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Karen Stevens
Pat Sheridan, District Ranger
Warm Springs Ranger District
422 Forestry Road
Hot Springs, VA 24445
karenlstevens@fs.fed.us
psheridan@fs.fed.us

re: Lower Cowpasture Restoration Project

Dear Ms. Stevens and Ranger Sheridan,

Please accept these preliminary comments on the Lower Cowpasture Restoration Project on behalf of Wild Virginia and Heartwood. Our intention is to assist in your project planning by submitting these comments in advance of the scoping, NEPA process. Our hope is that you find them valuable and useful in honing the details of this project.

Introductory Comments

The Lower Cowpasture Restoration Project is the largest project ever conceived in the George Washington National Forest. It spans over 100,000 acres (77,000 acres of National Forest lands) and would take place over a span of 10 years. Most of the project area lies south of Millboro Springs, VA in the Cowpasture, Jackson, and Calfpasture watersheds north and east of Covington and Clifton Forge and spans parts of Allegheny, Bath and Rockbridge Counties. The initial project overview includes over 3,700 acres of logging of various intensities and scales, and the burning of 11,500 acres. It also includes some possible extreme streambank stabilization near I-64, possible stream impoundment modifications in Simpson Creek and Wilson Creek, some road reconstruction north of Douthat State Park, some invasive plant removal, a new trail system in Rich Hole Wilderness and a new trail connector to the Douthat State Park system. All of this begs the question: just what exactly is this project "restoring"?

Natural History

It has been said that when Europeans first explored the Central Appalachians that a squirrel could travel from the Atlantic Coastline to the Mississippi throughout a contiguous canopy without ever touching the ground. There is no doubt that wolves, cougars and other large predators populated the Lower Cowpasture watershed. Large populations of Passenger pigeons (Ectopistes migratorius) and Carolina parakeets (Conuropsis carolinensis) resided here. Large populations of freshwater mussels resided in higher order streams of the Lower Cowpasture and native trout were abundant. The American bison (Bison bison) was extirpated due to over hunting, with the last being killed in the early 1800s. The wolf (Canis lupus or Canis rufus) in Virginia, for which bounties were paid, was killed around 1900. Also hunted to extinction were the eastern elk (Cervus elaphus canadensis) and the eastern cougar (Felis concolor couguar). Believed extinct since the 1930s, the U.S. Fish & Wildlife Service officially declared the eastern cougar extinct in 2011.

The Cowpasture watershed we know today was preceded by a millennium dominated by large trees, contiguous forests and prolific watercourses. Cowpasture may be named for the bison that grazed there or for the cattle that came with European settlement. When immigrants cleared and burned watershed lowlands for cattle grazing, they clearly mimicked some of the actions that Native Americans had implemented. But European settlement greatly increased the scale of human disturbance. Species were eventually hunted to extinction and widespread logging and burning virtually spared nothing.

Ecological Restoration

The Forest Service Manual defines restoration as "the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems, sustainability, resilience, and health under current and future conditions." (FSM, Ch. 2020.5 (2011-2013); 36 C.F.R. § 219.19)

Of the 8 projects suggested for the project area, only 4 - aquatic passage, watershed improvements, road decommissionings and invasive management—might qualify as true restoration activities. The rest of the projects, timber management, wildlife management, prescribed fire and new trail construction, are not true restoration activities. We therefore respectfully oppose their inclusion in a large scale "restoration" project such as the Lower Cowpasture is currently conceived.

Each of these 8 projects should stand on their own. Throwing them all together as "restoration" caused a myriad of problems.

- It masks their true identity and clouds individual impacts and benefits of each.
- The range of time for their implementation is unprecedented in the GWNF.
- There is no guarantee or implication that these are the only projects that will be proposed in the project area for the 10 years it spans. What other types of projects might also occur in the project area over that 10 year timeframe? How does this allow for accurate cumulative effects analysis to be done?
- Without clear delineations of each project, NEPA analysis is likely to be further compromised.

Combining restoration and non-restoration activities under the same banner is disingenuous. For example why is a trail construction in a wilderness area or commercial timber harvest at any scale considered part of this project? What do these have to do with restoration at any level?

We consider the Rough Mountain trail system a valuable project. We also support all manner of road closures and decommissionings and stream impoundment removals. But Wild Virginia will not stand behind a restoration project that neither meets the Forest Service's own definition of restoration nor maximizes all long term ecological benefits. As this project is currently conceived, it fails at both.

