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[redacted]

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USDA Forest Service - George Washington National Forest - James River Ranger District
Dunlap Creek Scoping Comments
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https://cara.ecosystem-management.org/Public//CommentInput?Project=65183 https://www.fs.usda.gov/project/?project= 65183

When I tried to comment via the websites, I got: "The requested URL was not found on this server. Additionally, a 404 Not Found error was encountered while trying to use an ErrorDocument to handle the request." And this turned up: https://www.elizabethsbridalmanor.com/slotsPublic/CommentInput?Project=65183

And there was no place to comment at this site:

https://cara.fs2c.usda.gov/Public//CommentInput?Project=65183

The Dunlap Creek Project Area ("DC PA"), located in Alleghany County, is about 10 miles southwest of Covington, VA. The proposed PA is about 18,300 acres in size and includes wild Trout streams (e.g., Crow and Little Crow Runs), old age forests, a VDNH Conservation Area. The proposal includes around 1,134 acres of commercial ground-based logging (453 acres of intensive even-age, 681 acres of intensive "thinning" - basal area reduced by 40-75%), 260 acres of burning (3 miles of dozer line), 245 acres of

mechanical/chemical "treatments" (tsi), fabricate or maintain 30 permanent openings (44 acres), fabricate 3.5 miles of new "temporary" road, and 17 miles of skid troads.

This proposal is harmful and not what this forest and country need.

Various aspects of the proposal would destroy and/or significantly degrade the ecological integrity here. According to the Virginia Natural Landscape Assessment, unlike most of the state the PA has sites of "Outstanding" and "Very High" Ecological Integrity" - see VANLA map.

The "Purpose and need" for the project is based on general programmatic Plan direction/boiler-plate language that could apply to hundreds of thousands of other acres of Forest. The site-specific level of Forest planning is to identify site-specific (in the PA) issues, concerns, information, and conditions that apply to the generic programmatic direction.
If there is a valid need to fabricate ESH in the overall PA, the SL does not validate that it must be fabricated at the specific sites that are proposed — those of most concern being the ones in VMTs or Conservation Areas (identified by the VDNH), beside Wild Trout streams, or that involve the cutting of old age tracts.

Key Natural Heritage Community Areas -- The two areas currently in this management prescription area are at Frozen Knob and Peters Mountain on the James River Ranger District (about 3,300 acres).

VMT - Alternatives

Implement **Proforestation** for the entire delineated **Snake Run Ridge and Slaty Mountain VMT areas.**

Amend the GWNF Plan to **designate the entire delineated Snake Run Ridge and Slaty Mountain VMT areas as "inventoried roadless areas" and as "PWAs"**.

Manage them under the prescription 12D & 4D and as "unsuitable" for timber; part of it is MP 13 - that is unreasonable and unnecessary.

Doing so will meaningfully respond to the "climate-smart" EO, America's "30X30", and the Executive Order old forest policy/goal/objectives.

It would serve to provide and restore the integrity of some of the largest contiguous intact roadless areas and perhaps the largest Old Growth area in the Central Appalachians and the eastern NFs and

Implement management direction to maintain their roadless character using a Standard/MP prohibiting road construction and timber harvest.

"Management of the 144,500 acres in the Potential Wilderness Area (PWA) inventory that are outside of the IRA boundaries varies among the alternatives. Some of the acres are allocated to Recommended Wilderness Study Areas, some are allocated to management prescriptions that emphasis a remote character and some are allocated to management prescriptions that allow active management including road construction and timber production." (FEIS 2-57)

The problem is that acreage in PWAs are open to so-called "active management" (*i.e.*, logging and road building) (FEIS Table 2-16); this does not emphasize remote character nor does it maintain the current roadless character. This 'management' is unpopular, counterproductive, degrading, unreasonable, and unnecessary.

Shift the acreage in these specific VMT areas that is MP 13 to MP 12D and/or 4D.

"The Forest Plan can be amended at any time during its existence. Such amendments are necessary to ensure that the Plan remains a viable, flexible document for managing the Forest. . . . The Forest Plan may also be amended as part of a project-level decision where a change or adjustment in the Forest Plan is appropriate for that project but is not applicable to the entire Forest. Examples of such changes might be adjustments to, or waivers of, standards. . . . It may also be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Forest Plan have changed significantly or when changes in policies, goals, or objectives would have a significant effect on the Forest-level programs. In the monitoring and evaluation process, the interdisciplinary team may recommend a revision of the Forest Plan at any time." (LRMP 5-19)

The proposed actions and associated ancillary actions would degrade the largest intact forest blocks in the DC project area — and some of the largest intact forest blocks remaining in the entire Central Appalachians. Significant impacts (intensity and context) may ensue. And there is considerable uncertainty as to the harmful effects such actions can have on vulnerable wildlife populations there. Plus more invasive species and more poisons deployed (TSI).

The logging, intentional human-ignited burning, fabricated fire lines (including with dozers), and any road construction are not consistent with Wilderness conditions and should not occur in any roadless block that qualifies as a Potential Wilderness Area (PWA).

Implementation of the proposed treatments would NOT maintain roadless character in the VMT/PWA/Natural Heritage areas. These human impacts also could be used subsequently by unscrupulous and dishonest people as a rationale for denying protection to an area; such as opposing or rejecting Wilderness designation or "inventorying" it as a formal "roadless area".

I've been dealing with this issue for 30 years on the GWNF and I have seen numerous areas improperly denied such status by FS planners. There is nothing to stop somebody else in the future from finding that implementation of the proposed treatments "would impact the potential for the **Snake Run Ridge and Slaty Mountain VMT/** PWAs to be considered for future wilderness recommendation."

Roads and Context - unroaded tracts

There are already "386,000 miles of National Forest System roads." (LRMP 5-18) And there are already huge backlogs of road problems and maintenance (BILLIONS of dollars).

There are already at least 5 MILLION MILES OF ROADS in the US; in less than the lifetime of a single tree (such as a White Oak or Black Gum), we've gone from ZERO MILES TO 5 MILLION.

The FS needs to STOP fabricating more roads.

In Virginia and throughout the East large unroaded areas are the rarest patch type in the landscape.

The fact that this agency refuses to consider many of those on the Forest as "inventoried roadless areas" does not change change their *de facto* significance and existence on the ground.

Now here's yet another proposed project that will destroy and degrade unroaded habitat and conditions on the GWNF.

SBA present? - MAs

I cannot tell from the scoping letter/map if any SBAs are present in the PA. Nor are Management Areas delineated; and there is no mention of in the SL of what Management Prescriptions are present here.

Cumulative Impacts to VMTs

Only 40% of VMT acreage is included in currently IRAs.

The cumulative impacts to VMTs, such as reducing or not maintaining their roadless or remote character and degrading, fragmenting or perforating their ecological integrity, is a significant issue of great concern.

The numerous recent projects/timber sales have failed to adequately protect VMTs.

In just the recent couple of years on the GWNF, the North Shenandoah Mtn., Sandy Ridge, Potts Creek, Archer Knob, and Green Hill projects ALL affect and degrade numerous VMTs. Many other projects since the Plan revision have been significantly reducing roadless/unroaded acreage and degrading the ecological integrity and non-motorized recreation associated with VMTs.

The GWNF has 23 Inventoried Roadless Areas (IRAs) with a total of 242,278 acres. As part of the revision process, the Forest identified 37 areas as Potential Wilderness Areas (PWAs) with a total of 372,631 acres. The PWA inventory includes all of the IRAs, with the exception of Southern Massanutten and The Friars (FEIS 2-56).

Over 220,000 acres of VMTs are not considered as PWAs or IRAs and are open to "active management" (*e.g.*, logging and roading). Further, 85,500 acres of PWAs that are outside of IRAs are open to "active management", plus more acreage in SM and Friars.

Alt. C for the Forest Plan revision had 386,800 acres in recommended WSAs.

Connectivity - significant features - 30X30

"Identification …. of core areas, corridors, and analysis of the connectivity within Forest Service lands and connectivity of the Forest with other lands" is especially important here since Snake Run Ridge is somewhat of a "sky island" with unique and rare communities.

This is a unique project area with potential wilderness areas, DCR Conservation Sites, Mountain Treasure Areas, remote or other sensitive habitat, old-age stands and old-growth forest, semi-primitive recreational oportunities/potential, and other important features across the interconnected landscape. This area (or at least large parts of it) is one such area that should be identified and actually "protected" (*i.e.*, qualify for either GAP 1 or GAP 2 protection status in the US Geological Survey's Protected Area Database) for achieving the goal/objective of the 30X30 initiative.

The Dunlap Creek area/project is a perfect example of a place in need of protection against the depredations of money-driven elitists and special interest groups.

New information/issues - 30X30 - climate-smart management

New information/issues have arisen since the last Forest Plan revision.

The FS should disclose how this project would affect lands needed for protection in the Administration's 30 by 30 or "America the Beautiful" initiative. This initiative recognizes the important role of intact forests in carbon sequestration and sets goals. Status 1 areas under the USGS Protected

Areas Database are areas "have permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference." Since current acreage of 30 x 30 protected areas GAP type 1 & 2 exists in the U.S (and underrepresented areas) than is needed under the 30 x 30 plan, additional areas should be protected. The FS should identify what areas should be protected as status 1 and status 2 areas. A smaller acreage is currently protected across the U.S. and across the southeastern U.S. than areas protected as roadless in the Roadless Area Conservation Rule. Therefore, additional areas should be identified as Protected Areas.

In addition, a new Executive Order (April 2022) is in effect with the objective of identifying, inventorying, and protecting old forest on National Forest lands for carbon sequestration and biodiversity (SK comments July 2023).

Roadless/Unroaded Tracts/Blocks/Areas — PWAs — VMTs

Roadless areas, unroaded tracts, or roadless blocks are in extremely short supply in the East and are one of the most important aspects of the GW National Forest. Various sites that previously existed have been whittled down over the years. Roadless areas/Unroaded tracts/Roadless blocks and Virginia Mountain Treasures continue to be diminished in size and degraded in quality on the GWNF. Implementation of this proposal would continue this harmful pattern; the Forest Service oftentimes fails to protect roadless tracts administratively. **The direct, indirect, or cumulative impacts of the DC proposal to the Forest's Roadless areas/Unroaded tracts/Roadless blocks/PWAs/VMTs may be significant**.

The cumulative impacts to these VMTs are significant; the North Shenandoah Mountain and Sandy Springs projects on the GWNF are just two of the recent projects that have degraded and diminished wilderness character in multiple VMTs.

We live in interesting times, in more ways than one. Politically, in the US we've seen the recent reintroduction of the Northern Rockies Ecosystem Protection Act ("NREPA"), the reintroduction of the the Wildlife Corridors

Conservation Act (S.1499, H.R.2795) , the push for nationwide infrastructure improvement; the Biden administration's announcement of the "30 X 30" initiative (to "protect" 30% of our nation's lands by 2030); the President's release of an Executive Order seeking "climate-smart" management policies for the USDA and USDI, the agencies overseeing National Forests ("NFs") and Bureau of Land Management lands ("BLMLs"), National Parks ("NPs"), National Wildlife Refuges ("NWRs"), and National Monuments and National Recreation Areas; and the old forest protection directive.

The overlapping intersection of these initiatives and policies, a point unlike any other in our lifetime, finally focuses the public eye on today's most crucial issues. Now is the time to finally advance the clear solutions that have previously not achieved the attention they are due.

More than just attention is due, these concerns demand action and funding. This goes way beyond political parties and partisonship. This is about everybody — PUBLIC lands, the shared commonwealth of ALL AMERICANS. There's a lot of work to do and a lot of Americans who want to do it. The problems, and opportunities are systemic, and systemic issues require systematic action. *Ad hoc* and half-baked responses are not good enough.

Current land management is in many ways not just a disgrace to science and reason, it's a manifestation of a basic disdain for the Creation. And a sneering contempt for the intelligence of Americans with more than two neurons to rub together.

The defenders of this unholy trajectory (many of whom financially gain from it and are the beneficiaries of its subsidies — follow the money), they would actually have you believe that all the parks, refuges, wilderness areas, and World Heritage sites and Biosphere Reserves, since they do not have logging and dozers and chainsaws inflicted upon them, that all of them are *unhealthy*. Who are we going to believe, the corporate pr minions and their government enablers? Or our lying eyes and countless scientific studies that reveal the incomparable majesty and irreplaceable necessity of these sanctuaries of life?

Forests, along with oceanic algae, are the greatest carbon sinks on Earth. So, from a climate standpoint, reducing deforestation and forest degradation, plus

accomplishing proforestation, afforestation, and reforestation, are every bit as important as reducing emissions — see, *e.g.*, August 2019 IPCC report at https://www.ipcc.ch/report/srccl/.

When America's National Forest system was started over a hundred years ago there were far fewer of us and far more wild places. The Forests were initially established in response to the desecrations and depredations of massive cutting by the timber industry and the recognition of the need to protect public watersheds. Over time, the timber industry took over the Forest Service, a textbook example of "agency capture" by the very forces the agency was originally meant to counter and control. Extraction and exploitation, logging and road building, have become the norm. Resulting in fewer and fewer unroaded natural areas and old-growth forests.

To further mislead the public, much of the logging and road building occurring on our NFs are now disgracefully and dishonestly labeled "restoration" by the US Forest Service. True, to rectify the past management "treatments" inflicted upon them, some valid restoration is called for on public lands, such as removing unnecessary roads and planting American Chestnuts. But **what our NFs and BLMLs need above all are retention policies, *i.e.* mandating avoidance of impacts so that these places can become and remain intact and healthy.**

The amount of all designated Wilderness in Virginia accounts for less than 1% of the state's total land area. The land types in shortest supply here and what America and the world need more than anything else are places that we keep our grasping paws off of. Still visited, honored, and enjoyed, but not exploited and desecrated.

The importance of roadless areas was documented for both small (1,000-5,000 acres) and large (>5,000 acres) roadless areas in the 2000 Roadless Area Final Environmental Impact Statement (RA FEIS). That FEIS contained an alternative 4 that would "Prohibit road construction, reconstruction and all timber cutting within Inventoried Roadless Areas" (see pg. ES-3). This option can and should be administratively implemented and expanded to ALL unroaded tracts or roadless blocks on the AK PA.

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The DC project managers need to identify ALL roadless/unroaded tracts over 1000 acres in size on the GWNF in the project area. The planners must also identify sites that could meet this objective if a road or road segment were to be decommissioned. This metric ($\geq$ 1000 acres) is the size used by the USFS in the ongoing Plan revision on the Wayne National Forest in Ohio to identify "roadless blocks" for analysis as Potential Wilderness Areas (PWAs). This potential must be analyzed here at this project area. It was not done for the 2014 Plan revision.

The outdated Plan failed to fully and fairly consider and analyse this concern/issue (*i.e.*, > 1000 acres roadless blocks). Nor did it consider the 30X30 initiative and the "climate-smart" Executive Order. This new information must be addressed here and now (it is "ripe") at this site-specific level of analysis.

I look forward to collaborating with you on this significant issue.

Connectivity - Resilience - Population viability

For long-term viability, large populations are essential, which in turn require habitat in large amounts and high quality for all life stages (Reed & McCoy 2014). Large populations are more likely to provide the high amounts of standing genetic variation needed to facilitate both phenotypic plasticity/buffering and genetically adaptive responses (Reusch 2014). Therefore, to decrease extinction risk, we must increase carrying capacity (K) or population abundance by increasing habitat area and/or habitat quality (including that of the surrounding matrix), and by reducing functional isolation of populations, *i.e.,* allow for dispersal/geneflow (Lindenmayer & Burgmann 2005, Vos *et al*. 2010, Quesnelle *et al*. 2013). So, just as we must **PROTECT**, we must also **CONNECT**.

Connectivity takes place at multiple scales — within the PA, between the PA and other sites and other parts of the GWNF, and between the GWNF and other National Forests and habitat patches.

Large storehouse of genetic material, the building blocks of ecological restoration and sustainability, are values that only large contiguous blocks of natural land can provide. And gene flow via dispersal is a key evolutionary process (Hoffman & Sgro 2011), so connectivity allowing

dispersal of organisms may be essential for maintaining viable populations and/or populations approaching carrying capacity (Kinniston & Hairston 2007). Connectivity for dispersal/gene flow also allows for the tracking of suitable habitat in response to climate change and contributes to the high standing genetic variability that may be necessary for potential adaptive evolution. Dispersal presupposes that there is something that can move, thus it is crucial to maintain sources of the individuals (propagules) doing the dispersing — we must **PROTECT** large populations/expansive habitats (Hodgson *et al.* 2011b).

Since we need to facilitate the ability of organisms to traverse landscapes, it is essential to address and nullify habitat fragmentation — we must **CONNECT** populations and habitats. Organisms with limited capacities of mobility, such as turtles or salamanders, as well as those with large home ranges or habitat specialists, are vulnerable to recovery or recolonization problems associated with habitat fragmentation. In this age, connectivity is particularly crucial so as to permit many populations and communities of wild organisms to remain viable as they track the moving locations of their preferred climate zone. **Resiliency to climate change demands an interconnected network of protected areas** - with longitudinal, latitudinal, and altitudinal pathways, both within and between National Forests and other reserves.

We need multi-scalar connectivity to address multi-scalar fragmentation — within the PA, between the PA and other sites and other parts of the GWNF, and between the GWNF and other National Forests and lands. Larry Harris, a wildlife biology professor of mine at the University of Florida, produced "The Fragmented Forest" back in 1984 and this book brought this fundamental concept into the public consciousness. After decades of dancing around this issue, it's imperative that we fully address it now. This is a systemic problem and it must be nullified and mitigated in a systematic way. It's all connected.

Connectivity is a function of intrinsic and extrinsic factors, *i.e.*, dispersal capability arising from characteristics of the specific organism (morphology, physiology, ecology, behavior) as well as attributes of the specific landscape (physical connectedness). **Patches, edges, and the matrix can all serve as barriers, filters, or facilitators of movement**. Isolation by sheer distance, geographic barriers, or landscape resistance all influence the ability of organisms to traverse landscapes. The overall landscape, as well as its

constituent habitat patches, has varying degrees of resistance/friction, *i.e.*, permeability to movements. Movement corridors, barriers, and landscape resistance will be experienced differently by each species due to differences in morphology, physiology, ecology, behavior — so, depending on the taxon, a landscape patch can serve as permanent habitat – conduit – barrier/filter – or source/sink (Anderson & Jenkins 2006).

Implementation of the proposal would drastically change the character (composition & structure) of the project area, thus drastically altering habitat quality and amounts of and the permeability/connectivity of habitat patches within. The SL ignores this.

Old age forest stands/sites - Old growth forest

Old age stands (that have long time periods without human domination) are ecologically critical areas.

Old age stands are essentially different parts of the Forest's diversity - see, *e.g.*, Wyatt and Silman 2010. In other words, they are NOT necessarily the same as or synonymous with "mature" stands. And now on the GWNF, forests as young as 51 years old are being referred to as "late successional" by FS planners (See 2021 Potts Creek EA).

There is already identified old growth in the central part of the PA — the VA Division of Natural Heritage delineated an area of at least 3600 acres (Fleming & Moorhead April 2000 report). And there are a lot of old age stands (140+ years old) in and outside of the two VMTs in the PA (see Bamford map - and this map is 10 years old). Depending on the *forest type*, there can be a lot more such "old age" stands; some forest types reach the minimum age for consideration at 100 years old, others types at 120 and 130 years. There are also a lot of small (1-99 acres) and medium (100-2499 acres) sized patches of potential OG as signified on the 2006 USFS map.

