson RunJ erkemtight MT (NRRD) FSR 396A (in the northern section of the MT); in Elliot Knob MT (NRRD) the Montgomery Run and Liptrap Run roads # 1760 and #1625A (above Hotshots); in Hankey Mountain MT (NRRD) FSR 425 and 425A; in Ramseys Draft (Bald Ridge/Lynn Hollow) MT (NRRD) the Rattlesnake Run roads # 455 and 455A and the road northeast of Braley Pond #254; on the NRRD FSR 95 from Camp Todd to FSR 85 (an expensive to maintain section that separates the Ramseys Draft and Little River RAs totaling around 55,000 acres); in the Jerkemtight, Benson Run MT (NRRD) FSR 173 west of the Shenandoah Mountain crest and FSR 399 to Wallace Peak; in Short Horse Mountain MT (LRD) the Browns Run road; on the Lee RD FSRs 93, 371, and 400 - the Paddy/Cove Runs road in VA (the portion south of the borrow pit in Frederick County about a mile in from Rt. 55 or from south of where access to private inholding is provided) that serves to separate Great North

Mountain MT from Big Schloss MT and Jonnies Knob MT; in Big Schloss MT (LRD) the Cove Run road # 371in WV and (LRD) FSR 1863 at Cedar Run and “road” # 1719 in the center of the MT northwest of FSR 88.

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