We therefore suggest that all of the elements of the project that do not meet the FSM criteria for restoration be removed from the Lower Cowpasture Project and be considered on their own merits as separate projects. This would allow for a broad expansion of the range of restoration activities possible under this project.

Lack of Relevant Forest Plan to set Direction for Project

All of the project planning work, public presentations, workshops and field trips have been held without the benefit of any direction from the Land Management Plan (still unreleased as of this date) which will dictate the framework within which this project must adhere. Therefore, many of the comments in response to this project are subject to the comments on the management direction in the yet unreleased plan for the project area. There is no way for the public to know if and how the objective for the Lower Cowpasture Restoration Project meets the goals and objectives in the Forest Plan that it will be implemented under. It would make much more sense to wait until the new plan is released for the project planning and public input to be initiated. The timing does not give the public the opportunity to have all of the information necessary to make educated comments on the project. The size and scope and long time duration for this project all point to the importance of familiarity with the plan that this project will be implemented under.

We therefore request that any further public meetings, field trips or requests for comments be delayed until the Final Land and Resource Management Plan for the George Washington National Forest is released.

Size, Scope and Timing

The Lower Cowpasture Restoration Project is the largest project ever conceived in the George Washington National Forest. It spans over 77,000 acres and 10 years. The initial project overview describes what past precedent would consider 8 separate and distinct projects, each with its own costs, benefits, environmental impacts and NEPA analysis. Rolling them all together makes it impossible look at each project separately, distinctly and on its own merits.

The long time frame won't allow for new information, updated analysis or scientific findings that might otherwise affect project specifics and environmental analysis.

New scientific information would be rendered moot. Rapidly changing environmental parameters could not be considered, including climate. Subsequent natural disturbances in the project area after scoping cannot not be considered in the environmental analysis. For instance, a large scale disturbance—fire, windthrow, icestorm, drought, insect predation—all which are happening at a larger frequency, is likely to occur which could create thousands of acres of early-successional habitat and make some elements of the project unnecessary as the purpose and need would have been naturally eliminated.

The Forest Service does long-range planning in a forest plan. That is not the role of project planning. The forest plan is meant to allow the agency flexibility in proposing projects that are necessary and timely. The long-range scale of the Lower Cowpasture Project sacrifices both flexibility and expediency in the project area.

We therefore request that the Lower Cowpasture Restoration Project be scaled back in time and scale to a 2-3 year implementation schedule. Elements of the project that are unlikely to be implemented within this timeframe should be proposed and scoped at some later date as necessary under the Forest Plan.

Restoration with an arbitrary bias.

The Lower Cowpasture Restoration Project ignores the entire history of the forest prior to European settlement and uses a virtual snapshot upon which is bases its desired future conditions. It envisions a time where human disturbances dominated the landscape. The project attempts to replicate that narrow slice of history when human disturbances ranged across the project landscape.

It appears that the project planners envision a landscape with regular, unnatural disturbances that mimic not natural processes but instead that replicate the human disturbance patterns of logging and burning that have predominated the most recent 150 years. This bias is clearly arbitrary and problematic for any true ecological restoration of the Lower Cowpasture watershed. There is no consideration given to one of the most effective and efficient means of ecological restoration which is *passive restoration*. Simply protecting areas by ceasing activities that cause degradation and impede ecosystem or species recovery is both cost and ecologically efficient. There is no mention of forest restoration that maximizes the benefits that a largely unmanaged landscape can create.

Passive restoration clearly is implied under the Forest Service definition of restoration. The entire Lower Cowpasture project area is at some level of recovery from the ravages of clearcutting, fire, erosion and flooding that leveled the area near the turn of the century. Assistance in "the recovery of an ecosystem that has been degraded, damaged or destroyed" to its former integrity is the goal. Allowing ecological processes that naturally create a mosaic of linked climax ecosystems with natural disturbances creating the diversity of a fully functioning forest can be done simply and easily through a long term commitment to passive restoration. As Willers notes, "if that which has functioned beautifully through the eons free of human meddling is to survive, management must become an erasing, a reversing, a minimizing of human impact—a science of letting things be." (Willers, 1999)

We therefore suggest that the Lower Cowpasture Project give due consideration to the benefits of passive restoration throughout the project area. We also suggest that passive restoration areas of significant size be designated throughout the project area.