All these tracts need to be connected, not fragmented; strategic proforestation will accomplish this. In other words, sites should be managed to maintain and enhance the unusual character of the vegetation here, this character being old-age forest (very rare in the East). All these areas need to be protected from human-caused detrimental habitat change (*e.g.*, harmful edge effects, suppression of seral development, and invasives). In this way,

we will provide areas that can further develop characteristics of old-growth forests and additionally will serve to provide protection and preservation of the area's scenic quality, water quality, natural characteristics, and water resources; as well as provide a variety of recreation opportunities that are consistent with the preceding purposes.

The non-contiguous old-age stands should all be connected by late-successional forest/stands; planning and alternatives can accomplish/implement this.

The "Key Natural Heritage" area delineated by the FS does NOT include the entire area delineated by the experts of the VDNH. This is a major problem and significant issue. And it needs to be rectified at this site-specific level of planning.

I am concerned about harm to tracts of old age mixed mesic, dry-mesic Oak, and dry & dry-mesic Oak-Pine here. These **old age stands and portions of stands should be off-limits to logging and road building and intentional burning (*i.e.*, considered "unsuitable" here)**. This is another alternative that should be fully developed (and implemented).

An associated issue/concern involves the honest assessment and provision of the full diversity of older age classes.

In re old age stands, logging, legacy, and herbaceous communities see:
J. Wyatt and M. Silman. 2010. Centuries-old logging legacy on spatial and temporal patterns in understory herb communities. Forest Ecology and Management 260: 116–124

Keywords: Appalachian forest, Resilience, Disturbance, Hierarchical partitioning, Biodiversity

"abstract:

Understory herb communities in the Southern Appalachians are among the highest biodiversity plant communities in North America. In the mid-1990s, a debate began over whether understory herb communities recover to their pre-disturbance states following logging. Studies showing reduced herb-layer diversity in previously logged forests were criticized for not accounting for intersite environmental heterogeneity. More recent studies have addressed

environmental heterogeneity, but have neglected long-term recovery by using "mature forests" as young as 80 years old as the benchmark for diversity comparison, even though old growth stands have disturbance return intervals exceeding 500 years. Here we address concerns clouding previous studies of high-diversity Appalachian herb communities and investigate their long-term recovery by comparing paired sites of old growth forest and forest logged 100–150 years ago. We found that species richness and individual abundance is greater in old growth forests than mature forests and that species composition differed significantly between the two. Turnover in species among old growth and mature forests accounted for 11% of the total species richness and was significantly greater than expected. Species turnover at intermediate (5–50 m) and landscape-scales (>10 km) contributed the most towards total species richness. Herb communities in rich cove forests have successional trajectories that exceed 150 years, with important community changes still occurring long after the forest returns to what has been previously termed a "mature" state. To conserve the diverse herb layer, we conclude that mature forest stands are too young to serve as baselines for recovery, landscape- scale preservation of multiple forest stands is needed to maximize species richness, and maintaining 100–150-year logging rotations will likely lead to loss of biodiversity.

"1. Introduction

Temperate forests worldwide and their understory herb communities have undergone large-scale and long-term anthropogenic disturbance through land conversion and logging (Houghton, 1995; Goodale and Aber, 2001; Schulte et al., 2007; Miyamoto and Sano, 2008). Knowing the time course of recovery and long-term implications of disturbance on biodiversity and community structure is essential for conserving these plant communities (Duffy and Meier, 1992; Foster et al., 1996). In 1923, old growth forests covered 822 million acres in eastern North America (Leverett, 1996). Over the past century, these forests have been intensively logged, and today old growth forests have been reduced to small tracts of 10–100 acres totaling 750,000 acres (0.09% of the original area) due to harvesting and clear cutting (Davis, 1993).

"While old growth forests have been reduced to relicts, they are the only means for assessing recovery of secondary forests. Old growth forests provide a baseline for evaluating the effects and effectiveness of conservation

strategies (Foster et al., 1996), and remnant old growth forests provide a valuable point of reference for ecological patterns and processes occurring in the absence of direct anthropogenic disturbance (McCarthy, 2003). To manage the high-diversity herbaceous communities found in Southern Appalachian forests, stands logged at the turn of the 20th century, termed "mature forests" in the literature, are used as the benchmark for assessing recovery of recently logged forests (Ford et al., 2000). However, minimum times between stand initiating events in Appalachian forests are on the order of 400–500 years (Lorimer, 1980), meaning that recovery has been studied over 20% or less of their successional trajectory. Focusing on short-term implications of logging neglects the critical question of whether forests recover from logging. Studies conducted on forests less than 100 years old may provide an inadequate baseline for effective biodiversity conservation. In this study we ask how conclusions about biodiversity and ecosystem recovery and management decisions might change if we look at the remaining 80% of succession not accounted for by past studies."

Climate change - Proforestation - Carbon sequestration

Logging forests (what some term "harvest" - as if the most complex terrestrial ecosystems on the planet are a crop they planted), is by far the greatest source of carbon emissions from forested land. Far more than results from fire or natural disturbances such as insect damage and blowdown (see Harris *et al*. 2016). Nationwide, logging operations account for *ca*. 85% of carbon emissions from forests. And while doing this, these human and natural disturbances were estimated to reduce the potential carbon sink of US forests by 42%. Emitting carbon and reducing carbon sinks at the same time — **NOT climate-smart**.

Protecting forests is an essential strategy in the fight against climate change. And unlike some strategies for cooling the climate, it doesn't require costly and complicated technology (Law and Moomaw 2020, Law *et al*. 2022, Law *et al*. 2023). In fact, "Drastically reducing deforestation and systematically restoring forests and other ecosystems" has been called "the single largest nature-based opportunity for climate mitigation." (UNEP - 134) Some solutions are beneficial to more than one issue and in this case the co-

benefits are enormous — the protection and restoration of intact forests not only reduces carbon emissions and pollution, it also conserves biodiversity and counters the extinction crisis (UNEP - 111). "Ecosystem restoration can involve returning agricultural land to its natural state, or the rehabilitation of ecosystems on degraded land. Ecosystem restoration is a cost-effective way of achieving multiple benefits." (UNEP - 113)

Clearly, the rehabilitation of forest health achieved by "proforestation", and through it achieving the actual protection and restoration of forests, confronts and positively counters all three of the overarching issues/catastrophes at once. **With the confluence of ongoing mass extinction/extermination, climate change concerns, and the 30X30 initiative, the time is ripe for installing proforestation as the fundamental working principle behind the urgently needed improvement and modernization of the management framework for the George Washington National Forest**. The USDA FS should explicitly set a positive example and lead the debate. The lands and wildlife have been damaged, but they can be brought back to health. And here's how:

Proforestation means "growing existing forests intact to their ecological potential" (Moomaw *et al*. 2019). In other words, protecting standing intact forests and letting them grow and develop in complexity to their natural old growth state. This is in contrast to afforestation (planting new forests) and reforestation (replacing forests on deforested or recently harvested lands), both of which take much longer to remove carbon dioxide from the atmosphere in their early years than older forests do as they continue growing.

Proforestation has the further advantage of not requiring any 'new' land. Allowing existing trees, particularly in older and mature forests, to continue growing and sequestering carbon is essential for climate-smart management. This simple concept is explained in the 2019 peer-reviewed paper authored by Drs. William R. Moomaw, Susan A. Masino and Edward K. Faison published by the journal "Frontiers in Forests". The paper's title says it all: "Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good."

On the lands in the PA that are not young pine plantations, the GWNF managers should actively promote proforestation.

"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)

Indisputably, young trees hold less carbon than they will at ages of 50 to 100 years. White Pine studies by the Native Tree Society (NTS) in the US Northeast show that one pine's annual increase in carbon sequestration at 100 years is equivalent to the increased sequestration of multiple young pines. For example, a 30-year-old white pine may hold 200 to 250 pounds of trunk carbon. The same tree can easily hold 1,700 to 1,800 pounds at 100 years, and 2,400 to 2,500 pounds by age 150. Most of the carbon increase comes after 30 years, and significant accumulation continues for decades.

Globally, the largest 1 percent of living trees contain ***half*** the above ground carbon, and current acreage of young forests sequester only half of what they are capable if they were older and larger. Another study found that a 100-centimeter diameter tree annually absorbs as much carbon as an entire 10-20 centimeter tree holds cumulatively.

So, **a climate-smart strategy for the public's forests — our GW National Forest and other public forests — *starts* by protecting them in order to maximize carbon sequestration and reduce carbon emissions. Climate-smart care for public forests entails proforestation — protecting and maintaining standing forests**.

The analysis of the "no action" alternative in other DEA/EAs was deficient with regard to the benefits of proforestation.

Allowing standing forests to grow to their full biological potential is far more effective in mitigating climate change than are cutting down mature trees and planting young ones. The youthful GWNF and other Eastern NFs have a long way to go to ecological maturity. The nearby Peters Mountain or Frozen Knob "Key Natural Heritage Community" or the Ramseys Draft WA on the GWNF are examples of the age-related structural and compositional complexity that can be attained in this eco-region.

Old growth forests of the eastern United States sequester and store significantly more carbon than both young and mature forests (McGarvey *et al*. 2015; Burrascano *et al*. 2013) because they generally host significantly more large living trees, above ground biomass, and dead wood (McGarvey *et al*. 2015; Burrascano *et al*. 2013), because they have been shown to have lower soil respiration rates than younger forests (Liebman *et al*. 2015), and because the rate of tree carbon accumulation increases continuously as trees grow in size (Stephenson *et al*. 2014). The transition of young and mature secondary forests in the eastern United States to old growth status is an especially promising opportunity to increase carbon sequestration and storage (Lichstein *et al*. 2009, Law *et al*. 2022).

In addition, with proforestation management, the DC PA and the GWNF will significantly contribute to meeting America's goals for actually "protected" lands. In the context of *30x30*, 30 percent "conserved" unequivocally means that by 2030 30 percent of the nation's lands and waters will have qualified for either GAP 1 or GAP 2 protection status in the US Geological Survey's Protected Area Database (meaning that they have permanent protection and mandated management plans that do not allow extractive uses) — this issue was NOT considered and analyzed for/in the 2014 GWNF Plan. If the USDA is to manage and restore National Forests for the perpetuation of the diversity of Creation and for the good of all Americans, not for profiteers and special interests, then this shift to proforestation and custodial management that achieve real on-the-ground "protection" is absolutely essential.

* The climate-smart management directive, the 30X30 goal, and the use of proforestation for carbon sequestration and to counter climate change are new issues and new information that the old Forest Plan did not meaningfully consider in its formation of "desired conditions" for this project area (see SL). New information on climate change and the diversity/extinction crisis must be fully and fairly considered now and the management direction for the PA correspondingly updated and altered.

It is time to amend the Plan as part of this site-specific decision. This is certainly legal and within the scope of the project.

For instance, when the 2006 Hoosier NF Plan was approved by then Regional Forester Randy Moore (now Forest Service Chief), he had this to say in his ROD: " The management direction provided in the Forest Plan will be subject to periodic and timely change as new information comes to light and when the public demonstrates a desire for a changed focus in management. Amendments to the Forest Plan will be proposed when the need for change is evident and the public will be involved in those changes."

Carbon Sequestration - Stagnation - Tree Growth - Forest Vigor - Old Forests

Many ecological, forestry, and carbon sequestration models are built upon the premise that trees lose vigor as they age. Numerous EAs and other documents issued by the USFS refer to the decrease in vigor of older trees at project areas and use this purported decrease as a rationale for the "need" to implement logging. The ages of trees referred to by FS planners as declining in vigor are usually only around 100 years old or even less.

Studies of old trees at latitudinal and altitudinal treelines suggest that this premise may not be true (*e.g.* Jacoby et al. 1996; Esper *et al.*, 2002). And there is good evidence that the premise may not be true on the HNF as well.

Neil Pederson, Ed Cook, H. Myvonwynnn Hopton, and Gordon Jacoby (of the Tree-Ring Laboratory, Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY 10964) examined the growth trends of more than 800 oak trees from a dataset composed of white oak (*Quercus alba* L.) and chestnut oak (*Q. prinus* L.) distributed from Alabama to Michigan and New York State: "Results show that growth does not always decline as trees age. In all classes, oaks have shown increased ring widths over the past 150 years. Ring widths have been significantly wider than average since the late-1800s and throughout most of the 20th century. Remarkably, this phenomenon is observed in the oldest known white oak (1519-1983). This tree experienced increasing ring widths from 1811-1982 when it was 292 to 463 years old. Likewise, the oldest known chestnut oak responded vigorously to a reduction in competition at 410 years of age, following one century of increased

growth rates. The oldest yellow-poplar trees have experienced increased ring widths similar to oak. . . .

"Many of the trees in this dataset experienced accelerated growth at 200, 300 and even 400 years of age. Because carbon allocation to stem growth occurs after root and shoot requirements are met (Waring and Pitman, 1985), it is clear that the oldest trees have experienced vigorous growth over the last century. . . .

"Our results also indicate that old oak forests may be active carbon sinks to help reduce the buildup of anthropogenic carbon. Evidence of trees representing three species ≥1/2 maximum known age with accelerated growth lends justification for conservation of the many old, second growth forests in the eastern US landscape. From this data it would appear that growth of 120+ year- old trees will slow only if environmental conditions deteriorate significantly." (Pederson, N. *et al*. 2005; also see Pederson, N. *et al*. 2007) Further, William S. Keeton, of the University of Vermont, studied northern hardwood-conifer forests in the Adirondack Mountains of upstate NY: "Aboveground biomass was significantly ($p < 0.001$) different among mature (165 Mg/ha), mature w/remnants (177 Mg/ha), and old-growth (254 Mg/ha) sites. . . . Our results support the hypothesis that basal area (live and dead) and aboveground biomass can continue to accumulate very late into succession in northern hardwood-conifer forests. Empirical studies suggest there may be more variability in biomass development than predicted by theoretical models. If the data represent a trend of biomass additions in stands well over 300 years of age on some sites, a leveling off would have to occur later in stand development than previously predicted. This would have important implications for our understanding of both the quantity and temporal dynamics of carbon storage in old-growth forests. Forest management approaches emphasizing development of late-successional forest structure yield high levels of carbon storage, offering options for participation in cap and trade carbon markets." (Keeton, W.S. 2008)

"There is a growing body of evidence that forest ecosystems do not necessarily reach an equilibrium between assimilation and respiration, but can continue to accumulate carbon in living biomass, coarse woody debris, and soils, and therefore may act as net carbon sinks for long periods (12, 57–59)." (Keith, H. *et al*. 2009)

The above information must be fully and fairly considered and is further support for altering the proposal and implementing proforestation in the great majority of the Archer Knob project area.

The natural thinning process known to take place in forest stands as they age is occurring here, and that is good. Yet the agency implies that this process is bad and states that the proposal is needed here for "improving forest health." But the natural and expected processes that are occurring here are signs of a *healthy* forest. The agency's concerns about tree density appear short-sighted - there is a need to take a longer term perspective and let natural thinning proceed as the forest develops in age and and grows to its ecological potential.

Age-Classes - Ecological Legacy - Old forest

At present in much of the project area there is probably an **extreme disbalance in the distribution of age-class forest acres**. There are generally very little or zero acres represented in the 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, 351-360, 361-370, 371-380, 381-390, 391-400 years-old **age classes** (the scoping letter doesn't say). Individuals of the tree species found here are known to commonly attain such ages, when allowed.

Not mentioned in the SL is that there are ZERO stands (or exceedingly small amounts) in the above listed **older age classes - they are extremely under-represented**.

I'm guessing that this project proposes to cut hundreds of acres of 100+ forest. **The failure of the planners to disclose basic information as to the age of the stands proposed for cutting is utterly unreasonable and dismissive of public involvement.**

In addition, now the GWNF planners are labeling forests only 51 years old as "late-successional" (Potts Creek DEA). This can be yet another way to deceive the public and misrepresent the impacts of their management.

These old age classes are important components of forest diversity. And it does not appear that the FS is managing to maintain the diversity, abundance, and sustained yield of these age classes.

For "stands" said to be greater than 200 years old, they probably cover less than 1% of the GWNF; a similar paucity may go for the PA.

The scoping letter does not mention anything about this misbalanced situation regarding "age classes", except that more early successional is "needed".

To ignore and lump age classes is a way to misleadingly label this project area as somehow predominantly older and in need of artificially fabricated ESH.

As there are extremely few, if any, acres of the above-listed age classes here, much of this project area can be honestly described as "predominantly younger".

It is not reasonable to ignore a lot of age classes and lump them together (such as 110+ in the PC DEA) when discussing and analyzing "distribution" or "balanced age class" and the "need" to cut to attain it. Of note is the fact that maximum tree ages found thus far by independent researchers often far exceed those listed in the USDA Silvics manual (Pederson, N. 2007).

A site that has not been cut for 200, 250, 300, 350, 400, or 500 years is NOT the same as one that is 140 years old. Nor is a site 150 years old the same as one 100 years old. Conditions (such as amounts of woody debris or understory flora) are different as are communities. Who could even look at a 350-year old tree and think it to be the same in structure (or function) as one 150 years old of the same species on similar site conditions? Of course they are not the same.

And various research indicates that plant and animal communities are not the same at old sites as at younger sites. See, *e.g.*, Eastern Old Growth: Prospects for Rediscovery and Recovery, edited by Mary Byrd Davis 1996 Island Press, and Ecology and Recovery of Eastern Old-Growth Forests, edited Andrew Barton and William Keeton 2018 Island Press, and Matlack, G.R. and J.R. Schaub 2011 "Long-term persistence and spatial assortment of nonnative plant species in second-growth forests" Ecography 34: 649-658

(incorporated by reference). Niche complexity expands multi-dimensionally and thus these old forests provide for more organismal diversity or abundance.

And it may take centuries for plant species to colonize and populations to stabilize. See Honnay, O. *et al*. 2005.

The use of truncated and/or misleading age classes has little ecological basis, but instead is apparently based upon the concerns and convenience of timber management.

Mature forests are of the age that a mosaic of habitats is gaining expression due to the operant natural disturbance regime (Franklin, J. *et al*. 2002; Keeton, W.S. 2004). And still more such niche complexity (including canopy openings) can be expected to develop as mature forests develop into old growth (Dahir, S.E. and C.G. Lorimer 1996).

Habitat complexity generally increases as forests age (Franklin *et al*. 2002); three-dimensional niche complexity increases with age, thus providing extensive areas of **diverse types of habitat**. Amongst other benefits, this complexity provides refugia from predators (Finke and Denno 2006), a factor presumably of critical importance to a small somewhat defenseless forest omnivore, such as the Box Turtle (*Terrapene carolina*) for example. A body of research indicates that canopy gaps, herbaceous vegetation, mushrooms, invertebrate richness or abundance, snags, and large woody debris amounts are generally more abundant in older forest habitats (Whitney and Foster 1988, Meier *et al*. 1995, Greenberg and Forrest 2003, Van de Poll 2004, Ziegler 2004, Webster and Jenkins 2005, Keeton *et al*. 2007, Scheff 2014). For instance, the stand-initiation and stem-exclusion stages of seral development (*sensu* Oliver and Larson 1996) (*i.e*., early successional habitat with high density of saplings) is commonly characterized by a depauperate herbaceous layer (Halpern and Spies 1995, Roberts 2004).