Oak Regeneration

Lucy Braun notes that "the idea that a climax is dominated by one or a very few species is widespread." In reality, the mixed mesophysic forest "is characterized by a large number of dominants." The dominant trees of the aboreal layer are beech, tulip tree, basswood, sugar maple, chestnut, sweet buckeye, red oak, white oak and hemlock." Braun further notes that "no good areas of mixed mesophytic forest at lower elevations in the Allegheny Mountains (can be) found."

The demise of the chestnut, in combination with the widespread logging over a century ago has resulted in secondary forests that grew from one virtual clearcut. Unmanaged stands in the project area that have not been logged subsequently continue to contain an inflated population of relatively shade intolerant species. As natural succession makes its way across the temporal landscape, it stands to reason that forests will become more diverse and the population of shade intolerant species would decline from the larger size populations that are remnants from a time of massive deforestation.

It does not make sense to commit to a future of eternal forest management to create an artificial oak composition of forest still in its infancy and recovering from serious widespread human disturbance. We maintain that the desired future condition of any project labeled "restoration" should strive to achieve a forest that manages itself and that is continually moving towards its natural climax state. Natural disturbance regimes create the conditions for a resilient diversity in forest composition and structure to allow a diverse genepool of species to build forests of relative health and longevity.

We fail to see any purpose or need to pursue an "oak regeneration" component to the Lower Cowpasture Restoration Project.

Prescribed Fire

The Lower Cowpasture Restoration Project proposes 11,500 acres of prescribed fire. The Allegheny Highlands portion of the 636,000 Appalachian Fire Learning Network already includes over 10,000 acres of burning done since 2008. Other fire projects planned for areas near or within the Lower Cowpasture project area (including the Evans Tract Prescribed Burn, Fore Mountain Early Successional Habitat and Little Neal Prescribed Burn) would burn an additional 1,400 acres. This brings a conservative estimate of fire-managed lands in the project area to 23,000 acres. This is nearly ¼ of the entire project area!

Of course, the Lower Cowpasture Project has a 10-year implementation schedule making it more than likely that there will be other projects planned over the next decade within or adjacent to the project area. There is, therefore, no way that a cumulative effects analysis can be done on the Lower Cowpasture Project. But given the fact that such an immense part of the entire project area is planned *at this point in time* to be burned at least once, gives this project a scale of disturbance not seen since the logging and forest of the end of the 19th century. Is this the forest that this project attempts to emulate?

We are glad to see that some mapping has been done of past fires, prescribed and otherwise, in the project area. This information is very important since these areas are currently providing the benefits of early-successional habitat in the forest. That being said, we fail to see the need for the huge scale of prescribed burning included in the Lower Cowpasture Project.

While there is not a firm consensus on the role of natural fire in shaping historic southern Appalachian forest composition, two points should be made: first, that the Southern Appalachian Physiographic Province averages between 55 and 60 inches of rain a year, with Millboro and Hot Springs averaging around 45 inches per year. Because of the rates of annual rainfall, the fuel load does not accumulate where there are closed canopy conditions, but decays, and the ground generally stays moist, except on ridge crests, especially ones displaying southern or western aspects.

Second, lightning strikes initiate few fires in the Southern Appalachian Mountains, averaging two to six fires per million acres per year (Southern Appalachian Assessment, Terrestrial Report, 1996; Schroeder and Buck, 1970). Such facts cast doubt on the popular position that fire has been a driving factor in southern Appalachian forests beyond the drier ridge sites.

We realize that some southern Appalachian forest types have a historic fire association, though we have questions as to which, if any, have fire dependency. We have reservations about the frequency and extent of the fire regimes in other forest types that are a part of the Lower Cowpasture Project.

We are concerned of the potential for a frequent fire regime to have negative effects that include:

- a loss of humus layer
- a reduced ability for the forest to absorb precipitation
- a resultant loss of soil and water quality

- overall nutrient loss
- reduction in valuable micro and macro organisms
- an overall "xericizing" of the forest that could overall change its basic ecological character

Naturally induced fires are inevitable in some places, and there are existing procedures for National Forest management for their role, as in allowing some natural fires in Wildernesses. In response to those who may claim that such views on fire are dangerous and irresponsible, we state that we do not have objections to the Forest Service taking basic measures to avoid the spread of fires to private property.

Were Southern Appalachian forests allowed to develop according to natural processes, the issue of "fuel load" in much of the landscape would not be an issue. Fires would take place in areas where their association (mostly dry, south facing areas) warrants. It would be worth considering restricting anthropogenic fire to a few clearly xeric areas and the urban-wildland interface.

The "fire-oak" hypothesis that has recently become highly regarded amongst forest managers is not conclusive and should be viewed cautiously. Concerning the issue of "oak suppression", Scheff points out that it is known that oaks can persist in the understory for up to 90 years:

While the top kill and-sprout strategy is often cited as indicative of fire adaptation, it may be more appropriate to consider this as a drought and canopy disturbance adaptation. The theory of "Storage Effect" in ecology explains that long-lived species do not need regular recruitment to maintain their place in an ecosystem. Rare ecological conditions that are conducive to successful reproduction or recruitment can be sufficient. In this case, it may be that extreme drought events (which are becoming more clear in the published and unpublished dendrochronological record for the region) happening once every century or so could be the disturbance process by which oak mysteriously maintains presence, even dominance, in the more mesic range. Under these conditions (which may be associated with fire as a result of extreme drought) we would expect to see extensive die-off of more mesic species in mid-range niches with a selective advantage given to oak species. This model would also explain how some old growth oak forests show recruitment in cohorts, rather than continuous recruitment associated with more classically shade-tolerant species. Oaks are not disappearing from some non-native vector. Rather, they are constricting in dominance across some moisture gradients. They will persist. (Scheff, 2012*)*

A recent study by Matlack, "Reassessment of the Use of Fire as a Management Tool in the Eastern Forests of North America", calls in to question the current state of literature on fire's role in shaping Eastern forest ecosystems.

Matlack points out that the number of spatially explicit studies so far is small. He analyzes 14 of the most frequently cited studies on fire in Eastern North America. He observes the limitations in these studies:

Most published studies have been done in a small subset of possible landscape positions, including dry ridge tops, geologically defined barrens (e.g., cedar glades, serpentine barrens, oak openings), steep slopes, and well-drained dune systems. Nine of the 14 studies fell into one of these categories. Because fire occurrence is strongly affected by landform and soil texture, such sites are likely to have atypical fire regimes (sampled communities were often intentionally selected for high fire frequency)…. Studies have not been representative at a continental scale. Eight of the 14 studies were done in the prairie transition zone on the western edge of the MDF(Mixed Deciduous Forest). Six de- scribed their sites as "prairie" or "savanna"—community types that are known to have frequent natural fires. Study locations are strongly clustered (4 are from a small area in Missouri), and large regions have received no attention at all. Few studies have been done in Braun's (1950) Appalachian oak, oak–chestnut, or mixed mesophytic regions, making generalization difficult across the whole MDF (Hart & Buchanan 2012).

The actual studies themselves have distinct limitations in sample size, duration of study, and other aspects of methodology. In most of these studies, few stands were sampled. Also, fire ring studies are not very long. For example, Only 5 of the 14 studies included at least 10 trees dating back to 1850, and 4 of these studies came from a single study area (i.e., southwestern and central Missouri).

Matlack also addresses a glaring problem with the core design of these studies:
Probably the greatest weakness in the use of fire-scar records as evidence for the occurrence of fire lies in the handling of negative results. Understandably, trees with-out fire scars would not be of interest in a study seeking to measure fire interval; few studies mention trees without scars (10 of the 14 studies report only results from scarred trees). It is questionable whether a study reporting mainly unscarred trees would be publishable at all, implying a publishing bias toward scarring. Selective reporting could potentially skew fire-history reconstructions to a high frequency of fires.

Amongst the studies examined by Matlack were those of Abrams, Guyette, and McEwan, whose works are frequently cited by the agency (Abrams also being cited in this project).

Matlack's work should at least raise some questions as to the strength of the science behind landscape fire regimes in the Central Appalachians and in much of Eastern North America in general. In his closing comments, Matlack adds to the speculation that we have raised regarding the long-term future for forests that are undergoing a frequent fire regime:

On the basis of these observations, what would be the cumulative effect of introducing fire over large areas? In removing aboveground stems fire is similar to herbivory. Deer (Odocoileus virginianus) browsing has resulted in a near-complete shift in forest vegetation to graminoids and ferns (species with protected basal meristems) over large areas in western Pennsylvania and northern Wisconsin (Rooney 2001). By analogy, it is reasonable to expect widespread prescribed burning to increase the prominence of graminoids and ferns and substantially reduce species with exposed meristems. With introduction of fire, the MDF (mixed deciduous forest) could potentially come to resemble the fire-shaped, grass-dominated forests of western North America (e.g., Laughlin & Fule 2008; Coop et al. 2010).