LWD is of great importance in both aquatic and terrestrial ecosystems (Doloff, C.A. 1996, 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 (such as in the PA), 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). By removing the sources of this LWD, the proposal would exacerbate this degraded condition.

Amounts of large woody debris deposition are directly correlated with forest age (see Keeton, W.S. *et al*. 2007, Spetich, M. *et al*. 1999, and Hedman, C. *et al*. 1996). LWD amounts are naturally much higher in wild old growth forests than in the many relatively depauperate human-exploited areas that characterize our landscape (Hedman, C. *et al*. 1996, McMinn, J.W. and D.A. Crossley 1996, Spetich, M. *et al*. 1999, Webster, C.R. and M.A. Jenkins 2005, and Webster, C.R. *et al*. 2008).

Various mushroom species are important elements of the diets of various species, such as Wood and Box Turtles (Strang, C.A. 1983). Box Turtles can be important spore dispersers and thereby contribute to the maintenance of mycorrhizal networks and forest health/regeneration (Jones, S.C. *et al*. 2007). Macrofungal and myxomycete fungi richness was significantly positively correlated with log size and amounts of CWD at old age oak and mixed mesic forest study sites in Ohio (Rubino, D.L. and B.C. McCarthy 2003). Similarly, mushroom diversity and amounts were significantly positively correlated with old growth and amounts of LWD in New Hampshire (Van de Poll, R. 2005).

These older sites with large trees and complex canopies may harbor a great deal of diversity that is virtually unknown. The science of **canopy ecology** is very recent and we are just beginning to be aware of the incredible array of life that exists in forests way above our heads (see The Arbornaut: A life discovering the eighth continent in the trees above us, M. Lowman 2021). For instance, a recent study that took place in Kansas oak forest found 8 new species of Tardigrades (an entire phylum unto themselves). And it was just relatively recently that researchers found Green Salamanders (*Aneides aeneus*) living 75′ feet up in S. Carolina forests (Waldron and Humphries 2005). Who knows what arthropods, vertebrates, gastropods, lichens, bryophytes, epiphytes, tardigrades and more are living high in the overstay of the Archer Knob area? And what would be the effects of cutting their home out from under them? This is **significant uncertainty**.

Obviously, trees and other organisms die in nature, but naturally their bodies are not removed from the ecosystem — ***nothing*** **goes to waste**. Which is exactly the opposite of the current management regime impressed upon these ecosystems — the constant *removal* of the organisms (tree bodies) that would

otherwise be recycled into and enrich, sustain, and recompose the system. Plant and animal species and physical conditions may vary across the forest canopy, through the understory, shrub and herb layers, and all the way down to the forest floor and into the soil — horizontal and vertical diversity and complexity that is continually handed down over the ages.

In a naturally wild old forest it is the persistence of **ecological legacy** throughout the course of natural disturbances that promotes such resilient niche complexity and diversity of community composition and forest structure. Ecology is about legacies — that which happened, or didn't, in the past forms the contemporary context of the present system. Some things are here that shouldn't be and some things are missing that should be here (*e.g.*, lots of old trees).

Across most NF acreage (and private lands), the flowing natural successional and recompositional process has been and is constantly disrupted, suppressed, and manipulated by cutting forest sites at relatively young ages. **Proforestation counteracts this disruption, depletion, and impoverishment, this plundering of the legacy**. Instead of damaging their integrity by constantly removing components and suppressing development, existing forests would remain intact to grow to their ecological potential. And remember, such true forest "restoration" is also the most effective way to counter climate change.

The Forest Service should be taking the lead and setting an example by implementing this management here. And it has the discretion to do so.

Old Age Stands - Old Growth

The scoping letter does not disclose how much of the PA is ≥130 years old. Or how much of the PA is ≥120 years old (minimum ages for old growth for different forest types [USFS 1997]).

Some of the sites proposed for logging in the project area may well meet any valid criteria for being labeled "old growth". There may be also other sites on the forest that that are not considered old age, but that are nonetheless old

growth (due, for example, to the failure to properly identify and age the oldest trees in a tract).

I have had a great deal of experience with FS failures to properly identify old growth (such as at the Hematite, Hoover Creek, Sugar Tree, and Mulligan timber sale sites on the GWNF). I certainly hope that this does not occur again here.

Of note, is that the youngest cutting unit at the Potts Creek PA (a stand said to be only 86 years of age) contained a tract of old growth.

This forest at the PA can "regenerate" without your heavy-handed treatments. For proof of this, I suggest you look at the tracts of old growth that are existent in/nearby the project area; such as at Frozen Knob and Peters Mountain.

Those forests are exemplars of : "Some types of temperate moist forests that have had limited influence by human activities can be multiaged and do not necessarily consist exclusively of old trees, but often have a complex multiaged structure of multiple layers produced by regeneration from natural disturbances and individual tree gaps in the canopy (53)." (Zhou, G. *et al*. 2006 Old-growth forests can accumulate carbon in soils. *Science* 314:1417.)

Removing or degrading old-age sites is not reasonable "restoration", nor is it "climate-smart" or necessary in order to satisfy local markets. These old sites need to be allowed to continue to maintain and enhance their development and complexity through natural regeneration processes. At the very least, these sites must not be subjected to proposed heavy-handed human disturbance (*e.g.*, vegetation management such as thinning, regeneration, openings; dozer lines; road construction; unnecessary burning). It is reasonable and easily feasible to leave old age and old growth sites out of the heavy-handed "restoration" proposed; in that way natural processes and proforestation can restore forest health on the PA.

A clear **Alternative** that must be developed in detail and fully and fairly assessed is one that focuses on and **only cuts the younger sites to fabricate esh** and NOT all the other proposed logging.

Associated with this is the issue: what are the old-forest-associated focal species here? I am concerned about the impacts to viability of the **Cerulean**

Warbler and other interior forest birds and Bat species (such as Indiana, Northern Long-eared, Small-footed).

In the older/mature sites, they are of the age that natural thinning and canopy disturbances have occurred/are occurring. They are turning into compositionally mixed stands with LWD loadings and broken canopies - allowing a diversity of ground-level light intensities and multi-species communities. The mosaic of habitats and niche complexity will increase as the stands grow older still.

Forest structural diversity

There may be a case here at some localized sites for using SCE. I am here referring to **silvicultural techniques that fall under the broad rubric of "structural complexity enhancement" (SCE)** (Keeton 2006, Scheff 2014). Typical objectives of SCE include vertically differentiated canopies, elevated large snag and LWD volumes and densities, variable horizontal density (including canopy gaps), and re-allocation of tree basal area to larger diameter classes (Keeton 2006). Intensive logging, such as typical even-age harvest methods, generally simplify on-site structural diversity, reduce litter and woody debris, and alter soil structure and microclimate regimes (Chen *et al*. 1999, Zheng *et al*. 2000, Webster and Jenkins 2005, Todd and Andrews 2008). SCE, however, could accelerate the development of important older forest characteristics while allowing for an economic return (Keeton and Troy 2006). Mimicking gap-scale natural disturbance in a limited and targeted manner can fall within the range of disturbance intensities consistent with developing and maintaining old-growth structure while assisting in the regeneration and recruitment of oaks and other shade intermediate-tolerant species (Scheff 2014).

Of course, it is not just the availability of artificial openings fabricated by logging that determines whether oaks can reestablish and sustain themselves at sites in a forest (Rentch *et al*. 2003a, McEwan and Muller 2006, McEwan *et al*. 2010). Where perpetuation of a substantial oak component is a concern, oak recruitment can be facilitated by locating individual selection (or small group selection harvests) in forest patches with ample advanced oak regeneration. Oak seedlings can grow and out-compete other species in

small gaps or even under canopy (Beckage 2000, Clinton 2003, Iffrig *et al.* 2008); for example, Rentch and colleagues (2003b) found **oaks were able to establish and persist in gaps < 200m^2 in area.**

Recreational experiences, opportunities, and attributes - primitive and semi-primitive

GWNF Plan — Theme 4 ***T4.1 Diversity of Opportunities and Settings***

"As the largest National Forest east of the Mississippi River, the GWNF" does NOT currently provide an officially "primitive" recreational experience, setting, and opportunity. If not here, in the East's largest NF, where will the USFS provide this ?

The closest we get on the GWNF and this project area is a SPNM experience, setting, and opportunity. These are in short supply in the East and this region; this project area can be improved to supply it.

"How are management actions maintaining or improving Desired Conditions for settings and opportunities provided by the NFS unit" (LRMP 5-14)

They are NOT if this project were implemented. These needed improvements would occur by implementing the above recommended actions; *viz*., proforestation, PWA and/or IRA designations, management under 12D/4D MPs, road decommissioning.

Wildlife habitat

Implementation of logging and road building in the project area would foreseeably reduce **Black Bear** habitat quality and security.

Implementation of logging and road building in the project area would foreseeably facilitate even more ATV trespass and poaching.

Implementation of logging and road building in the project area would foreseeably reduce **Ovenbird** habitat quality and security; and that of other mature interior forest taxa.

Of significant concern is the potential to destroy and/or degrade **Cerulean Warbler** habitat here. This must be avoided; otherwise, population viability and distribution on the Forest and project area could be significantly impacted.

Implementation of logging and road building and burning in the project area would foreseeably r**educe Box Turtle and salamander habitat quality and security and population viability and distribution**; and that of other slow site-sensitive interior forest taxa (such as invertebrates like snails and slugs and millipedes).

The current proxy MIS used on the Forest are extremely deficient and inadequate for honestly and sufficiently gauging impacts to them.

Site-specific analysis must makeup for this insufficiency.

There may be TES plants around here - *e.g.*, VA Least Trillium (it is known in the Elliot Knob VMT). Various of these are sensitive to Deer browsing and habitat changes wrought by "active management". The Plains Frostweed at Scott Hollow Barrens SBA is "threatened by competition from non-native invasive species" (DNH Wilson 2000).

The FS must implement no new Invasive species' pathways and facilitation here.

If it can honestly be established that esh must be artificially increased here, then recut areas <35 years old - "the age of 40 years old as the beginning of significant hard mast production in eastern hardwood forests is widely accepted." (FEIS 3-124)

This also involves alternative development.

ALL the natural esh resulting from natural disturbances and all that is existent on nearby private lands must be fully and fairly quantified and evaluated.

Where TESLR species (such as the Indiana Bat, Northern Long-eared Bat, and Small-footed Bat) may be harmed by activities, these activities should

be avoided in areas with TESLR habitat or known occurrences of TESLR species. Adequate mitigation measures must be established.

The FS must conduct thorough surveys for and analysis of TESLR species. Many TESLR species on the GWNF require special techniques for detection or are not easily observed at certain times of the day or times of the year. Appropriate surveying techniques should be utilized and these should be utilized at appropriate times of the year and times of the day. Persons with the requisite training for identification of TESLR species likely to be found in the area should conduct the surveys. An adequate amount of time should be spent in the field conducting surveys. The same applies for special habitats such as seeps.

Without establishing whether bat roost trees and maternity trees actually exist in the project area, the FS cannot reasonably find that incidental take limits are not being exceeded.

There's another sick little joke: daytime visual "surveys" for bats.

Seeps and other riparian areas are constantly being degraded by FS activities on the GWNF. The buffer zones applied are jokes (except they are not funny).

All riparian areas should be protected by at least 300' buffer zones. There are numerous scientific studies that document this need; the issues involved are far more than just sedimentation into streams.

See: David I. King, Curtis R. Griffin, and Richard Degraff, "Effects of Clearcutting on Habitat Use and Reproductive Success of the Ovenbird in Forested Landscapes," *Conservation Biology* 10, no. 5 (October 1996): 1380-1386.

Noss, R.F. 1991. Effects of edge and internal patchiness on avian habitat use in an old-growth Florida hammock. Natural Areas Journal 11: 34-47.

Birds - fragmentation - edge effects

Some examples of species of concern in the PA; these studies/research are relevant to this area.

For **Ovenbirds**, a "ubiquitous distribution of roads through forested areas potentially represents a significant cumulative reduction in abundance of the species (Rich et al. 1994). **If edge effects extend 150 m from roads and other human-made openings, 40% of the forested area in the northern half of the GMNF may represent lower-quality habitat for Ovenbirds.** Roads themselves account for more than 50% of the edge area in the region. . . . diminished productivity would limit the forest's capacity to function as a population source for forest fragments outside the GMNF that are population sinks (Pulliam 1988). As private lands become increasingly susceptible to subdivision and development, public lands such as the Green Mountain National Forest will become more important sources of contiguous forest habitat needed to sustain populations of forest-interior species (Askins 1994). Our study suggests that even narrow forest roads should be viewed as sources of habitat fragmentation that exert negative effects on the quality of habitat for forest- interior species such as the Ovenbird." (Ortega, Y.K. and D.E. Capen 1999) (emphasis added)

As regards **Cerulean Warblers**: "High rates of predation and brood parasitism often accompany habitat loss and fragmentation, especially in forested landscapes interspersed with agricultural lands and grasslands (Hoover and Brittingham 1993, p. 234; Brittingham and Temple 1983, pp. 31–34; Faaborg et al. in Martin and Finch 1995, p. 361). . . .

"Studies on cerulean warblers have concluded that increased distance from edge was a significant positive predictor of cerulean warbler territory density (Bosworth 2003, p. 21; Weakland and Wood 2002, p. 505). The reason for decreased cerulean warbler density near edges is not known, but may be a result of lower availability of suitable or optimal habitat near edges, or edge habitat avoidance, possibly as a result of increased predation pressure or other factors. The effects of fragmentation are likely to be context-dependent, where increasingly fragmented landscapes lead to decreased reproductive success due to increased predation and brood parasitism (Donovan et al. 1995, p. 1393). Specifically, Donovan et al. (1995) found that nest failures of three forest- nesting, neotropical migrants (ovenbird (*Seiurus aurocapillus*), red- eyed vireo (*Vireo olivaceus*), and wood thrush (*Hylocichla mustelina*)), were significantly higher in fragmented forests than in contiguous forests." (USFWS 2006)

Reduction of "interior forest" results not just from the loss at a site that is directly altered. The deleterious effects of the proposal extend far beyond the sites of actual cutting or road building. Confining the analysis of impacts to Ovenbirds nesting habitat just to "the number of acres cut" is not sufficient as current scientific knowledge recognizes a potential 600-meter edge effect for bird populations (see "Roadside Surveys: Changes in Forest Composition and Avian Communities with Distance from Roads" by P. Leimgruber, W.J. McShea, and G.D. Schnell [submitted to FS], and Wilcove, D.S. *et al*. 1986, 1987). This edge effect extends into the surrounding extant forest from roads and cutting sites. Edge avoidance is exhibited by various species, including Ovenbirds (Villard, M.-A. *et al*. 1998).

T**here must be some analysis, estimation, and disclosure of current population numbers and distribution** for Ovenbirds, Scarlet Tanagers, Red-eyed Vireos, Wood Thrush, Worm-eating Warblers, and/or whatever species are used to gauge impacts to forest interior habitat conditions and **area sensitive and remote habitat species**.

In addition to "interior" species, of concern are the **direct, indirect, and cumulative impacts of Forest management activities upon area-sensitive and "remote" species (*e.g.*, Least Weasel, Northern Saw-whet Owl, Black- billed Cuckoo, Swainsons Warbler, Cerulean Warbler, Timber Rattlesnake, Jefferson Salamander, Scarlet Tanager, and Black-throated Blue Warbler).**

Box Turtles

Box Turtles (*Terrapene carolina*) are significant components of the Forest's diversity and communities (NFMA). Does the Forest Service have the most basic baseline population/demographic/distribution inventory information about the Turtles here? Does the Forest Service have the most basic monitoring information about the Turtles here?

And **the present MIS are totally inadequate proxies for gauging impacts to the Box Turtle populations here**.

There is much suitable Box Turtle habitat throughout the PA. Box Turtles (BT) definitely occur in the PA (I have observed them). Box Turtles may be (and have been) directly, indirectly, or cumulatively negatively impacted by project implementation, through such harms as direct deaths or injuries and habitat degradation, alteration, or reduction.

The Turtles are every bit as important as any so-called "demand species". **The vast majority of Americans (95%) are not hunters**.

Burning of BT habitat should be avoided. The direct mortality from the extensive burning proposed could be immense and of significant harm to population viability on the PA.

The effects of fire on this species are not clearly understood. Obviously, here could be immediate burn/post-burn mortality. But there could also be injuries and delayed mortality. See Howey and Roosenburg 2014.

Even if burning and other forest management practices were confined to periods of the Turtle's winter dormancy (Roe and Bayles 2021), they could still be run over, crushed by trees, and mortally disturbed. They are not very far under the litter and humus when hibernating. And the burns and other treatments would still not only alter/degrade habitat, that could also alter the Turtles' behavior and habitat selection with resultant decreases in body condition and/or decreased fitness. Having to move more to find intact habitat (food and cover) places them in more exposure to predation.

The FS has stated that "open woodlands, when maintained by fire, may create permanent habitat for demand species" (Potts Creek DEA) But <u>not a peep about harm to non-"demand" species such as the Box Turtle</u>.

For the same reasons outlined above, in addition to not burning their habitat, **the FS should refrain from logging mid-successional, mature, and old-age forest in the area.**

Habitat area, quality, and connectivity are obvious factors of importance for population viability. But there is some uncertainty as to what precisely constitutes habitat quality for Box Turtles. **Though certainly deciduous, mixed, or coniferous forests with a diversity of understory vegetation (**leaf litter, herbaceous forbs & ferns & grasses, and fruit-bearing shrubs are used for cover, thermo- and osmo-regulation, and foraging)**, streams or nearby wetlands, and canopy gaps are good** (Dodd 2001**,** Weiss 2009, Wilson 2012, Williamson 2013, Laarman 2017). "Leaf litter contains

numerous invertebrate food sources for box turtles, retains moisture, and remains relatively cooler than the surface temperature, which could explain why turtles are found on or near leaf litter." (Weiss 2009) Canopy gaps (which have fine-scale ecotones/edges and esh) are used for feeding and thermoregulation (Stickel 1950, Madden 1975, Dodd 2001, Fredericksen 2014). **Forests with maples were favored at the Allee site in Indiana (**Williams and Parker 1987). Home ranges are generally small (*ca*. 2-25ha) and Turtles exhibit site fidelity/philopatry (Stickel 1950, Stickel 1989, Dodd 2001, Baker 2009, Currylow *et al*. 2012, Cross 2016).

As omnivores, they use a wide variety of foods (Ernst and Lovich 2009, Krichbaum pers. obs.). Turtle habitat use may be in response to the fine-scale presence or abundances of litter invertebrates, fungi, or herbs that are distributed non-randomly in the forest (Meier *et al*. 1995, Caldwell 1996, Hanula 1996, Hutchinson *et al*. 1999, Rubino and McCarthy 2003, Van de Poll 2004, Kappes 2006, Gilliam 2007).

On top of uncertainty about what constitutes habitat quality, there is uncertainty about functional connectivity because it adds uncertainty about dispersal distances and behavior and facilitating genetic exchange, and colonization over the long term.

Upland openings suitable for nesting sites are another factor (these can be anthropogenic openings). Occupancy of these can be expected to peak in late May and June and early July. "Land managers should be aware neonates reside in or very near their natal openings for several months after nest emergence." (Laarman 2017) Use of openings and ecotones can be a function of microhabitat preferences pertaining to thermo- and osmoregulation regulation and relative humidity (Penick *et al*. 2001, Rossell *et al*. 2006, Currylow *et al*. 2012, Cross 2016).