There is absolutely no ecological justification for the scale of burning that the Lower Cowpasture Project proposes. While we understand that the financial incentives exist for this scale of burning, we believe that this is no reason to burn over 23,000 acres of forest in a 100,000 area, no matter what "benefits" you wish to create. We submit that natural disturbance regimes are sufficient for a naturally diverse forest ecosystem and natural process to dominate the project area. They should be allowed to proceed without the eternal management of an ecosystem by logging and fire.

We support prescribed fire as a tool to protect and restore rare, threatened or endangered species and ecosystems. Therefore prescribed fire should be relatively small and tightly focused, not large, sweeping and random. We request that the Lower Cowpasture Project identify such species and ecosystems and only focus prescribed burning in these areas and implement a long-term monitoring to assess effectiveness at meeting these goals and objectives

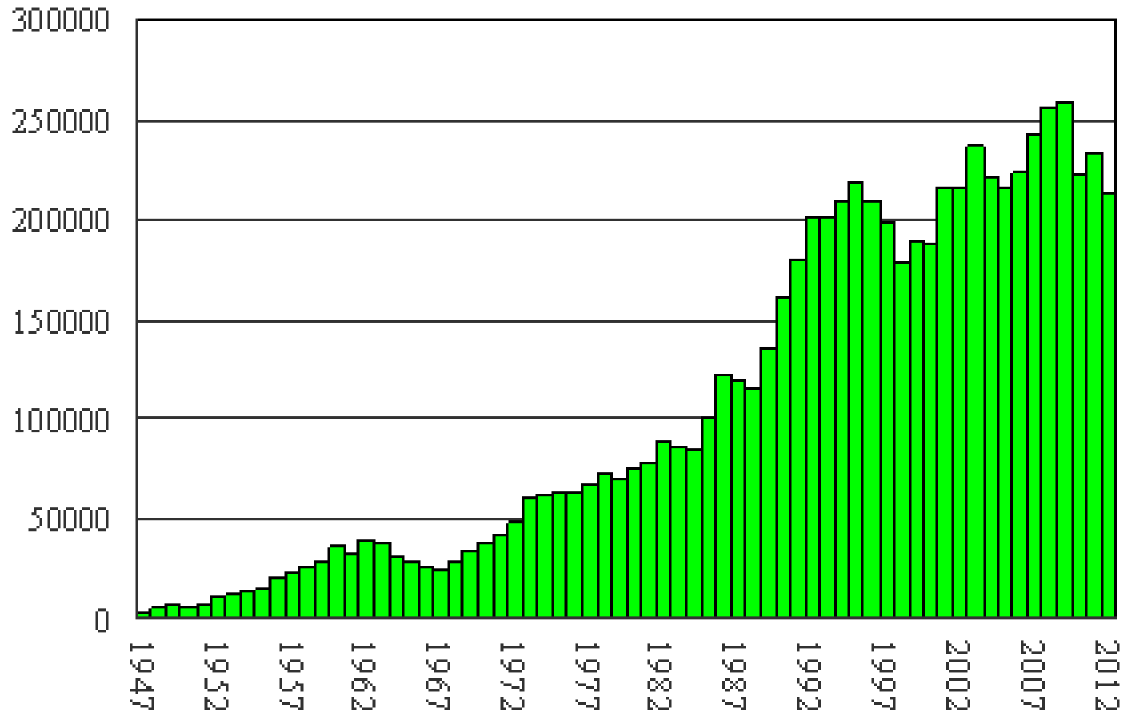
Early Successional Habitat and Wildlife

Does GWNF forest management need to create more opportunities for wildlife and hunting? We do not believe that science, history or trends substantiate a purpose or a need for active management to increase hunted game species in the GWNF.