In general, high-quality habitats for Box Turtles have low human impact.

These PA area Box Turtle populations need all the help we can give them.

If the FS wants to protect Box Turtles in the project area a good start would be improving/enhancing the PA by diverting vehicles and logging equipment away from those areas of Turtle habitat and restoring/enhancing the areas by allowing these sites to developmentally advance into heterogeneous patches of old-growth forest (the background of the Turtle's evolutionary history).

The agency's proposed "restoration" must be maintained/accomplished with more make-work projects, *i.e.*, repeated/perpetual burning and cutting (stand improvement, thinning, etc.). This burning of places over and over and over will foreseeably slaughter untold numbers of slow and small vertebrates and invertebrates who are unfortunate enough to have to "share" this planet with us. Burning and cutting Box Turtle sites/habitat also may foreseeably result in significant damage or degradation or death to Turtle habitat, populations, and/or individuals, thereby significantly impacting viability and distribution on the Forest. This destructive scenario is proposed in large sections of the project area; of particular concern is the relatively intact VMT areas.

The potential for significant impacts (direct, indirect, cumulative) to the population viability of Box Turtles here is foreseeable.

The FS must obtain information on population sizes, monitoring and inventory data for this species on the GWNF AK PA, estimate mortality related to this proposal should it be implemented, and assess amounts of habitat degraded or destroyed and the affects of all this on Box Turtle distribution and viability. For the agency to make a valid determination of "no significant impact" to this species it must have this fundamental information and viability analyses. And the current MIS are inadequate proxies for the Box Turtle.

I am concerned about the significant uncertainty involving basic demographic and monitoring information on the Box Turtle and other wildlife populations on the Forest and at this specific site. I am concerned that relevant population and monitoring data are lacking or absent. Aside from the uncertainty involved, there is also significant controversy as to the impacts and desirability of intentionally logging and burning Box Turtle habitat and populations.

Cumulative impacts to the Box Turtle's viability/distribution/dispersal on the Forest are another particular concern as these proposed AK working areas are not the only place the Forest Service is (or proposing to) degrading or destroying or fragmenting suitable habitat, and perhaps directly killing Turtles - and has done this in the past as well. Cumulative impacts from the roads on the Forest and their associated traffic and predators are also a concern. And the FS intends to continue various treatments in the project area in the future.

The Box Turtle, as with most turtle species, possesses life history traits that make populations especially vulnerable and sensitive to increased human-caused loss and mortality: slow growth, late maturity, high natural mortality of eggs and hatchlings (such as from predators), high survival of adults, long lives, and low reproductive potential (Gibbs and Amato 2000, Heppell *et al*. 2000). After reaching maturity, turtles must then survive and reproduce for decades more just to replace themselves (the "feasible demography" of Seigel 2005; Congdon *et al*. 1993 & 1994). There is no apparent "density dependent" response operant (Congdon *et al*. 1993); *i.e*., at low population levels there is no compensatory increase in birth rate or hatchling survival. In fact, just the opposite (reduced birth rates) can reasonably be expected to occur, due to such factors as difficulty in finding mates (Belzer and Seibert 2009), *i.e*., an Allee effect producing further reductions in population size. It is essential that conservation practitioners not address these multiple/synergistic stressors to population viability individually in isolation (Crawford *et al*. 2014).

Currylow and colleagues (2013), who studied Box Turtle ecology in Indiana, had this to say: "Other evidence suggests that box turtles are sensitive to environmental disturbances that affect local habitat features (Currylow 2011, Dodd 2001). Therefore, **annual losses of a relatively small proportion of adults may result in a gradual decline toward local extirpation** (Belzer 2002, Doroff and Keith 1990)." [emphasis added]

In addition to the concerns discussed herein about the proposed logging, burning, and road building, the FS planners must also adequately and fairly evaluate **the direct, indirect, and cumulative effects of biocide applications upon Forest diversity, sustainability, populations, and communities.** I am particularly concerned about impacts to amphibians and reptiles. See, *e.g*., Relyea, R.A. 2005 and Relyea, R.A. 2006. Immunosuppressive effects of low-level exposure to organochlorines have been implicated in pathologies observed in Eastern Box Turtles (Tangredi, B.P. and R.H. Evans. 1997).

Cumulative impacts of biocides are a significant concern. See, *e.g*., Relyea, R.A. 2008. **Indirect effects (*e.g*., the initiation of deleterious trophic cascades)** are also a significant concern. See, *e.g*., Relyea, R.A. and N. Diecks 2008.

Many of the issues, concerns, argument, research, and evidence with regard to Box Turtles pertain as well to salamanders.

ESH - Existing conditions on the project area - Natural disturbances

What population monitoring data for esh-dependent taxa within the project area are there? There's usually just some Forest-wide or county-wide data. The **evidence in support of the "need" to fabricate more esh is not disclosed**; a programmatic non-site-specific "desire" is not evidence in support of a well-reasoned site-specific decision. MA 13 is a "wildlife management" area ("Mosaics of habitat") so wildlife should be the driving force here.

If this agency can scientifically and logically establish that there is not enough esh in this project area (including that occurring from natural disturbance processes) and that more is needed in order to "restore" it, then **develop and completely analyse an alternative that turns already existing early- and mid-successional stands (*a significant* % of the project area) into new esh**. The FS admits these early seral sites "provide minimal benefits in regards to herbaceous undergrowth and bugging areas for wildlife." (Jefferson NF FEIS 3 - 108)). See Reynolds-Hogland, M. *et al*. 2006 for such a recutting proposal and the science behind it. Such an alternative complies with the NFMA and MUSY.

Of concern are the impacts from the currently proposed massive loss of habitat for **interior forest birds** and those associated with older forest. The FS must take a full and fair hard look at the ESH issue here. See "Forest-clearing to create early successional habitats: Questionable benefits, significant costs" (M.J. Kellett *et al*. 2023).

A major problem with this proposal is that the FS does not properly consider the contribution of natural processes to maintaining wildlife habitat, such as "early successional habitat", on the project area. See SL — the "current ESH" is just the acreage of artificial ESH fabricated by human logging operations. So, this misleading and inadequate information does not make it clear that this area is ecologically departed or needs more logging to fabricate ESH.

The FS planners apparently do not properly consider and analyse natural esh patches, including those under two acres in size (the scale of many canopy gaps) (there is no mention of this in the SL). As a consequence, the GWNF managers use an invalid "need" to fabricate such habitat as a rationale for cutting down valuable and important mature and old-age forest habitat. Until this natural e.s.habitat is fully and fairly considered and assessed this proposal does not have a valid foundation.

The fact that the FS managers/planners might not formally inventory or monitor this habitat or for some reason does not like its floristic composition does not alter the reality of its *de facto* existence on the ground. It must be fully and fairly estimated and assessed and properly considered.

A full and accurate appraisal of the "existing conditions" is the *sine qua non* of informed decision-making and honest public disclosure of impacts and rationale.

Fire and other natural disturbances have not been excluded from ecosystems here. There were and continue to be natural disturbances operant on the PA landscape. And anyway, fire is not the only disturbance that might promote oak-hickory regeneration. Disturbances include not just fire, but also drought, insect outbreaks, windthrow, etc. It almost seems as if the FS would have the public believe that the PA lands on the GWNF have not/do not experienced such periodic disturbance.

The truth is that our 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 strikes and resultant fire, insect outbreaks (including gypsy moths), tree senescence, windthrow, Beaver, drought, flooding, and other small-scale natural disturbances (Braun, E. 1950, Rentch, J. 2006). Does the agency have some evidence that these factors do not operate in the project area? A disturbance regime of small-scale, within-stand gap processes dominated the natural forests in this region (Rentch, J. 2006, Runkle, J. 1985, 1991). Further, it is critical to consider that intensive **logging operations not only significantly directly alter habitat conditions, but in addition they interfere with, impede, truncate, and/or prevent the expression of the natural disturbance regime**. Something that one would not want to do if actual "restoration" was the goal.

The simple fact is, natural disturbances small and large are constantly happening somewhere throughout the Forest, forming a shifting mosaic of habitats (see Shugart, H. and D. West 1981, and Harris, L. *et al*. 1996). With the sporadic nature of natural disturbances (see, e.g., JNF FEIS 3-107, 109), early successional habitat is naturally patchy or spotty and species are adapted to this. Though episodic, natural canopy gaps are a regular occurrence here, their rates vary depending on the scale of natural disturbance events in a particular year and the forest type studied.

On the George Washington NF 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); a similar situation can be expected here on the AK PA. **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 a project area may have natural esh conditions.**

There is every reason to believe that this is the case on the DC PA. This must be fully and fairly considered and analyzed for well-reasoned decision-making here. The need to fabricate more is not apparent.

What is the fire history here? It's been estimated that around 90% of Eastern fires are from human ignitions, and they certainly did not disappear from the landscape. Because of this fact, it can be perceived that there have been *too many* fires on the landscape.

In the interests of accountability, reason, science, sustainability, and forest health, the agency must accomplish the full survey, estimate, analysis and consideration of the contribution of naturally occurring ESH in the project area (at least down to 200m^2 in size) to sustaining wildlife populations. The FS must clearly and thoroughly disclose supporting site-specific rationale and data for assertions that various amounts of ESH must be artificially fabricated at this project area.

Further, the agency must fully and fairly **consider (amounts, distribution, and condition) and analyze the ESH on private lands (*e.g.*, woodlots, agricultural sites and places such as power line corridors) near or within the project area** here and its contributions to sustaining wildlife populations in the project area.

By refusing to acknowledge, tabulate, and analyse all the natural esh in gaps and at edges the public would be misled and the FS would be using a flawed basis of decision making. The so-called "purpose and need" for this project would be biased and inadequate and illegal under NEPA.

Impacts to/from White-tailed Deer

The proposed regeneration logging and other "vegetative manipulation" would **predictably inflate populations White-tailed Deer** (*Odiocoileus virginiana*) in the project area by fabricating/supplying more browse. Even-age logging causes increases in the level of Deer that browse on forest understories (Redding, J. 1995; US Forest Service 2000).

There is a good reason for not wanting to draw focus to the Deer issue: Who could possibly think there is a shortage of Deer? **There is probably already a very high density of Deer on the Forest and surrounding area — what is it estimated, ≥ 30/square mile? The SL does not disclose the density here at the PA.** For instance, in Virginia, the White-tailed Deer population has increased 400% since 1968, and Virginia's human population has increased 61% (Donaldson, B. 2005).

There are already excessive Deer numbers as regards forest or ecological health. For instance, Deer populations such as are found at the current density on the Forest are considered harmful by Maryland state biologists and others; see, *e.g.*, 15-20/sq. mi. in Marquis, D.A. and M.J. Twery 1992. The Maryland DCR publication states that more than 20 per sq. mi. are an ecological problem.

Deer are the most dangerous wild animal to human safety (vehicle collisions) in the country (Donaldson, B. 2005). High Deer populations harm flora and fauna, including rare species (*e.g.*, sensitive plants and ground-nesting birds) (see, *e.g.*, Jefferson NF FEIS 3 – 137, references). High Deer densities also reduce tree seedlings such as regenerating oaks. Implementation of the proposal would foreseeably exacerbate these undesirable harms.

Inflating the populations of this species (in the absence of its natural predators such as Cougars and Wolves) that will have detrimental impacts to flora and fauna (see various papers by T.P. Rooney, W.J. McShea, S.D. Cote and others)

does not facilitate the restoration of the PA, it impedes it; harming forest health and resiliency.

This issue regarding Deer impacts must be fully and fairly considered, assessed, and disclosed in the DEA/DEIS for the project.

What effect this sale will have on the existing Deer herd is an issue/concern here. The effect is well known and obvious. Deer respond positively to actions such as the this proposal that fragment forests and fabricate edge. Deer habitat would increase here from the proposed action, resulting in a numerical and/or functional response by the species.

The effect on the herd here from habitat alterations must be analyzed and disclosed. More Deer can be expected to be attracted to the area due to the increase in favorable conditions. With increased habitat and food, ultimately more Deer can be expected.

And the analysis also must disclose the effect on the other flora & fauna FROM the Deer herd and from the fabrication of conditions favorable to increasing their numbers or density here. "[W]hitetailed deer have reached and sustained densities across much of the eastern, northern, and southern United States sufficient to cause manifold and substantial ecological impacts." (see "The white-tailed deer: a keystone herbivore",1997, D.M. Waller and W.S. Alverson, Wildlife Society Bulletin 25(2):217-226; incorporated by reference). Deer's deleterious effects upon herbaceous ground flora are well documented. See "Impacts of white-tailed deer on endangered plants",1992, S.G. Miller, S.P. Bratton, and J. Hadidian, Natural Areas Journal 12:67-74; "Patterns of plant diversity in overbrowsed primary and mature secondary hemlock-northern hardwood forest stands",1997, T.P. Rooney and W.J. Dress, Journal of the Torrey Botanical Society 124(1):43-51; "Species loss over sixty-six years in the ground-layer vegetation of Heart's Content, an old-growth forest in Pennsylvaia, USA",1997, T.P. Rooney and W.J. Dress, Natural Areas Journal 17(4):297-305.

The effects of the Deer herd are not limited to plants; see "Herbivores and the ecology of forest understory birds",1997, W. McShea in The Science of Overabundance, McShea, Underwood, and Rappole, editors.

It is time for the GWNF planners to step off the Deer-Browse Treadmill. The planned massive artificial increase in ESH will mean a massive increase in browse available to W-t Deer. Subsequently, there will be numerical and/or

functional responses to increased browse. The Deer will foreseeably impact sensitive plant species directly, and impact other animal species indirectly by reducing their food and cover. Not unlike when domestic cattle (alien invasive species) eat herbaceous plants that would otherwise be available to Desert Tortoises. Inflated Deer densities are known to be a big problem, diminishing biodiversity and ecological health and resilience. In response to the increased browse pressure, the agency will then use the need to reduce browse pressure as a rationale for more timber sales to provide more areas of increased browse to decrease the pressure elsewhere in the Forest. And then the increased amounts of browse will result in more Deer, and then more browse will have to be provided to reduce the pressure, and on and on we go on the treadmill *ad nauseam*.

Enough already.

Aquatic Impacts

I am concerned about the impacts to **stream populations** of sensitive fish, crustaceans, mussels, and mollusks and other biota that would occur if the proposed logging, roading, and burning were implemented.

There is no mention of augmenting/providing instream habitat (*e.g.*, LWD).

It is also not at all clear what **impacts to "priority watersheds"** or other identified aquatic habitat the agency expects or how they would be prevented or mitigated. The SL says nothing about this, nor does it disclose if any sites are "at risk" either biologically or in watershed condition. We are concerned about the impacts to watersheds that would occur if the proposed logging, roading, and burning were implemented. Fabricating more sources of sediment to at risk streams or priority watersheds is a particularly bad idea.

Cutting operations are proposed beside Wild Trout streams (see SL map). This is unreasonable and unnecessary and needs to be dropped.

Use of large watersheds (much of which occur outside the project area) as an analysis area (*e.g.*, claiming that some amount of sediment deposition is only a small percentage of the deposition occurring in the overall watershed) is a circumlocution that does not sufficiently analyze the site-specific impacts.

Using this expediency is actually is outside the scope of the project area.

To improve watershed condition, **management must address entire watersheds within the project area (at multiple scales/orders), not just riparian areas** (and associated narrow stream buffers). The Forest Service is supposed to be engaged with "ecosystem management"; for planning purposes this entails the use of ecological units at scales that incorporate watersheds (Grumbine, R.E. 1990 & 1994; Noss, R. 1999). The paradigms of landscape ecology must also serve as a foundation for effective conservation (Harris, L.D. *et al*. 1996).

This expanded consideration is necessitated not just by concerns for human drinking water quality, but also by other significant ecological concerns as well (Saab, V. 1999). See, for example, Angermeier (1995): Faced with poor understanding of the mechanisms of extirpation and even of the identity of vulnerable species, "the most reasonable approach to conserving aquatic species may be to maintain the ecological integrity of entire watersheds and drainages".

For another example: "Our data suggest that in small stream ecosystems, a simple buffer zone of forested habitat is insufficient to maintain the stream conditions that support high salamander abundances. Instead, we found that salamander abundance was most closely related to the amount and type of disturbed habitat within the entire watershed." (Willson J.D. and M.E. Dorcas 2003)

Wildlife and habitat - TESLR species

Small creatures such as salamanders, skinks, turtles, and invertebrates with limited mobility (and avoidance ability) can be very sensitive to on-site disturbances such as roads and timber operations and fires (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). It may take many decades (*i.e.*, long-term impacts) for their populations to recover once reduced by human disturbances such as logging (Petranka, J.W. *et al*. 1993; Hoymack, J.A. and C.A. Haas 2009). Their size, physiologies, and behaviors 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).

So the large, mobile, and/or generalist indicator species (*e.g.*, 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 to site-sensitive snake, salamander, or turtle populations.

I am concerned about the populations of reptiles, such as Box Turtles and Worm & Earth Snakes and Timber Rattlesnakes and Coal Skinks, and amphibians, such as Plethodontid and Ambystomatid salamanders, on the AK PA. The proposed cutting and burning may significantly harm their populations directly (mortality from implementation of proposed "treatments") and indirectly (destruction and degradation of biotic and abiotic habitat). These herpetofauna are very sensitive to actions such as proposed for the PA — they cannot run away or fly away from harm, nor do they produce massive amounts of offspring (such as do some invertebrates and fish). The MIS used in the EAs are inadequate for properly gauging impacts to them. I am deeply concerned about the maintenance of their distribution and viable populations on the PA and the GWNF.

What are the effects on soil build-up and mycorhyzæ of the proposed management activities? What are the impacts on litter detritivores and ground-floor invertebrates and micro-organisms? How is nutrient recycling effected? What are the subsequent cascading ecological impacts (*e.g.*, effects of cutting/burning and other ground disturbance on ant populations - important seed dispersers - and thus upon flora and other fauna)?

What site-specific wildlife population data (such as population monitoring data & inventories for focal species) do you have that validate the claimed "need" for these proposed actions to supposedly benefit "early successional species" and other taxa ? This fundamental basis for the project's rationale must be clearly and fully disclosed.

The reduction of late seral stage habitat resulting from implementation pf the proposal is NOT "short term". The cut-over areas, particularly those subjected to coppice with reserves logging, would not return to late seral stage for at least 80 years. This is not short-term or insignificant.

The EA/EIS must disclose meaningful documentation and consideration regarding site-specific consideration of specific "Locally Rare" and “Sensitive” and TE species.

What are the “species of conservation concern” and other “At-risk species” that may occur here? Impacts to them from the ground disturbing activities are, of course, a significant issue.

Locally Rare species are a significant element of the Forest’s diversity. As they are “Locally Rare” (or “Sensitive” or TE), there is an obvious concern for their viability on this Forest. Impacts to Locally Rare and Sensitive species, such as the Cerulean Warbler, are a relevant issue and concern for this proposal; their proper consideration is essential for a well-informed well-reasoned decision.

It is vital that the locations of TESLR species be identified at the project area, and these locations strictly protected. Because of their rarity TESLR species have limited distributions and cannot be assumed to occur at wherever there is suitable habitat. It is to be expected that a species of concern such as Ginseng or Indiana Bat or Cerulean Warbler or Allegheny Woodrat or Worm Snake or Earth Snake or Timber Rattlesnake or Ginseng or Golden Seal may survive at only a few, or even a single, site(s) in a relatively large project area. So, to maintain their present distribution and viability (NFMA) such sites need to be precisely identified and fully protected. Otherwise, the population may be significantly harmed, both directly and indirectly, by the intense disturbance from logging/burning operations.

Implementation of this proposal can negatively various taxa in significant ways, *e.g.*, making for reduced habitat security and quality - more/easier access and poaching/collection pressure. This issue must be thoroughly vetted.

Implementation of this proposal would result in more harmful forest perforation and habitat fragmentation and deleterious edge effects. This

decreases habitat quality and quantity for various taxa, such as salamanders and herbaceous plants.

I am concerned about significant impacts of project implementation upon sensitive habitats and populations (their viability and distribution), such as seeps, rocky areas/outcrops, ephemeral ponds, steep slopes, mesic drainages, riparian areas, **salamanders, small snakes, Timber Rattlesnakes, Box Turtles, Allegheny Wood Rat, Indiana Bats, Northern Long-eared and Small-footed Bats**, rare/sensitive mussels and gastropods, TESLR species, cove hardwood tracts, northern hardwood tracts, and herbaceous understory plants.

The Forest Service may not be harming "critical habitat" for the species or be jeopardizing the "continued existence" of the species overall, yet its viability on this particular Forest may still be jeopardized. NFMA requires that viability be maintained on this particular planning area, not just somewhere on the species entire range. It is this NFMA mandated viability and distribution on this particular Forest and project area that the agency is not ensuring in this decision.

The agency's failure to fully and fairly consider, analyse and disclose the proposal's potential impacts to these species is a violation of NEPA and the APA. A failure by the agency to fully and fairly consider impacts to these species does not ensure protection of the Forest's diversity and does not ensure these species' viability and distribution on the Forest, violations of the NFMA.

Alternatives need to be fully developed that at least avoid direct impacts to these sites and taxa/populations. Implementation of the proposal (as currently configured) has the potential to significantly impact population viability for these taxa.

Minimum 300 feet no cutting/vehicle buffers for perennial streams/springs/seeps and rocky outcrops, 250 feet for intermittent, and 200 feet for channeled ephemeral streams are appropriate, scientifically valid, and feasible mitigation to implement here on the NF.

I am concerned about the viability and distribution of the Indiana and other rare Bats (*e.g.*, Northern Long-eared and Small-footed Bats). Surveys for rare

bats need to be done by qualified professionals at the proper times and with the proper methods and equipment. Mere visual diurnal walk-throughs during the course of BE/EA surveys are totally inadequate and improper. These will not result in valid site occurrence data, nor will it ensure that **maternal and roosting trees/sites** are properly identified and protected and that excessive take will not occur.

As the recent finding of IBats in North Carolina shows, one tree may harbor more bats than is allowed to be "incidentally" taken. Proper surveys have not been done here and are not being done here to ascertain whether Bats are present in or using cutting units. Nor is it proposed that proper monitoring by qualified personnel of trees if they are cut be accomplished to ascertain if incidental take requirements are not exceeded. **The Forest Service is not taking active measures (as they should be if the Bats were being accorded the requisite top priority) to ascertain the actual presence of roost/maternity trees.**

"Actions proposed under Alternative 1 are more than 0.25 miles from any known hibernaculum and more than 150 feet from any known occupied maternity roost trees." (GWNF PC DEA) How will they be known here?

I can give you contact information for a qualified bat surveyor.

Wildlife biologists have long considered **small maintained "wildlife openings"** to confer vastly greater benefits to various wildlife on a per acre basis than do esh regen from logging — depending on the species, it can be 50 to 1 or more. For instance, Turkeys, a focal species on the Forest, derive very little benefit from logged over sites compared to permanent grassy openings. According to the agency's own documents it takes 500 acres of logging to equal the benefit to the Turkey population of just 1 acre of opening - USFS "Wildlife Population Data Working Paper" by Goetz and McEilwane (part of the administrative record compiled by the FS for *Krichbaum v. Kelley* W.D.Va. 1994)

Therefore, fully develop/consider/implement an alternative that drops all the regeneration logging and thinning and just fabricates/maintains *ca.* 35-40 acres of openings (at the edge of sites recently already cut).

These **concerns for site-sensitive biota are not confined to fauna, but extend to flora as well**. The GW National Forest has great floristic diversity. Though

perhaps most renowned for their beauty, the Forest's herbaceous plants are significant ecological components as well (Whigham, D.F. 2004). 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, Kahmen, A. and E.S. Jules 2005, Bratton, S.P. and A.J. Meier 1998, and Primack, R.B. and S.L. Miao 1992). 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 Box Turtles (Jones, S.C. *et al*. 2007).

Woodland Salamanders

Salamanders and other small, cryptic site-sensitive species are important and significant components of the Forest's diversity. They are as important as any large game species. The agency is required by the NFMA to maintain their distribution and viability just as it is for other large mobile species. Yet there is no MIS present here to use to meaningfully gauge the effect of proposed actions.

Salamanders are significant components of forest ecosystems (Burton, T.M. and G.E. Likens 1975; Hairston, N.G. 1987). They perform many ecological functions (D a v i c, R.D. a n d H .H . W e l s h 2004) and may constitute "**keystone species**" (Davic, R.D. 2003). Numerous salamander species certainly do or may occur on the NF (Petranka, J.W. 1998).
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 upon salamander populations and upon fragmenting, diminishing, and/or degrading salamander habitat must be explicitly and fully addressed. And avoided. This has not happened before (see, *e.g.*, PC DEA).

As differing species of salamanders use/prefer different habitat conditions (Petranka, J.W. 1998; Davic, R.D. 2002), salamanders are not distributed homogenously in the Forest. Salamander distributions are linked to microhabitat conditions that can change with forest types and coarse-scale

site conditions (Harper, C.A. and D.C. Guynn 1999). In addition, microsite understory conditions with which they associate may not be precisely indicated by overstory forest typing (Ford, W.M. *et al*. 2002). So a closer examination of proposed burning and logging sites, a more thorough analysis of the burning and logging programs and their effects, and the avoidance of areas that would otherwise be logged or burned are all necessary.

What salamander species are here and what is their distribution? Populations of certain species may be restricted and patchy. The proposed logging has the potential to significantly harm their viability and/or distribution.

Thorough & accurate surveys, population data, and viability analysis must be gathered and performed by specialists using proper methodologies. Salamanders are small, cryptic, sometimes fossorial creatures that must be actively searched for, they can not be reasonably expected to be seen by just meandering through an area. Due to their rarity, sensitivity, and vulnerability, it is essential that such thorough surveys be performed.

The agency must sufficiently examine and consider the potential impacts upon salamanders. This concern is particularly important given the intent to destroy, degrade, or fragment salamander habitat (such as the mature forest and rocky areas), these species low dispersal abilities, and the moister areas (such as in the forest type 53 areas with drainages) targeted for cutting. Populations could be centered, perhaps even be only found at, the particular places targeted for intense manipulation. They have very small home ranges with limited abilities of mobility. They are susceptible and vulnerable to site-specific harm from logging/ground disturbing operations and subsequent habitat alteration.

This project analysis must consider widely-shared and relevant scientific information that shows that salamanders and their reproductive success may be significantly impacted by logging and roading and burning such as proposed for here (see, *e.g.*, Petranka 1993). This significant issue of salamander monitoring and viability and scientific information must be reasonably considered by the agency.

This is a particularly salient concern for the old sites, moister areas, rocky sites, and tracts with LWD cover objects, proposed to be cut here. These sites must be avoided, *i.e.*, be off limits to cutting, burning, and dozer work.

Impacts to site-sensitive creatures such as salamanders must be fully and fairly assessed and disclosed. These creatures are vitally significant components of forest ecosystems.

The proposed logging project may significantly impact (directly, indirectly, and cumulatively) salamander populations in the project area and Forest. This proposal if implemented would log, road, and burn sites occupied by these vulnerable species.

This is unacceptable and improper and does not protect the Forest's diversity and harms me personally (as well as other people who enjoy healthy ecosystems, amphibians, and ecological integrity).

Salamanders can also serve as indicator species or monitoring proxies for a host of other site-sensitive low-mobility taxa of the forest floor (see Welsh, H. H., and S. Droege, 2001, A case for using plethodontid salamanders for monitoring biodiversity and ecosystem integrity of North American forests, Conservation Biology 15: 558-569; incorporated by reference). Implementation of the proposal could significantly harm the viability or distribution of salamanders or these other species.

The Forest Service should alter the proposal and not log the mesic sites, including but not limited to drainages, north slopes, rocky hollows, and riparian areas.

The present MIS are mostly large mobile vertebrates. The use of these species does not accurately gauge the impacts to small site-sensitive species of low mobility such as salamanders and Box Turtles and other herpetofauna. 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. **Present MIS that occur here do not allow for the accurate monitoring and assessment of management impacts to salamander populations**. Then some other indicator of effects needs to be used; the project's and Plan's MIS are deficient. NFMA at 16 U.S.C. 1604(g)(3)(C).

It is apparent that the proposed operations have the potential to significantly harm the habitat of and thereby the distribution and viability of some salamander species. This issue must be fully and fairly considered by the agency here.

Fires naturally occur predominantly on drier sites where salamanders are absent. Therefore, controlled burns on dry sites supporting rare plants and unique natural communities may be compatible with salamander conservation.

However, th**e proposed burns here are not confined to drier sites with rare plants. Mesic sites, including drainages, north slopes, and riparian areas, and sites with ground cover used by salamanders are proposed for burning** (see maps). **This is unacceptable and unreasonable.**

In addition, at present sites with salamanders and other sensitive taxa may be routinely subjected to intense ground disturbance by **fabrication of fire control lines with dozers**. The scoping letter and maps for the project do not disclose which lines were to be constructed in such a way, or where. Such construction may directly kill salamanders, destroy habitat, create additional habitat fragmentation, increase forest edge, facilitate invasive species, and provide for illegal motorized access and attendant harms (*e.g.*, poaching).

Roads serve to fragment salamander populations and habitat (Flint, W. 2004).

Intensive even-age logging operations have moisture and temperature effects (Chen, J. *et al*. 1999 and Zheng, D. *et al*. 2000) The operations result in drying and/or increasing the temperatures of the ground surface, as well as compaction of soil. This can alter the habitat of as well as destroy or diminish invertebrates living there (as well as vertebrates such as skinks and salamanders). **This may result in population reductions, significant impacts to viability, and/or distributional loss** for organisms with perhaps limited dispersal and recovery capabilities and/or of their prey populations.

Microclimatic differences can directly determine the distribution of species within patches (*i.e.*, biological diversity) and the movement of species among patches (Chen, J. *et al*. 1999). For example, salamander distributions have been found to be correlated with microclimatic moisture gradients and cover objects (*e.g.*, woody debris) (Grover, M.C. 1998). **Intensive logging degrades microhabitat characteristics for woodland salamanders**; not only by altering thermal and hydric regimes, but also by decreasing plant or animal food items due to decreases in soil or leaf litter moisture and/or decreases in leaf litter amount and depth (Crawford, J.A. and

R.D. Semlitsch 2008, and Petranka, J.W. *et al*. 1993). These concerns also apply to the proposed burning.

Terrestrial salamander abundances are affected by forest thinning. See Grialou, J.A., West, S.D., and R.N. Wilkins. 2000 ("Relative comparisons revealed that red-backed salamanders were influenced by forest thinning. The difference in relative capture rates because the thinning treatment was minor. The observed decline in red-backed salamanders may be explained by direct machine impacts and soil compaction from skidders") The effects of forest clearcut harvesting and thinning on terrestrial salamanders. Journal of Wildlife Management 64(1): 105-113); incorporated by reference. See also Harpole and Haas, "Effects of Seven Silvicultural Treatments on Terrestrial Salamanders, For. Ecol. & Mgmt. 114:349-356 (1999) ("Salamander relative abundance was significantly lower after harvest on the group selection ($p<0.005$), shelterwoods ($P<0.007$ and $p<0.015$), leave-tree ($p<0.001$), and clearcut treatments($p<0.001$)").; incorporated by reference.

Large plethodontid populations declined in group selection cuts after the Daves Ridge TS (Mt Rogers NRA; Daves Ridge Group Selection "Project Overview"). See the 1994 SO monitoring and evaluation report, section on Daves Ridge TS and James Organ's report on salamanders and related issues in the Daves Ridge area ("Salamander Survey in Connection with Daves Ridge Timber Sale"). "For future Environmental Assessments involving salamanders, Sensitive or of Special Concern," Dr. Organ recommended, for terrestrial salamanders to "keep regeneration areas small, one to three acres in size, maintain large undisturbed tracts of forest between regeneration areas to permit salamanders to freely move around regeneration areas rather than to be trapped by a checkerboard pattern of thermal and low moisture barriers, do not disturb existing down and decaying logs within the regeneration area if possible…" as well as other recommendations. These documents, already in possession of the GWJNFs, are incorporated by reference.

Negative impacts to Black Bears

More roads/avenues of access equals less/loss of security for Bears.

U.S. Forest Service EAs acknowledge that timber sale operations in an area results in increased hunting pressure there. Logging operations can be seen to make an area more desirable for Bear hunters (*e.g.*, providing easier access for humans, attracting Bears to so-called "escape" habitat that does not actually provide an escape from humans), but this does not equate to being better for Bears.

Present roads and additional "temporary" and permanent road construction or reconstruction will facilitate entrance into an area by hunting groups and hounds. They will be able to more easily interfere in Bears' lives during chase season, kill season, and by illegal poaching.

This project would destroy and diminish remoteness — "key habitat attributes for bear in Virginia including remoteness and the availability of den trees and mast."

"Black bears are opportunistic omnivores and consume a variety of seasonal plant and animal foods including flowering plants, grasses, various roots and tubers, and **especially soft mast** (grapes, berries, apples, etc.)." (emphasis added)

Roads

Another alternative that needs to be developed in detail (and implemented here) is one that involves no new road building (of any kind, including those deceptively labeled "temporary"). This is for the greater good, ecologically, recreationally, and economically.

In addition, "unneeded roads" here must be identified and decommissioned; not just "closed", but revegetated. Use these "linear wildlife strips" to restore the American Chestnut (*Castenea dentata*) to the project area.

Candidates include the aforementioned 1766, and 2544U 2.15 miles, 406 6.15mi, 406B Taylor Hollow (on border).

Roads have significant harmful impacts; they facilitate invasive species and degrade wildlife habitat (e.g., edge effects) and wildlife security (such as for Black Bears).

The Forest is embedded in a landscape that is a conglomeration of patches of land bearing a multitude of differing conditions, uses, and intensities of development. Loss of forest cover is ongoing (Drummond, M.A. and T.R. Loveland 2010). Large unmolested forest blocks can be considered as the rarest "patch type" in the region. The GWNF provides some of the only unroaded blocks of habitat left.

The **impacts of roads and their associated edge effects upon populations of biota (vertebrates, invertebrates, flora), habitat loss, habitat degradation, habitat fragmentation, and forest perforation/fragmentation must be fully considered, disclosed, analysed, and evaluated in the DEA/DEIS**.

The extent and degree to which roads serve to act as barriers, alter the permeability of the landscape, and reduce accessible habitat must be fully considered, disclosed, analysed, and evaluated.

The degree of the barrier effect of roads and associated habitat loss of course varies with the species and the type of road and the volume of traffic. "However, even minor roads may be a major barrier to movement for some species, such as salamanders (deMaynadier and Hunter 2000), invertebrates (Mader 1984), small mammals (Swihart and Slade 1984), and some snakes (Shine et al. 2004), due to the behavioral response of these species to the road surface." (Eigenbrod, F. *et al*. 2008) Even small unpaved forest roads can negatively affect **salamander distribution**; see, *e.g*., Marsh, D. M. 2007 and Semlitsch, R.D. *et al*. 2007.

"I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the **macroinvertebrate** soil fauna. Roads also significantly reduced the depth of the leaf-litter layer. These **effects persisted up to 100 m into the forest**." (emphasis added) (Haskell, D.G. 2000)

Anthropogenic Habitat & Forest Fragmentation/Fracturization/Perforation - Edge Effects

The FS must fully and fairly recognize the significance of the perforation or internal fragmentation (Harris, L. and G. Silva-Lopez 1992) from roads, logging, utility corridors, and other openings that perforate the Forest here. The discussion in innumerable EAs, however, confines the analysis of affects to habitat just to "the number of acres cut." But it is not just the amount of habitat that is lost or altered, but also the *distribution* of that loss or alteration. Habitat spatial pattern is conceptually separate from the sheer amount of habitat available (Eigenbrod, F. *et al*. 2008; Franklin, A.B. *et al*. 2002; Villard, M.-A. *et al*. 1999; McGarigal, K. and W.C. McComb 1995; Harris, L. and G. Silva-Lopez 1992; Flamm, B.R. 1990). Measures of both are simultaneously needed to accurately characterize suitable habitat and management impacts (Fortin, M.-J. *et al*. 2003). And further, it is not sufficient because current scientific knowledge recognizes a potential 600-meter edge effect. This edge effect (*e.g.*, increased predation) extends into the forest from the roads and cutting sites. For instance, scientific research on a Wyoming National Forest determined that cutover sites and roads affected 2.5 to 3.5 times more of the landscape than the surface area occupied by the actual cuts and roads themselves (Reed, R. A. *et al*. 1996). **Edge effects accumulating throughout the PA must be thoroughly and explicitly addressed**.

Edge effects and perforation/fracturization/fragmentation are "forest health" issues. **Numerous researchers point to the significance of such impacts. 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. 1994, Graham, M.R. 2007, and Flint, W. 2004. Even if the FS does not consider there to be fragmentation on the Forest (see DCER at pg.), it still must deal with the impacts of edge effects. **The impacts of deleterious edge effects translate to a form of habitat loss or reduction for various taxa (**Harris, L.D. *et al*. 1996)**.** The ecological footprint of edge effects and this concomitant habitat loss and degradation must be fully considered, analysed and disclosed. Due to the multitude of mechanisms resulting in edge effects, the quantity and quality of these impacts may be significant.

Timber cuts, roads, development, and other conversion of habitat result in the fabrication of ecological edges with a multitude of deleterious impacts. The impacts of deleterious edge effects translate to a form of habitat loss for

various taxa (Harris *et al*. 1996). **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); *e.g*., the 100m effect from roads on macroinvertebrates in Appalachian forests found by Haskell (2000).

Although there are various ways to examine it, at the least a meaningful effort must be made by the FS planners to in some way **identify, quantify, measure, analyse, map, and disclose the estimated road effect and intensive logging edge effect zones (DEI - both current conditions and that from proposal implementation) on the project area**. Perhaps use 100 meters from both sides of all the roads and even-age logging units on the project area as a **distance-of-edge-effect** (Zheng and Chen 2000) to calculate and evaluate the amount and distribution of this pattern. See Reed, R. *et al*. 1996, Forman, R. 2000, Riitters, K. *et al*. 2004, Fletcher 2005, Harper *et al*. 2005. However, analysis of a range of zones should perhaps be performed as a 100-meter effect zone is extremely conservative; see, *e.g*., 800 meters as regards Black Bears in Rudis & Tansey 1995 and Reynolds-Hogland & Mitchell 2007.

This analysis needs to be performed now at the site-specific level since it was not done for this project area during the Plan revision analysis. This way, well-reasoned decision-making can occur with regard to the significant issues of fragmentation, perforation, edge effects, and restoration.