U.S. Fish and Wildlife Service shows a steady drop in the number of hunters and hunter days in the US since 1991. In the Mid Atlantic states the total number of hunters has declined more than 12% since 1991. (USFWS, 2014)

What is the result of creating increases in deer habitat and edge areas? Despite a decline in the number of hunters, deer and deer kills are at or near historic levels. But dead deer are not the only cost/benefit of large deer populations. Virginia is one of the ten states with the highest probability of hitting a deer with your car. (Chandler LG, 2014) Deer cause over 56,000 reported car crashes yearly here in Virginia. Better than one of every hundred drivers hits a deer each year in Virginia (State Farm Insurance, 2013) An average of three fatalities and more than 450 injuries are attributed to deer-vehicle accidents annually. (VDGIF) Car crashes make deer the deadliest animal in North America. (Cambronne, 2013)

Virginia Deer Kill, 1947 to 2012 (VDGIF, 2014)



White tails also pose a risk to other wildlife and to forest restoration as a population of deer will eat the forest understory, reducing the kind of brush that you need there for turkey, grouse and some native songbirds. Also, the effects of deer populations browsing on sensitive plant species and understory diversity is well documented. (Alverson et. al., 1988; Rooney, 2001)

Wild Turkey

DGIF estimates Virginia's wild turkey population to be approximately 180,000 birds. In Virginia, 4,432 turkeys were harvested during the 2012-13 fall turkey season. The 2012-13 season total was the highest fall harvest reported over the past 5 years.

Grouse

DGIF reports that ruffed grouse populations have been stable over the past few years with an overall gentle decline over the last decade which corresponds to a gradual decrease in the number of hunters providing population data (Norman, 2010-11 Ruffed Grouse Population Status in Virginia).

While populations of hunted wildlife in Virginia are in no jeopardy, the distribution of their populations has changed with the gradual increase in age of national forests overall since their widespread denuding of the late 1800's and early 1900's. This is a result of natural succession, not of any failing in forest management.

The arbitrary nature of wildlife

Wildlife is defined in the Oxford dictionary as "wild animals collectively; the native fauna of a region." Yet the Lower Cowpasture Project demonstrates an arbitrary bias towards three "game species" that have hunting seasons in Virginia, white-tailed deer, wild turkey and grouse. We find no mention of any non-game, rare, threatened or endangered species. There is no mention of any keystone species that are indicators of healthy ecosystems. And (with the possible exception of the American chestnut) there is no mention of any possible reintroduction of extirpated species as part of the restoration plan.

We note that there is significant precedent for actions that have resulted in successful reintroduction of extirpated species. The Virginia Game Commission began a reintroduction program for beavers between 1932 and 1938 and by the early 1950s, beavers had reoccupied many parts of their former range in Virginia. Also, the fisher (Martes pennanti pennati), was successfully reintroduced in West Virginia in 1969 and its range is expanding towards Virginia after over hunting resulted in extirpation. The Virgina white-tailed deer (Odocoileus virginianus virginianus), was officially reported as having a *zero population in 1890*, but with legal protections and careful management, white-tailed deer populations were successfully reestablished in Virginia.

Beaver

Beavers are important in that they create new habitats that benefit a variety of other animals. They "help create a mosaic of field, swamp, pond, and forest in various stages of succession." (Wolke, 1999) Their dams slow the flow of moving waters and allow other wildlife and plant species to colonize this modified ecosystem. Ducks and other waterfowl, as well as many reptiles, amphibians, and aquatic insects, are attracted to beaver ponds.

We recommend that extending beaver populations would create numerous restoration benefits in the Lower Cowpasture, Jackson and Calfpasture watersheds.

Restoration of Trophic relationships

The ecological significance of coyote-wolf hybrids establishing populations in Virginia is important in restablishing predator-prey relationships. (Bozarth, 2011) The restoration of ecological processes would be further facilitated by the restoration of preexisting trophic relationships. This can be done by the reintroduction of top carnivores, notably the cougar (Felis concoulor cougar) and wolf (Canis lupus, Canis rufus) to their past range.

We recommend that the agency begin negotiations with U.S. Department of Fish and Wildlife and Virginia Department of Natural Heritage and Game and Inland Fisheries to explore the possibility of the reintroduction of cougar and wolves to the project area as part of the Lower Cowpasture Project.

Restoration and decreasing the influx of pests, pathogens and invasive species

Although natural in origin, the effects, the population and the range of pests, pathogens and invasive species are heightened by human activities. Plant pests and pathogens have shown an unprecedented level of mobility in recent decades, both spreading to new territories as stowaways in shipments of commodities, and shifting their range in response to climate. These trends have also been observed to apply to trees, where devastating outbreaks of diseases like Dutch elm disease, chestnut blight, and ash dieback have affected large areas in recent years.