One of the reasons this DEI analysis is needed is to rectify the current inadequate consideration/disclosure of impacts to **forest interiors;** such as for the Ovenbird - "This species is selected to help indicate the effects of management on the availability of suitable mature forest interior habitats." (FEIS)

For example: "The configuration of edges is largely determined by human-induced disturbances including timber harvesting, agricultural expansion, and urbanization. . . . In all these landscapes [including the Chequamegon NF], the area of edge influence has the potential to be a dominant component of the landscape. . . . Different fragmentation patterns can result in varying amounts of edge in the landscape. About 70-81% of these landscapes [including the Chequamegon NF] are still described as forest, but the amount of forested area falling within 60 m of edges is 34, 24, 33, and 56%, respectively. . . . Additive

effects from two or more edges may influence the core area (Table 1) in fragmented landscapes and therefore be particularly important for conservation." (Harper, K. *et al*. 2005) A similar, or worse, situation can be expected to occur here on the GWNF.

"Harrison & Bruna (1999) suggested recently that most effects arising from habitat fragmentation were driven by edge effects. Thus, understanding the effects of habitat fragmentation will require understanding edge effects, which will ultimately require understanding how multiple edges influence edge responses." (Fletcher, R. 2006)

The impact of depredation by edge-affiliated predators cannot be overemphasized. **Abundant populations of generalist predators** (such as Racoons 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, J. *et al*., 1993; Engemann, R.M. *et al*. 2005).

Box Turtles and other species are known to use human-modified habitats such as roadsides and embankments for nesting and other behaviors (SK pers. obs.). This makes them vulnerable to generalist predators that have increased in the human-dominated landscape and that regularly use modified habitats (see Mitchell, J. and M. Klemens 2000, Marchand, M.N. and J.A. Litvaitis 2004, and Litvaitis, J.A. 1993). Thus, these sites may be "**ecological traps**" for turtles and other species that are attracted to them (see, *e.g*., Herr *et al*. 2020 for Timber Rattlesnakes).

Due to human subsidy (*e.g*., garbage), habitat alteration (*e.g.,* increases in ecotonal edges and roads), and extermination of large predators (*e.g*., Cougar and Gray Wolf), populations of many meso-predators such as Raccoons have markedly increased in the East (Engeman, R.M. *et al*. 2005; Mitchell, J. and M. Klemens 2000; Ripple, W. 2009). As far back as 1988, it was estimated that Raccoon numbers in the United States were fifteen to twenty times higher than they were in the 1930s (Sanderson, G. 1988).

Roads, utility corridors, openings and other developments, and the logging projects (which usually include some type of road construction and/or reconstruction) implemented by the Forest Service serve to 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 Box Turtles, song

birds (*e.g.*, Ovenbirds), and other taxa (Mitchell, J.C. 1994b). And the affiliation of Raccoons with stream corridors is well known (Spackman, S. C. and J. W. Hughes 1995). Elsewhere, the FS realizes that forest cutting will facilitate increased depredation in project areas by these small predators: see, *e.g.*, "increase predation" and "resulting edge" at EA-44 and "additional woodland edge" at EA-54 of the 2008 GWNF Laurel Road timber sale Environmental Assessment.

An alternative approach for dealing with this is to manage landscapes such as the PA in order to reduce predator impacts (Schneider, M.F. 2001). In other words, halt the fragmentation of habitat where we can and restore more natural conditions to places that have been developed in the past (through such actions as road obliteration and revegetation).

I am concerned about the **sustained yield and sustainability of unfragmented/unfractured/unperforated habitat** [or whatever the FS chooses to label this] for various taxa (for examples, see those mentioned in above discussion) and unfragmented/unfractured/unperforated forest conditions. We are concerned about the direct, indirect, and cumulative impacts of Forest management activities that diminish the sustained yield and sustainability of unfragmented/unfractured/unperforated habitat for various taxa and unfragmented/unfractured forest conditions. We are concerned about **the direct, indirect, and cumulative impacts of Forest management activities that diminish the sustained yield of "interior" and/or "remote" habitat (from anthropogenic edge effects resulting from mechanisms such as logging or roads) for various taxa** (*e.g.*, warblers, herbaceous plants, carnivorous mammals). See also discussion under "Ovenbirds" below. We are concerned about **the direct, indirect, and cumulative impacts of Forest management activities that result in edge effects**. Of concern also are the **direct, indirect, and cumulative impacts of Forest management activities upon area-sensitive species.**

I am concerned that the effects of management at the PA and GWNF are such that **the compositional, structural, and functional diversity of the Forest's ecosystems are NOT "at least as great as that which would be expected in a natural forest**" (in violation of the NFMA).

Logging, Thinning - Canopy opening - Mosaic

There is much more influencing conditions on the ground and tree regeneration than simply the amount of canopy openness that exists. The verbiage in the SL would have the public believe that all you have to do get your desired floristic composition is open up the canopy with chainsaws.

In the terms of landscape ecology, the GWNF exists as a mosaic of patches (Urban, D.L. *et al*. 1987). The various patches composing a landscape mosaic are heterogeneous in space and time due to the interactions of three pattern-forming templates (Swanson *et al*. 1988, Pickett & Rogers 1997, Angelstam 2003, McEwan *et al*. 2010):

- site-specific physical conditions (including soil, aspect, hydrology, climate)

- natural disturbance regimes **- biotic interactions** (such as mutualism, competition, parasitism, predation [which includes browsing/grazing]).

Broad- and fine-scale distributional patterns of understory and overstory forest vegetation result from synergies of these site-specific physical conditions, disturbance regimes, and biotic interactions (Watt 1947, Braun 1950, Swanson *et al*. 1988, DeMars and Runkle 1992, Callaway 1997, Pickett and Rogers 1997, Hutchinson *et al*. 1999, Angelstam 2003, Dyer 2006, Dyer 2010, Matlack and Schaub 2011, McEwan and Muller 2011, Chapman and McEwan 2012, Anning *et al*. 2014).

These templates must be considered and maintained to sustain the broad spectrum of diversity of habitat, communities, and ecosystems in the HNF. The physical environment includes such features as edaphic conditions, elevation, slope inclination and aspect, temperature, and precipitation (Whitaker 1956). These factors influence fine-scale microclimatic patches and gradients that affect patterns of vegetation composition and structure (Jackson and Newman 1967, Chen *et al*. 1999, Dyer 2009, Dobrowski 2010, Anning *et al*. 2014).

At montane sites in western Virginia, for instance, differences in soil moisture and depth, aspect, and topography explained differences in vegetation on upper and lower slopes (Stephenson and Mills 1999). In addition to moisture, edaphic, and topographic gradients (McEwan, R.W. and R.N. Muller 2006; Lawrence, D.M. *et al*. 1997; Ashe, W.W. 1922), canopy

gaps are a major factor structuring understory and overstory vegetation in deciduous forests of the eastern United States (Glasgow, L.S. and G.R. Matlack 2007a). Disturbances occur in the canopy as well as in the understories, independently or in concert (Runkle, J.R. 1991b).

Thus, it is obvious that understory vegetation diversity and tree regeneration/recruitment results from far more than just the amount of canopy openness at a site.

Faunal habitat selection is affected in turn due to foraging preferences, need for cover from predators, and because behavioral thermo- and osmo-regulation involves the selection of optimal microclimates (Grover 2000, Converse and Savidge 2003, Dubois *et al*. 2008 & 2009). The vegetational structure of microhabitats can be a primary driver of thermoregulatory conditions, and hence activity or habitat preference patterns (Reagan 1974). For example, the most important conditions for defining the microhabitat of Eastern Box Turtles (*Terrapene carolina)* (*viz*., surface temperature, relative humidity, and understory plant cover) were related to thermoregulation and minimizing water loss (Penick *et al*. 2002, Rossell *et al*. 2006).

Both natural and anthropogenic disturbances that alter vegetative conditions can influence thermal conditions on the ground (Saunders *et al*. 1998), though generally natural disturbances may have less of an impact than anthropogenic ones (Lewis 1998, Saunders *et al*. 1998). Small openings in the forest canopy provide sites for Box Turtles and other fauna to bask, as well as provide small sun blotches or flecks important for understory plants; see "Sunflecks and Their Importance to Forest Understorey Plants" by R. Chazdon 1988. These microsite differences in light availability occur throughout the mature forests at this project area, thereby temporally and spatially affecting various biotic distributions and ecological processes.

Box Turtles and other small taxa do not need huge logging cuts in order to effectively thermoregulate. In fact, such sites are not favorable. Typically, thinning or removal of the forest canopy results in reduced relative humidity and moisture at the ground surface and increases in mean temperature, temperature fluctuations, and solar radiation (Collins *et al*. 1985). A road, roadside, or newly logged site may not provide buffering plant cover conditions.

For example, in oak-hickory forests in southern Indiana Currylow and colleagues (2012) found ground temperatures in exposed recently logged sites to be significantly warmer (as much as 13°C) than forested control sites. They concluded that **the summer temperature extremes in the logged sites (0.15 - 4.4ha in size) reduced their suitability for Box Turtles (*T. carolina)* and other herpetofauna**.

Similarly, in my GWNF study area the highest proportions of temperatures above the Wood Turtle's critical thermal maximum (CT_{max}) were at array sites of anthropogenic disturbance, a roadside and a fabricated opening, while the only VA array site that recorded no temperatures $\geq CT_{max}$ was in a thickly regenerated 30-years-old clearcut. Such sites are not good for fine-scale thermoregulatory shuttling.

Because plants affect environmental conditions and resource availability within areas where animal activities take place, vegetation patches pattern animal habitat use in manifold ways (Doak *et al*. 1992, Baxley and Qualls 2009). Knowledge about these habitat associations is critical for maintaining the spaces essential to organismal conservation.

For instance, small natural canopy gaps are regularly used by Wood Turtles (Remsburg *et al*. 2006, Krichbaum 2018) and Box Turtles and are important for sustaining herbal growth, richness, and persistence (Goldblum 1997, Anderson and Leopold 2002). By allowing for a greater range of forest floor light levels and temperature regimes, gaps allow for more floristic richness or abundance and enhanced thermoregulatory opportunities.

An understanding of the ecological processes under which vegetational communities develop is needed in order to determine the effects of management practices upon them and in turn upon fauna. At any site, multiple successional pathways are possible post-disturbance (Egler 1954, Connel and Slatyer 1977). Various factors are responsible for this (e.g., site-specific physical conditions or the abundance of browsers), but it partially depends upon the starting point (see "initial floristic composition" in Egler 1954, Roberts 2004). For tree taxa in particular this means the existence of a seed bank and advanced regeneration (the seedlings already growing at a particular site) (Brokaw and Busing 2000). The types and amounts of these are important for determining precisely if or where to subject an area to anthropogenic disturbance.

Within natural forests where this PA is located, as well as in much of the northeast and Central Appalachian region, a disturbance regime of small-scale, within-stand gap processes is the norm (Runkle 1985 & 1990, Mladenoff et al. 1993, White and White 1996, Seymour et al. 2002, Rentch 2006). These intermittent stochastic canopy disruptions occur through such mechanisms as windthrow, tree senescence, ice storms, drought, insects, American Beaver (Castor canadensis), floods, and pathogens (Braun 1950, Rentch 2006). Large "catastrophic" stand replacing events, such as hurricanes and conflagrations (canopy fires), are naturally a rare occurrence (Runkle 1990, Lorimer and White 2003).

The congruence and harmonization, or lack thereof, of human disturbance (e.g., cutting regimes) with the spatial and temporal parameters of the natural disturbance regime are an ongoing conservation concern here and elsewhere (Franklin et al. 2002, Seymour et al. 2002, Lorimer and White 2003, Roberts 2004). Researchers in northern Maine found individual tree selection and group selection systems to be the most obvious silvicultural analogs to the natural disturbance history (White et al. 2005). In research involving Appalachian mixed-hardwood sites in West Virginia, Miller and Kochenderfer (1998) found that that "[c]anopy openings with a minimum diameter of 170 feet (0.5 acre) provide suitable light conditions for virtually all desirable [tree] species to develop and grow to maturity".

The ecological rationale for all the extensive proposed heavy thinning (perhaps ca. 680 acres) is not clear at all – how it was decided that such large tracts need to be opened up, where the desired numbers are coming from, and how the current conditions were calculated. I get the feeling that just as it is with esh, the multitude of naturally existent more open canopy tracts are not being considered (they have broken canopies and gaps), since they do not take up an entire "stand".

And I still do not understand where the ecological rationale for all this "open woodland condition" is coming from. Where do such forests exist naturally in this bioregion? It all sounds like a fixation on fabricating an anthropogenic cultural landscape that demands constant inputs of time, energy, and money. - *i.e.*, **make work projects**.

Ecosystems, Oaks, and cutting

Lucy Braun, who examined native old forests before they were almost eliminated in the 20th century ("the late 19th and early 20th centuries were tantamount to a 'perfect storm' for most forests in the eastern United States. This period represented both the height and the tail end of the clear-cutting era and the catastrophic wildfires that followed" Abrams 2003), recognized that the mesophication of forests was a natural process as forests age without or low human impact/exploitation. She even had a term for it - **xerarch succession** (in D.F.E.N.A. 1950). And there are multitudes of other taxa that benefit from this, not just some canopy tree species. Oak-hickory dominance is/was naturally localized - typically on somewhat drier sites (Braun 1950, Paulus *et al*. 2018).

After the Europeans invaded and took over, there were a lot more fires taking place over more area. So, centuries of human-caused fires here and other major human disturbance *(e.g.*, large openings and Chestnut blight) can be expected (following the FS's own logic) to have resulted in an excess/increase of oaks and other taxa called fire-tolerant. And this pyromania is what some in the FS are intent on "restoring" (follow the money).

The oaks are localized or prevalent due to the synergies of the three landscape templates.

This project is all about trying to force an artificial disturbance regime and manipulated composition upon thousands of acres and alter/control the overall forest type. Oak regeneration/recruitment is not simply a function of canopy openness. The SL reads as if the FS would have the public believe that all it has to do is reduce the canopy tree cover with chainsaws across hundreds of acres and then oaks will crop up all across the landscape like magic. Not only is regeneration NOT due to simply opening the canopy with chainsaws, but that is not all that is necessary for the FS to accomplish - no, more make work/job security must be inflicted *ad nauseum*, and that's left out of the SL and PR for the project.

The proposed cutting does NOT typically result in oak-hickory stands. **Subsequent additional "treatments" are always needed**, such as timber stand

improvement (mechanical and chemical), pre-commercial thinning, and commercial thinning. Finally, **after the application of lots of tax dollars and other cultural/economic/energy inputs that alter stand structure and composition (such as the TSI proposed here now)**, oak-hickory dominant stands might result.

Many oak species and other hard mast producers are NOT shade intolerant, nor are they shade tolerant — they are considered to be of intermediate tolerance (see, *e.g.*, Burns & Honkala 1990 Silvics manual). White Oak, Red Oak, Chestnut Oak, and Pignut Hickory are of "intermediate" tolerance to shade (B&H 1625 *et seq*.). Small gaps allow almost all species to regenerate; even very shade intolerant taxa in the Central Appalachians can grow in gaps as small as 0.5 acre (Miller and Kochenderfer 1998). And in some of the small gaps at the project area (and elsewhere) there was advanced regen of hard mast producers such as various oak species. So, who am I going to believe, you or my lying eyes. And oak taxa saplings can remain in the understory for decades waiting for another disturbance event to release them; *e.g.*, White Oak seedlings, saplings, and even pole timber are able to persist under a forest canopy for more than 90 years (Burns & Honkala 1990).

Of course, it is the interaction of the landscape templates, not just the availability of artificial openings fabricated by logging, that determines whether oaks can reestablish and sustain themselves at sites in a forest (Rentch *et al*. 2003a, McEwan and Muller 2006, McEwan *et al*. 2010). Where perpetuation of a substantial oak component is a concern, oak recruitment can be facilitated by locating individual selection or small group selection harvests in forest patches with ample advanced oak regeneration. Oak seedlings can grow and out-compete other species in small gaps or even under canopy (Beckage 2000, Clinton 2003, Iffrig *et al*. 2008); for example, Rentch and colleagues (2003b) found oaks were able to establish and persist in gaps < 200m^2 in area.

The landscape template of **biotic interactions includes such mutualists as Mycorrhizal networks (MNs),** which generally fall under two separate categories: Ectomycorrhizal (ECM) fungi and Arbuscular (AM) fungi. These two classes of MN have some fundamental differences and appear to compete with one another (Johnson *et al*. 2018 - research done at an old growth forest in southern Indiana). Species such as oak, hickory, and beech

are served by ECM networks, whereas maples and tulip poplars are served by AM networks. ECM trees typically produce slow-decaying leaf litters with lower nutrient content relative to co-occurring AM trees, resulting in distinct biogeochemical nutrient economies. Because ECM fungi possess the ability to mine nutrients from detritus, whereas AM fungi do not, ECM trees may be most competitive in their own soils (Johnson *et al*. 2018). ECM networks are especially sensitive to intensive harvesting regimes.

Research has shown that ECM fungi decline overall, regardless of ecozone, due to harvesting (Wilhelm *et al*. 2017). In contrast, AM populations increased in harvested plots likely due to their common symbioses with successional plant cover (Wilhelm *et al*. 2017). **By implication, the removal of mature ECM trees and the corresponding disruption of ECM networks may facilitate AM invasion and succession from oak-hickory to maple-tulip ecosystems.** In addition, soil compaction from harvesting profoundly affects ECM fungi abundance, structure, and function; it therefore raises concerns regarding forest productivity, juvenile tree regeneration/recruitment and long-term ecosystem functioning (Hartmann *et al*. 2014).

And yet, you are proposing intensive cutting with extensive canopy removal on hundreds of acres.

These impacts to and from MNs are a significant issue that have not been and must be fully considered by the FS.

Furthermore, because of differences in shade tolerance, drought resistance, and seedling growth rates, a forest management prescription will not benefit each oak species' needs. (Rebbeck *et al*. 2011). White Oak seedlings are able to exist in relatively low-light conditions (*i.e*., shade) (Hutchinson *et al*. 2012). ""To target white oak seedling regeneration, we propose that light levels need not be increased above 18% of full sun; to target chestnut and northern red oaks, light levels need not be increased above 25% of full sun. . . . This suggests that the photosynthetic capacity is saturated with no additional benefits afforded to oaks. If light levels are higher, only faster-growing shade intolerant competitors such as red maple and black cherry, which display more plastic growth responses, would benefit." (Rebbeck *et al*. 2012).

And yet, you are proposing intensive cutting with extensive canopy removal on hundreds of acres.

Furthermore, contemporary climatic warming can be expected to benefit oaks (see maps of range shifts in climate modeling by Iverson)

This unreasonable fixation on oak-hickory is driven by economic bias - oaks have higher value to the timber industry than other species. No doubt, if maples and other typical mesophytic forest taxa were the more commercially valuable, then the FS would be moaning about their "need to do something about the excess of all those oaks out there."

The FS documents read as if the agency would have us believe that "wildlife" does not exist in mesophytic and beech-maple areas and can only exist in oak dominated forests. That is nonsense. Shade tolerant species such as maples are important for wildlife food and shelter. For instance, hundreds of species are known to feed on maple samaras. Where they are allowed, wildlife thrives in the Beech - Maple - Basswood region.

Another issue - The GWNF planners must fully and fairly consider and disclose **effects of acid deposition on soil productivity, in conjunction with effects of removal of tree biomass (boles) from logging sites, and the affects of these upon nutrient depletion (e.g., calcium), long-term productivity and sustainability, and sustained yield**. See Gasper, D. C. 1997, and Rentch, J.S. 2006.