Unfortunately, all of the projects considered part of the Lower Cowpasture Restoration Project, with the exception of road closures, create new opportunities for pests, pathogens and invasive species. Any project that is focused on restoration must do everything possible to limit the increase and influx of pests, pathogens and invasive species. We do not consider the introduction, or the increase in population or range of non-native invasive species in the project area an acceptable byproduct of any type of forest management, no matter how well intentioned it may be.

Stream impoundment removal, erosion control and bank restoration are the only activities in the project that can create conditions which help stem the tide of pests, pathogens and invasives but even these, if not carefully implemented, can be problematic. We believe that true ecological restoration can only be effective if it reduces or eliminates the vectors and opportunities for their spread and their intrusion to new areas.

Roads

The presence of roads in the forest creates many significant ecological and management problems. The scientific literature abounds with information on the negative impacts of forest fragmentation and associated edge effects created by roads and other disturbances. Among the widely recognized impacts are the isolation of wildlife populations, changes to plant communities and structure due to altered physical conditions, and increased predation on forest-breeding birds. Recent research reveals that even small dirt roads in Virginia's national forests can fragment and negatively affect woodland salamander populations. As previously stated, roads are the most common avenue for the spread of non-native invasive plant species. (Trombulak, S.C. et.al, 2000)

Roads are also a significant source of sedimentation, particularly when they are not adequately maintained. In the mountain regions of Virginia, excess sediment is a grave threat to water quality and aquatic species. As a recent Environmental Assessment for a proposed timber sale and prescribed burn on the GWNF explains, "On National Forest System land, sedimentation is the priomary factor in water quality degradation. Sedimentation may be introduced into stream channels from soil disturbing activities such as timber harvesting and road construction." (USDA FS, 2007)

Decommissioning roads is a very effective tool for restoring healthy forests and watersheds. Many of the problems described above can be minimized by closing, regrading, and revegetating unneeded roads. Some management problems that are impediments to restoration, such as illegal all-terrain vehicle (ATV) use and wildlife collection, can also be reduced.

Road decommissionings should strike a balance between maximizing ecological and hydrological benefits while minimizing costs. At minimum, all decommissionings should include blocking entrances, removal of culverts, manual removal of invasive vegetation, establishing drainageways and installing waterbars.

In order to maximize recreational access and connectivity, we recommend that all decommissionings should be considered either as additions to the existing trail system or as "unauthorized" (unmaintained) trails.

We recommend that the Lower Cowpasture Project implement an aggressive program of road closures and decommissionings for all unnecessary roads, with a priority on those with the most severe hydrological problems and those in or adjacent to existing roadless, potential wilderness, research natural or special biological areas.

Non-Native Invasive Species

Non-Native Invasive Species (NNIS) of plants are a severe threat to the project area resulting in loss of biodiversity, increased exposure of native species to disease and degradation of the ecosystem. Early recognition and removal of NNIS is extremely important to maintain intact ecosystems.

First, a strategy for removal needs to be determined based upon the biology of the plant to be removed. The best removal practice will determine the season, the method of removal and how many times the area needs to be remediated. Mechanical means are the most desirable methods but are not always the best method of removal. For example, cutting *Ailanthus altissima* (tree of heaven) causes suckers to grow profusely, increasing the number of individuals and making the problem worse.

If mechanical means alone will not accomplish removal, then an herbicide, possibly in conjunction with mechanical methods is indicated. When herbicide application is the best removal practice, specific, targeted herbicide application is the method of choice over broadcast spraying of herbicide. Tree of Heaven that is mechanically cut, with the stump treated immediately with herbicide, can be effectively controlled.

The least toxic product should be the herbicide of choice. Surfactants present in some herbicide formulations can be very detrimental to aquatic and soil life so extra care must be exercised. At all times, the concept that the GWNF is a watershed and therefore must be maintained in the most pristine condition must be the guiding principle.

Second, if mechanical methods are used, the site should be returned to as close to initial, undisturbed conditions as possible. Disturbance is what usually allows NNIS to become established in the first place. Moving leaf litter and disrupting soil exposes seeds present in the soil to conditions that might favor germination. Exposed soil also makes a good substrate for new NNIS to be introduced. If the NNIS targeted for removal has already set viable seeds, the plants should be bagged and removed from the forest.

Third, follow up visits and monitoring of the area should be done to determine effectiveness of the remediation method. Depending on the species targeted to be removed, multiple site visits may need to be scheduled until the seed bed is depleted or there is no regrowth.