There is an emerging consensus that acid precipitation accelerates nutrient leaching from forest foliage and the soil profile (Rentch, J.S. 2006). Nitrogen deposition can affect deciduous forest trees and conditions as well as coniferous (Boggs, J.L. *et al*. 2005 & 2007). For just one implication, **these negative and variable impacts must be considered in determining "suitability" of cutting sites in the PA** (forests with hickories, oaks, Basswood, Tulip Trees, maples)**.**

The habitat here is already compromised and then the agency decided to add further insult to injury. The agency must clearly tell the public about the implications of a decision to implement the proposed project — the affects of acid precipitation on soil productivity, site-specific soil nutrient sensitivity and infertile geologies, the removal of tree biomass (boles) from sites and the effects of this on nutrient depletion.

Trees contain large reservoirs of calcium and magnesium. Removal of the trees from this area that is already highly stressed and degraded has clear

implications for the ability of the site to buffer and recover from acidic deposition. This is in addition to the other stresses upon the ecosystem resulting from invasively entering with heavy machinery and altering and removing site conditions. The cumulative impacts of the cutting in conjunction with the current degraded situation may be significant.

"Forests that may be particularly susceptible to nutrient depletion effects of harvest removals would be those with a large proportion of species such as hickories (*Carya*), basswood (*Tilia americana*), oak (*Quercus*), and yellow-poplar (*Lirodendron tulipifera*), which store large amounts of calcium in their bole wood (Raynal et al., 1992). Johnson et al. (1988) found significant decreases in subsoil exchangeable calcium due to high uptake rates by the Walker Branch mixed deciduous forest, containing a high proportion of calcium-demanding species. Forests where large amounts of the base nutrients are stored aboveground would be susceptible to base losses from harvesting. Soils that are sensitive to base cation depletion from harvesting include those with low CEC, moderate to low base saturation, those that develop from parent material low in weatherable bases or those that are highly weathered." (Adams, M.B. *et al*. 2000)

Air pollutants/contaminants/effects of concern include acidification (acidic deposition), nitrogen and sulfur deposition and saturation, changes in nutrient dynamics (e.g., elevated/mobilized aluminum and increased leaching of base cation minerals), heavy metal toxicity, pesticide toxicity, and visual impairment. For instance, at the ecosystem level, deposition/saturation/acid precipitation has been linked to **calcium depletion** in the Central Appalachians (Adams, M. B. 1999).

The GWNF planners must adequately address these issues and concerns and provide for long-term sustainability and productivity and sustained yield. The FS planners must fully and fairly address the direct, indirect, and cumulative impacts of acidic precipitation and deposition upon many taxa, such as trees, herbs, lichens, snails, birds, reptiles, and amphibians. For example, acid deposition that causes a decline of soil calcium on poor soils (soils with poor buffering capacity are found throughout the GWNF) could reduce snail populations (Hotopp, K.P. 2002).

An expansion of spatiotemporal perspective is in order. The habitat mosaic on the GWNF may likely shift to include more oaks (due to warming and

drying) without having to take the drastic and destructive and unnecessary steps entailed in this proposal. **All this proposed patch fabrication (that does not mimic the spatial scale [grain] of most natural disturbance here) and edge interspersion (from cutting, roads, dozer work) and chronic disturbance (such as repeatedly burning sites) might in some sense enhance *alpha* diversity at a local scale in the short term, but at the cost of facilitating the proliferation of invasive species and common species (White-tailed Deer and Stiltgrass) through impacts to sensitive and vulnerable species (such as Box Turtles and Salamanders) and the fragmentation and perforation of the greater landscape (long term damage and impoverishment) (*i*.e., diminished *beta* and *gamma* diversity).**

The fact that when some maturing oaks and hickories age and die they may be replaced by trees such as maple and beech or whatever does not mean that ALL of them are or that it is happening everywhere - the trajectories are heterogeneous in space and time due to the interactions of three pattern-forming templates. Because of this, at some sites oaks may actually *increase* in number. And climate change modeling predicts that oaks will EXPAND their range northwards. Further, oaks have the ability to remain in the understory for decades, biding their time, building up amounts of advanced regen and waiting for a disturbance release event.

"White oak usually becomes dominant in the stand because of its ability to persist for long periods of time in the understory, its ability to respond well after release, and its great longevity." (Burns & Honkala 1990) Vol.2 at pg. 610) (emphasis added) "If regeneration of a white oak stand is the desired goal, then the implementation of a slower, more gradual approach to opening up the canopy may be necessary." (Rebbeck *et al*. 2011 at pg. 2229) A slower more gradual approach is called natural processes operating over long periods, *i.e.* proforestation.

Furthermore, "species richness" does not necessarily decline, just because there are fewer individuals of some taxa. In fact, diversity could increase with a more even mix. What precisely are the site-specific "native species" that may be imperiled in the absence of logging in the PA ? This richness assertion reads like self-serving hyperbole; on top of the circular logic employed by using the programmatic Plan written by the FS as an excuse for site-specific "silvicultural treatments" by the same FS.

The FS often implies or states that stands of a certain age are necessary for "optimal" oak mast production. But stands do not produce mast, individual trees do. And trees of optimal mast producing age can and do exist in old-age and old-growth stands. In fact, the vast majority of trees in an old growth forest are not old (a reverse J curve of abundance-age). "Stands" of a certain age do not necessarily produce more mast than do older "stands". What exactly is meant by "optimal"? Is it simply the greatest number of acorns? **How many oaks of so-called "optimal mast producing age" are there in the project area? Precisely how did the agency reach the conclusion that there is a shortage of these trees in the proposed cutting units? optimal mast producing age are there in the project area? How do you know there is a shortage?** And how do you know that cutting down mature oaks will result in an increase in mast available, considering all the factors that go into this (diverting energy to reproduction/mast is just one part of a tree's energy allocation budget - there can certainly be good reasons for instead allocating it to maintenance, growth, or storage)?

Such alleged increase is particularly dubious since there's a good chance that at some time in the near future more cutting will take place in the project area (since it is suitable) and mature mast producing trees will again be "harvested" and removed from the system.

In Burns and Honkala (1990) at page 1186 of Vol. 2, for White Oak "Trees normally bear seeds between the ages of 50 and 200 years, sometimes older" (can reach at least 600 years of age) and "individuals may persist in the understory for many years (90 years) by repeatedly dying back and resprouting. This phenomenon permits the gradual buildup of advance reproduction" (pg. 1187) This says NOTHING about the optimal age. NOTHING about the "optimal" age for Chestnut Oak mast production (pg. 1393). For Northern Red Oak it states "usually does not produce seeds abundantly until about age 50." (pg. 1405) and similarly for Scarlet Oak "maximum production does not occur until after 50 years of age." (1711) Only for Black Oak, a notoriously short-lived species that is a minor component of the proposed cutting sites I visited (at many places I observed none), did it state: "reaches optimum production at 40 to 75 years." (pg. 1437)

Where on the GWNF can we see all the old stands that have become dominated by Red Maple and Black Gum? The only places I have ever seen

dominated by RM are the timber sale sites that have been recently intensively logged.

GWNF EAs claim: "Over the long-term, these gap dynamics will move the stands from an oak dominated stand, to favor more shade tolerant species in the overstory such as red maple, black gum and white pine."

Maybe, that depends on a lot of things - the interactions of the landscape templates. This hyperbole involving oaks doesn't help this agency's credibility.

There was an unnatural inflation of oaks due to human disturbance (this is the FS's own logic). So a diminishment of their proportions is good - it makes for more diverse forests.

Here's what the GWNF FEIS has to say hard mast availability:

"The availability of hard mast producing species is not considered to be a problem with any plan alternative as shown in Tables 3B2-12 and 3B2-13."

In fact, "The alternative with the highest projections for mid- to late successional hard mast producing forest is C with 951,300 acres (90%) at 10 years."

Alternative C as analyzed had **no commercial logging**.

Burning

Why aren't prescribed burns restricted to or concentrated at the sites of fire-dependent communities ? Instead, the FS proposes to burn riparian areas and vast tracts of mesic hardwoods.

The FS basically intends to burn around 260 acres. **The problem with this proposal is that the burning is NOT targeted at restoring the fire-dependent communities. The FS must do this instead of burning moister deciduous habitat used by biota such as salamanders and Box Turtles and sensitive herbaceous flora**. **Mesic sites, including drainages, north slopes, and riparian areas, and sites with ground cover used by salamanders and Turtles and multitudes of other creatures may be proposed for burning** (the SL map fails to reveal the locations).

The prescribed burning should be confined to **fire-dependent communities. The project managers need to develop in detail and fully analyze (and implement) alternatives that do precisely this.**

"Recent wildfires in the project area include the Barbours Creek Fire (7,351 acres) in 2012 and the Mill Branch Fire (32 acres) in 2005. The Barbours Creek Fire was part of the Easter Complex, a large complex which threatened private structures in the area. . . . Canopy gap analysis showed the Barbour's Creek wildfire of 2012 created approximately 2 acres of early structure and 110 acres of mid-late open structure in the project area." (Potts Creek DEA)

ONLY 2 ACRES OF ESH CREATED out of thousands of acres burned ! So, **fires do not accomplish one of the main objectives of your 'purpose & need'.**

There is NO amention of fauna mortality in the SL from the proposed fires. **What post-fire monitoring data, analyses, and estimates do the GWNF managers have for deaths of small slow creatures such as Box Turtles, salamanders, invertebrates, snakes, shrews and others ?** Many of these hide in the ground floor litter, humus, cwd, and vegetation that these prescribed burns can be expected to pyrolyze. Does post-fire monitoring even search for and record this mortality ? And much of this mortality would not even be discernible. What fire monitoring data, analyses, and estimates do the GWNF managers have with which to ascertain the significance of impacts to population viability and distribution on the project area and Forest? I have a feeling that this is another gaping void of **uncertainty** regarding the project's effects.

Nonetheless, this proposal proposes to inflict improper avoidable harms and waste Americans' tax dollars by burning huge areas that are NOT fire dependent.

Many of the concerns and issues expressed elsewhere for logging apply as well to burning of habitat (*e.g.*, microclimate alteration). Just as with logging, 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 Box Turtle can be destroyed, diminished, or altered.

And of course wildlife themselves may be incinerated. For example, at sites previously burned on the GWNF, Wood Turtles and Box Turtles have been encountered which had rekeratinized shell mutilations suggestive of long-term recovery from burns caused by fire (S. Krichbaum, pers. obs.; Akre and Ernst 2006 observed similar damage). Of concern are the impacts to the viability of populations of these species and other slow/small/vulnerable fauna as a result of intentional burns.

And it will probably keep happening: *e.g.*, "Units would be treated with recurrent prescribed burn treatments to achieve the desired conditions," (App. C Potts Creek DEA)

A chief rationale 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', "cover", 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).

Burning 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. "Dynamics of coarse woody debris in southern forest ecosystems", pp. 10-17 in McMinn, J.W. and D.A. Crossley, Jr. (eds.), Biodiversity and Coarse Woody Debris in Southern Forests. USDA FS General Technical Report SE-94; incorporated by reference). Burns dry out the very conditions upon which the Forest Service has claimed that species such as salamanders or Box Turtles depend. Soil moisture is an important abiotic factor affecting the local diversity of soil fauna, such as snails (Martin, K. and M. Sommer 2004).

The incineration of forest material (*viz*., woody debris, litter, humus) not only directly destroys many small creatures, but also significantly alters the site quality for a great many other species, such as Box Turtles and salamanders. For instance, fire can have a negative impact on important components of habitat, such as leaf litter, thus degrading mesic micro-habitats (Ford, W.M. *et al*. 1999).

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 *op cit*). Snail assemblages and densities are positively correlated with litter composition and depth (Martin, K. and M. Sommer 2004). Litter-related habitat characteristics also influence the composition of other soil faunal groups in forests, such as earthworms and carabid beetles (*id*.). "[P]lots in which salamanders were captured, harbored significantly higher numbers of snails than plots in which salamanders were not captured." (Harper, C.A. and D.C. Guynn 1999)

The concern is about significant impacts resulting from the burns to the viability and distribution of species/populations/communities with limited mobility (see, *e.g*., Santos, X. *et al*. 2009 regarding negative effects to mollusks). Past experience with burns on the National Forest indicates that a managerial criterion of success for a burn is when a substantial proportion of the duff and leaf litter are incinerated. **How long does it take litter/duff/soil populations to recuperate, reinvade, reestablish, and/or recover after they are suppressed/destroyed by fire?** Does repeated burning on short time intervals (*e.g*., 5 years or 15 years or 25 years or more) allow them enough time to recover? **Are their populations being chronically suppressed due to an accumulation of impacts over time?**

Thousands of acres of the Forest recently burned, such as the nearby Toms Knob area in 2012. What was the impact upon the turtle, salamander, invertebrate populations there at the burn sites?

After all these decades of intentional burning on this Forest, do you have the slightest idea how much mortality you are inflicting upon small slow animals (e.g., turtles, snakes, salamanders) who can't run/fly away from harm? Monitoring data with pre- and post-fire population estimates - without this there is **significant uncertainty** about the potential impacts from this proposal**.**

I've seen some of tour post-fire monitoring reports - you consider it successful to burn up the litter and duff, the very places the small creatures will hide in to try and escape the devastation.

Prescribed fires on the National Forest are often implemented through ignitions around the perimeter of the burn area. And on top of these multiple ignitions, the interiors of burn sites are also ignited. See, *e.g.*, 2007 GWNF Lee RD burn project DM-10: "Boundaries of the area may be ignited with drip-torches followed by strips through the interior to complete burning out the area." "Ignitions may utilize aerial resources (helicopter or UAS Drone), ground resources such as hand crews, or a combination of both. " (PC DEA)

Small and/or slow moving animals have negligible chances to escape when thus surrounded, and even large and/or swift movers can become confused and trapped by a wall of flames that is seemingly in every direction.

Perimeter and/or interior burns kill wildlife of public interest. The ethical underpinnings for intentionally incinerating sentient beings for any reason are certainly questionable. But it is particularly heinous when the incineration is done in such a manner that could not be worse if it was calculated or that could be avoided or that is unnecessary or that is done simply to achieve some floristic composition that somebody deems 'desirable ' (perhaps partly or wholly for economic reasons).

This is a significant issue, as well as an issue of controversy and conflict. Yet the FEIS for the Forest Plan failed to address it in the slightest. What is the agency's rationale for concentrating on some variable floristic composition pre- and post-burn, but showing no apparent concern or consideration for the killing of multitudes animals during the fire? This is an ethical issue with on-the-ground ramifications. It is also an issue involving important values held by the public. This concern with controversial and uncertain aspects must be fully and fairly evaluated here and now. See Strohmaier, D.J. 2000.

Invasive species

Thus far the FS is failing to adequately address and evaluate the impacts and effects of Forest roads (be they system, closed, temporary) upon **invasive**

plant species. The construction and maintenance of roads on the Forest does not "reduce impacts from invasive species", instead it exacerbates them. **Decommissioning and revegetating (with native species such as Chestnut) various roads on the Forest will positively address Plan Goals**. This option for achieving desired conditions must be developed and studied in detail for this project.

Until the FS can control the invasives that are already here, it should not inflict more management activity (*e.g.*, logging, roading, burning) on this project area that will predictably lead to more problems with invasive plant species.

As written, the name of this proposal could honestly be changed to: The Dunlap Creek Stiltgrass, Garlic Mustard, and Multiflora Rose Enhancement Project.

The **spread of invasive species** such as Asian Stiltgrass, Garlic Mustard, Multiflora 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. And poisoning/polluting the Forest with chemical biocides to 'control' the invasives is also harmful.

For the PA, the FS planners need to fully investigate and **implement an alternative(s) that prevents the introduction and spread of invasive species,** such as an alternative that identifies and minimizes the pathways by which invasive species are introduced.

Instead, the FS is proposing still more poisoning of the forest. Maybe even before the project's main ground disturbance begins: "treated with a foliar spray or dormant stem injection method of glyphosate, triclopyr, or imazapyr along haul roads prior to project implementation" (PC DEA)

Special habitat conditions/components

Protection of sensitive and /or special habitat components is a significant issue here. **These places include very steep slopes, rocky outcrops,**

rocky/boulder slopes and hollows, rocky ground floors, ponds, and moist/wet areas (*e.g.*, hollows, seeps, and drainage channels).

There are many rocky slopes/outcrops here; for example, I've seen them in and around proposed cutting and burning units. These are favorable habitats for various taxa, such as salamanders (Plethodontids and Ambystomatids) and Timber Rattlesnakes and Coal Skinks.

Leave them alone, these sites should not be burned or logged.

Significant rocky outcrops and rocky areas exist at sites proposed for intensive logging. Rocky slopes also exist at sites.

I have brought up this issue repeatedly in the past; and here we raise it again. Roads, dozers, and logging on steep slopes (*e.g.*, slopes in excess of 35%) is harmful, unacceptable, improper, and avoidable; the same goes for areas with highly erosion-prone soils.

AVOIDING these steep slopes is yet another obvious **alternative** action or mitigation (design element) that the planners improperly refuse to fully develop and examine.

There may be springs/seeps in the proposed cutting sites. There are certainly streams and drainages. And very steep slopes exist here.

All these areas are themselves important components of biodiversity and also are important habitats and refugia for various biota such as salamanders and mammals. They need to be strictly protected and buffered through alternative development and mitigation measures.

"Harvesting" activities must be avoided in the rocky areas. **Through avoidance or mitigation measures the FS must protect the rock outcrops, rocky hollows, rocky slopes, and seeps in the project area.** These are salient features in or immediately adjacent to numerous cutting sites.

Such sites have been called "key wildlife areas" by the FS (GWNF Dry River RD Maybe TS EA-5). Just as do riparian areas, these sites provide special habitat conditions unlike the general forest area (*e.g.*, microclimates, niches). They are themselves important components of biodiversity and also are important habitats and refugia for various biota, such as reptiles (e.g., **Timber Rattlesnakes and Coal Skinks), amphibians, invertebrates, Wood**

Rats, and lichens (see, *e.g.*, Balcom, B.J. and R.H. Yahner 1996). For instance, mesic and rocky hollows, slopes, and drainages are very important localized habitats for salamanders. Emergent rocks are important for "microsite moisture retention, refugia, and feeding substrate for woodland salamanders" and may serve as "primary long-term refugia and colonization sources" following logging (Ford, W.M. *et al*. 2002. Stand age and habitat influences on salamanders in Appalachian cove hardwood forests. Forest Ecology and Management 155: 131-141).

In addition to serving as refugia for salamanders and other fauna, rock outcrops are also important refugia for herbaceous plants and provide source populations for recolonization; see, *e.g.*, Bellemare, J., G. Motzkin and D.R. Foster. 2002. Legacies of the agricultural past in the forested present: an assessment of historical land-use effects on rich mesic forests. Journal of Biogeography 29: 1401–1420).

But merely not performing actions within the outcrops, hollows, and slopes themselves does not avoid impacts to these unique areas. Without proper buffer zones (such as extending out at least two tree heights or approximately 280-300 feet) the habitat conditions and populations within the outcrops would not be protected. The mitigation and alternatives must meaningfully and explicitly avoid impacts to these areas and protect the Forest's diversity.

Destruction/alteration of a single Timber Rattlesnake hibernaculum could devastate a snake population for miles around.

Seeps and springs are a component of landscape diversity and are very important for maintaining the population viability and distribution of salamanders, frogs, crayfish, box turtles, turkeys, and other species (see, *e.g.*, USFS JNF Hagan Hall TS EA-43, 44, 46; incorporated by reference). Removal of their canopy cover impedes and disrupts the natural ecological succession of these areas. Implementation of the proposed alternative/mitigation is not compliant with the DFC for these microhabitats. These areas should be absolutely off-limits to cutting and removal and vehicles; and the no-disturbance zone should be more than just the "immediate" wet area due to hydrological, shade, and drying concerns.

From the letter dated June 28, 1998 of the late herpetologist Dr. Joseph Mitchell to JNF Glenwood District Ranger Egan (incorporated by reference): "I am also concerned about removal of trees around, not just within, seepage

areas, which as you know are important habitats for salamanders. The integrity of this habitat type comes into question." See also Mitchell, J.C. *et al*. 1997. Factors influencing amphibian and small mammal assemblages in central Appalachian forests. Forest Ecology and Management 96: 65-76.

The springs and seeps need a protective no-disturbance buffer around them. This buffer should be at least two tree-heights in extent so as to protect their integrity (*e.g.*, protect them from increased temperatures). See also Seth Wenger, 1999, "A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation", Institute of Ecology, University of Georgia, 59 pp. (incorporated by reference).

It is crucial to recognize and address the fact that terrestrial riparian or stream/spring/seep protection zones are not just buffers for aquatic habitat, but are themselves ***core habitat*** for various taxa. So **the riparian zones/core habitat areas themselves need to be buffered** from, for example, edge affects or recreation or roads. See Semlitsch, R.D. and J.B. Jensen. 2001. Core habitat, not buffer zone. National Wetlands Newsletter 23: 5-11. The upper watershed or upslope habitat can be just as important as the defined or so-called "riparian" or seep habitat. This is a cogent reason for making the strictly protected riparian zones or aquatic buffer areas as wide as possible (such as, *e.g.*, at least 127 or 290 meters from the stream bank).

Also see Crawford, J.A. and R.D. Semlitsch. 2007. Estimation of core terrestrial habitat for stream-breeding salamanders and delineation of riparian buffers for protection of biodiversity. Conservation Biology 21(1): 159–167.

Also see Petranka, J.W. and C.K. Smith. 2005. A functional analysis of streamside habitat use by southern Appalachian salamanders: Implications for riparian forest management. Forest Ecology and Management 210: 443–454: "The appropriate management of streamside forests and use of riparian strips is poorly resolved for many systems because of a lack of understanding of the extent to which riparian forests function as environmental buffers for aquatic species versus core (essential) habitat for semi-aquatic and terrestrial species. . . . Because of the vulnerability of plethodontid salamanders to edge effects, effective management of southern Appalachian streamside habitats may require the addition of a terrestrial buffer to protect terrestrial core habitat that immediately adjoins streams and seeps."

"Current U.S. Forest Service guidelines for southern Appalachian streams require only an ~9 m (30 feet) buffer for headwater through second-order streams and an ~30 m (100 feet) buffer for streams third-order and

above. Crawford and Semlitsch (2007) found that stream salamander assemblages require a core terrestrial habitat of 42.6 m and recommended a total buffer zone of 92.6 m (core terrestrial habitat plus a 50 m buffer to mitigate edge effects). While current USFS regulations are not adequate to protect stream salamander populations in clearcuts, these larger buffer zones would likely decrease the impact of timber harvesting on microhabitats within riparian areas of streams and help prevent local population declines." Crawford, J.A. and R.D. Semlitsch. 2008. Abiotic factors influencing abundance and microhabitat use of stream salamanders in southern Appalachian forests. Forest Ecology and Management 255: 1841–1847.

The buffers advised by Crawford and Semlitsch are the minimum that should be applied here.

The past and current state of biotic populations and water quality of perennial streams, and intermittent and ephemeral tributaries, even if a "fishery" may be absent, must be disclosed. Total amounts of sediment estimated to enter these on-site stream segments from the proposed cutting or roading must be meaningfully analysed.

Precisely what monitoring information has been gathered here on the effects to ephemeral/intermittent/perennial stream populations and water quality from previous cutting? Exceeding the threshhold levels for certain site-specific intermittent or perennial tributary "resources" may be at risk as a result of impacts from the proposed logging and roading.

ATVs and OHVs

This project area, part of a larger area of contiguous National Forest, and containing remote forest, roadless/unroaded tracts, and special biological areas is eminently NOT SUITABLE as the site of an ATV playground.

One of the most wretched aspects of this proposal (aside from the 1600 ACRES OF LOGGING) is the idea to construct roads. That some of the roads are labeled "temporary" does not nullify their harmful affects. The proposed road building, skid trails, and dozer lines would foreseeably **facilitate more illegal ATV trespass** and its associated harms. This may significantly harm wildlife, aesthetics, ecosystems/communities, recreation, and our spiritual values.

This does not serve to restore the PA, nor does it enhance resilience.

The proposed roading would not only result in forest fragmentation and perforation with ecologically harmful edge effects and degraded visual and recreational qualities, it will also provide an access route for illegal motorized activity and other human disturbance. Even if "closed" or "temporary", these roads facilitate harmful and undesirable motorized access (such as from ATVs) into the area, with consequent harmful and undesirable disturbance and impacts to wildlife. Such illegal motorized access is already known to occur in this Ranger District; we have seen the evidence first hand.

The decision to build more road mileage into this area and facilitate more motorized access is not consistent with the Plan condition desired for this area of Forest.

The agency must fully analyse and disclose the impacts from the clear potential that the project has for increasing illegal motorized use, such as from ATVs. Construction techniques (*e.g.*, dozers) that result in wide routes, will easily facilitate illegal ATV use and make it even more difficult for law enforcement officers to control. There is clearly a potential for significant harm to interior forest, remote habitat, and disturbance-sensitive wildlife, as well as to human feelings of solitude, serenity, and remoteness. This potential harm is of particular concern for those creatures who are targets of deadly persecution such as Timber Rattlesnakes.

The agency typically glosses over impacts from the clear potential that a project has for increasing illegal motorized use, such as from ATVs, and associated criminal activity such as poaching. The agency dismisses and misleads regarding such potentially significant harms with inaccurate and unsubstantiated claims regarding the ability to "control" such activity. This foreseeable illegal activity would further harm remoteness, habitat security, and freedom from disturbance. We oppose the proposed actions by the FS that facilitate these harms to the Forest and to us.

The cumulative impacts of all this may be significant. The analysis and disclosure must clearly analyse and disclose the cumulative **impacts to remote habitat, interior habitat, and disturbance-sensitive species** in the PA.

The project area has the conditions that the FS has said fits the profile for such illegal use. It has the "hidden, out-of-the-way places" said to fit the

profile, as well as "adjacent private land" (see GWNF 2005 AHTS at EA-63). The Forest Service has made specious claims that gating/blocking techniques and law enforcement can control illegal ATV use. This is refuted time-and-time again by observations on-the-ground in NFs. I have witnessed innumerable evidence of trespass on blocked and gated roads. Signs, blocks, and gates definitely do not stop ATV trespass and the agency knows this.

Foisting off the problem as a "law enforcement issue" is irresponsible and improper. The claim that 'law enforcement will handle the problems' that planners of this project help create and make worse is utterly without basis in fact.

<u>The Forest Service must fully and fairly consider, analyze, and disclose the direct, indirect, and cumulative impacts of the proposed action on/from facilitated ATV/OHV use.</u>

For the restoration of the PA and its resilience, the FS must 1) cease building new permanent roads, so-called "temporary roads", skid trails, and dozer lines that facilitate illegal OHV/ATV use; 2) recontour and/or revegetate existing roads with trees and native vegetation that discourages illegal OHV/ATV use; and 3) block vulnerable roads using methods demonstrated to be 100% effective at halting illegal OHV/ATV use.

<u>Restoration</u>

The FS often labels proposals such as this one as "restoration". But many proposed activities are not actually restorative. **Rather than maintaining or enhancing stand development potential (Keeton *et al*. 2005), implementation of the proposed "treatments" would retard it - the extensive intensive logging proposed here (even-aged regen & heavy "thinning") is the antithesis of restorative.** Indeed, the proposed management actions fragment and perforate and otherwise suppress and degrade the development of ecosystems here.

When the FS mentions 'restoration', reference is usually made to maintaining or fabricating cultural landscapes (*e.g.*, "mechanical or chemical treatments", "even-age management" stumplands with impeded, retarded, or retrograded

stand development) that are dependent upon anthropogenic inputs for their structure, composition, and/or function. This is not restoration in the valid sense of the concept; see DellaSala, D.A. *et al*. 2003 and FSM.

Honestly, most of this proposal reads more like "make work projects" and "job security" for bureaucrats and their partners in the publicly subsidized exploitation industries. In other words, the same old-same old gussied up with new obfuscations.

The agency needs to go back to square one and this time engage the services and expertise of people other than those trained in silviculture (much of which involves cutting down trees), but who have an understanding of and experience with other aspects of the incredibly complex ecosystem that we call a forest, people such as entomologists, mycologists, herpetologists, mammalogists, malacologists, ornithologists, ichthyologists, botanists, population biologists, biogeographers, landscape ecologists, conservation biologists, and forest ecologists. For a proposal this huge, getting a broad range of advice is essential.

One of the fundamental guiding principles of valid ecological restoration is to have as little impact as possible. Allow natural processes to restore as much as possible. Passive and light-touch actions are preferable to a heavy-handed approach. In other words, true restoration is a close-to-nature approach, a level of intervention to the point where forest self-renewal processes operate. **The goal is self-sustaining intact ecosystems needing as little management intervention (in other words: tax dollars) as possible.**

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) This is the antithesis of the extensive intensive even-aged logging proposed here that drastically retards stand developmental potential.

We should be preserving, protecting, and maintaining mature forests as much as possible. Particularly where there is already so much young forest available across the landscape of Virginia (see VDF forest statistics for the state).

Allowing natural forest development and restoration to occur (proforestation) is reasonable, beneficial, promote forest health, and confers desirable conditions — see "Intact Forests in the United States: Proforestation

Mitigates Climate Change and Serves the Greatest Good" by Moomaw, Masino, and Faison 2019 (attached).

I look forward to collaborating with you on achieving this significant goal.

Restoration priorities call for the Forest Service to:

- • prioritize watersheds for restoration activities (*e.g.*, drinking water and TESLR watersheds),
- • close targeted roads and revegetate them with blight-resistant Chestnut trees or other native species,
- • transform roads into trails (through re-contouring and/or re-vegetation),
- * restore and enlarge unroaded blocks of habitat,
- • augment stream loadings of large woody debris,
- • restore riparian areas by relocating camping areas, trails, roads, and cutting units away from streams/rivers (*i.e.*, expansive buffer zones),
- • reforest riparian pastures,
- • promote increased Beaver populations (Naiman, R.J. *et al*. 1988; Elliot, J. 1990),
- • work to return extirpated species to suitable habitat, and
- • eradicate and prevent introduction of invasive species.

This project as proposed would accomplish a little of the above forms of actual restoration. Hundreds of acres of logging and road building that result in tons of sediment added to watersheds, forest perforations, and edge effects do not "restore" water quality or natural conditions.

Just about everything you are proposing to do (*i.e.*, logging, road building, dozer lines, burning) will facilitate the spread of invasive species. This isn't a good idea (unless of course it's 'job security' that's on your mind). It obstructs and prevents actual restoration of the PA.

FS planners need to develop alternatives in detail that address the above issues and incorporate the above possible restorative activities (without the damage and degradation to structure, composition, function, and pattern wrought by logging and its associated road building). Then the public and the agency can have a comparative basis for reasonable decision-making.

Returning the grandeur of the American Chestnut to the Forest must be an agency priority. Prior to introduction of the Blight, Chestnut was a component canopy species throughout many of the lands of the GWNF (see Braun, L. 1950); there is still some Chestnut lwd in the AK PA. 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 an intensive natural fire regime here. Through the efforts of The American Chestnut Foundation a blight-resistant hybrid suitable for planting is or will soon be available.

There are many miles of currently open, closed, and temporary roads, "wildlife openings", and recent even-age logging sites on the project area 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 can be manipulated so as to reintroduce Chestnut at these sites. New logging is not necessarily needed to restore the it to the GWNF, although any young pine plantation sites at the PA can be restored with Chestnut.

By using existent roadbeds and recent previously logged units and pine plantations for Chestnut restoration, several restoration goals (restoring native habitat and 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.

Dispersed non-motorized recreation

This project area is already degraded for dispersed non-motorized recreation and for visual enjoyment by roads and past cutting. The detrimental cumulative impacts of additional cutting units and roads and dozer lines and burning must not be glossed over. By harmful recreational impacts, I mean, *e.g.*, more noise, increased potential for illegal motorized entry and poaching, diminished naturalness, degraded camping sites, degraded visual quality, impeded hiking, altered wildlife habitat and opportunities for viewing species that are not common like Deer, adverse impacts to desirable herbal plant gathering or photography due to more Deer being attracted to or

surviving in the area, loss of mature interior forest conditions which we enjoy and benefit from, damage and destruction of salamander habitat and populations and consequent harm to our/the public viewing of them, harm to TESLR species whose existence is valuable to me and other Americans, and harm to old age forest tracts. These may be significant effects (*e.g.*, direct, indirect, or cumulative).

The impacts of the proposed logging/burning/roading to visual and dispersed recreational resources and opportunities in the area have not received the requisite "hard look". This full and fair consideration is essential for a well-informed and well-reasoned decision.

Harm to scenic beauty and recreational benefits would result from implementation of this proposed project. From the verbiage in previous EAs, the FS apparently believes that dead or dying trees (snags and large woody debris significantly important to forest health) are visually intolerable or detrimental. But dead standing or wind-thrown trees that may be visible do not harm the "viewshed" or "visual resources". These are natural elements that add to the visual diversity and quality and overall environment here. The agency must fully analyse these positive aspects.

And the agency somehow fails to understand or admit how visually ugly and degrading logging operations are. Logging does not protect the visual resources in this area. Logging operations are not necessary to improve scenery or the views along roads or trails here. Stumps and slash and run-over soils & vegetation and dozer lines and logging roads and skid roads do not improve the scenic beauty here. They, in fact, harm our use and enjoyment of the area. The FS must fully and fairly consider this.

And there is much more to the "scenic resources" here than just the areas visible to what the agency calls "an average traveler". The other areas farther from the roads that would be impacted must be meaningfully addressed. This project area is used for dispersed recreation. The negative impacts of your proposal on the "scenic resources" must be fully and fairly considered, and avoided or fully mitigated.

Of course, also of concern is the **harm to the recreational experience of natural conditions in the VMT/PWAs and old growth tracts** (*e.g.*, aesthetics,

interior-forest plant/wildlife viewing opportunities, dispersed/primitive recreation, opportunities to experience solitude, spiritual values).

Climate change - restoration - forest/habitat fragmentation - alternatives

The Forest Service should include **an alternative** that mitigates or improves the balance of relationships between species, forests and climate change.. These would include, but not be limited to

- — Eliminating actions which do not maximize carbon storage in vegetation and in soils
- — Eliminating actions where extracted forest products result in reduction of biomass and carbon storage in vegetation and soils
- — Eliminating actions which accelerate the rate of evaporation of soils and can potentially increase erosion
- — Eliminating actions which remove, facilitate removal or make available forest projects that could be incinerated for any purpose.
- — Considering the cumulative impacts of all aspects of the project with regard to carbon storage, carbon released and carbon dioxide released on forest, landscape, state, federal and global scales.

Habitat fragmentation is a direct result of this project as proposed. (See also comments on old growth) Roadbuilding, roadwork and the fabrication of early successional habitat create and promote habitat fragmentation. As restoration efforts are dominated by actions that attempt to remedy actions and past projects by the agency that have resulted in, promoted or implemented habitat degradation and fragmentation of ecosystems, an alternative must be considered that does not contribute to continued habitat fragmentation.

It would be inappropriate to take steps to restore fragmented habitat in one place while continuing to promote and implement projects that continue to fragment habitat somewhere else or to attempt to mitigate climate change on one hand while exacerbating it at the same time with the other hand. Yet these are conditions that would be allowed to continue and proliferate with this project.

Among other measures, **the Forest Service should plan for climate change and develop/implement alternatives that (1) protect core roadless and remote areas, old age forest tracts, and other sites of high ecological integrity, (2) reduce forest fragmentation and (3) decrease and eliminate non-climate stresses such as logging and logging road/skid trail building**.

Potential for SIGNIFICANT IMPACTS - Such as to unroaded blocks/PWAs/SBAs/Box Turtles/Interior forest

Intensive ground disturbance activities (such as even-age logging, dozer lines, road building) are proposed or possible (the scoping letter is short on information as to the locations of some activities). If implemented these would may significantly **damage ecological or recreational or scenic conditions in unroaded blocks/roadless areas/potential wilderness areas in the PA**. Significant harm may occur to roadless characteristics and values (regardless of whether the areas are inventoried or not), wilderness characteristics and values, **special habitat conditions/components, special biological areas**, areas of high ecological integrity, mollusk habitat/populations, **interior forest and associated wildlife (*e.g.*, migratory birds)**, **old growth/old age forest**, **rare/sensitive species** (*e.g.*, Box Turtle, Plethodontid and Ambystomatid Salamanders, Timber Rattlesnake), **mycorhizhal networks, scenic beauty, and non-motorized recreation such as from edge effects, sedimentation, loss of mature/old age habitat.**

Our/my interests in and use of all these areas and Forest attributes (including things like natural appearance, undeveloped character, wildlife populations, old growth/old age forest) would also be significantly harmed.

The magnitude of various recent proposed projects (*e.g.*, thousands of acres of burning and logging of various types) is new for this NF.

This would obviously result in incomprehensible amounts of direct mortality of wildlife — **squashing and burning turtles and toads and snakes and salamanders and nestlings and snails and slugs and other invertebrates, all those small and slow creatures who cannot run away or fly away from harm, including those who live in trees**. And any survivors would be left in intensively altered habitat conditions, conditions that would alter plant composition and structure as well.

The fact that you intend to burn hundreds of acres of the project area, a mesic and sub-mesic forest that you treat as if it is some western xeric ecosystem, is monstrous overkill in and of itself (even without all the logging). The magnitude of this burning can foreseeably result in significant mass mortality of sensitive fauna and flora and harmful habitat alterations.

This is the size of four (or more) typical timber sales. The intensity of the proposed actions and their context and scale, with the potential for significant effects (direct/indirect/cumulative), militate for the preparation of an EIS.

There is a great deal of uncertainty about the effects of this proposal; fundamental information has apparently not been obtained as to the current population status and trend in the PA of various taxa (e.g., bats, Box Turtles, salamanders).

From the multitude, extent, context, and intensity of factors/issues/concerns (discussed herein), the controversy present, conflicts regarding the disposition of "resources", and the uncertainty involved — there is the clear potential for significant direct, indirect, and/or cumulative impacts to occur from the proposal's implementation.

For these reasons, unless the above impacts are avoided, preparation of a full EIS for this project would be necessary.

Basically, the management activities that are favorable and proper in this project area are those that help to revive the beauty and integrity of contiguous wild old-growth forest here in the Central Appalachians. In that regard, the present proposal fails miserably.

Thank you for your consideration. If there are any questions or if anything is not absolutely clear, please do not hesitate to contact me.

Merry Christmas,
Steven Krichbaum, PhD (ecology and evolutionary biology)