Climate Change and Climate Mitigation

Climate Change is one of the most serious environmental, social, and economic threats the world is facing today. It is a significant issue and is to be considered a significant issue in all federal actions, including the Lower Cowpasture Project. The Directive from the Chief of the Forest Service, *Climate Change Considerations in Land Management Plan Revisions*; January 20, 2010, lists two basic considerations for evaluating climate change: How climate change is likely to modify conditions on the planning unit and how management of the planning unit may influence levels of global greenhouse gases and thus climate change? (Climate Change Considerations in Land Management Plan Revisions; January 20, 2010; p. 2) Furthermore, the Chief's direction on climate change directs forest planning to "place increased value on monitoring and trend data to understand actual climate change implications to local natural resource management." In its absence, it is essential that projects incorporate measurable outcomes to measure the success of climate strategies so that the climate strategies can become a part of forest-wide adaptive management.

The current forest plan does not address climate, as it predates most climate/carbon directives. While it may be difficult to quantify the carbon and climatic effects of an individual project, cumulative effects analysis through NEPA is the primary vehicle for analyzing project effects over a wide special and temporal range.

Recent studies confirm that logging and vegetation management contribute to the disruption of carbon cycles that are contributing to climate change. (Sharma, et. al., 2013; FAO UN, 2006) Furthermore, climactic effects and effects of projects on a forest's ability to mitigate and stabilize climate are increased as the spatial and temporal ranges increase. Therefore, in the absence of such analysis, project level NEPA analysis becomes the vehicle for analyzing the cumulative effects of a single project when considered in concert with all other projects within a broad special and temporal range, including forest-wide analysis, region-wide analysis, a decade's worth of implemented projects, current projects and those projects likely to be implemented in the reasonably foreseeable future.

This project, as conceived, will have negative effects on the forest's carbon sequestration capacity in terms of logging, soil structure disturbance, loss of humus layer, and road impacts.

Climate as a Forest Product

Climate is influenced by changes in land cover. Large-scale conversions of forestland into agricultural land or urban development reduce carbon storage and the potential for sequestration and thus contribute to the build-up of carbon dioxide in the atmosphere. The warming of the atmosphere is linked to increased concentrations of greenhouse gases, including increases in carbon dioxide from changes in land management. Even though forests in the U.S. have acted as net carbon sinks since the 1950s, the annual additions to the sink (sequestration) appear to be declining. The Environmental Protection Agency lists the following forestry practices that can sequester carbon or preserve carbon storage: afforestation, reforestation, avoiding logging, and longer harvest-regeneration cycles. (USEPA, 2013)

Obviously, planned logging and burning and taking out vegetation for other reasons do not increase the capacity of forests a carbon sinks. "In fact, young forests rather than old-growth forests are very often conspicuous sources of CO_2 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." (Sebastiaan Luyssaert, E. et. al. 2008)

Forests affect climate and weather, in four primary ways: they lower temperatures, increase the moisture comment of air and soil, and absorb carbon dioxide from the atmosphere and they store sequester carbon. Each part of the forest contributes to climate control, from the leaves, stems, trunks and roots of trees and vegetation, to down woody debris, leaf litter and soils. Leaves cool the air through a process called evapotranspiration. Evapotranspiration is the combination of two simultaneous processes: evaporation and transpiration, both of which release moisture into the air. During evaporation, water is converted from liquid to vapor and evaporates from soil, lakes, rivers and even pavement. During transpiration, water that was drawn up through the soil by the roots evaporates from the leaves. It may seem like an invisible process to our eyes, but a large oak tree is capable of transpiring 40,000 gallons of water into the atmosphere during one year. (USGS) Leaves also filter particles from the air, including dust, ozone, carbon monoxide and other air pollutants. Through the process of photosynthesis, trees remove carbon dioxide and release oxygen into our air. Trees store the carbon dioxide, called carbon sequestration, and -- depending on the size of the tree -- can hold between 35 to 800 pounds of carbon dioxide each year. (USEPA, 2007)

Land surface changes can affect local precipitation and temperatures. Vegetation patterns and soil composition can influence cloud formation and precipitation through their impact on evaporation and convection. (de Sherbinin, A. 2002) Overall, the world's forest ecosystems are estimated to store some 638 Gt (638 billion tons) of carbon, which is more than the amount of carbon in the entire atmosphere. (www.greenfacts.org.)

There are many positive effects of allowing second-growth trees to mature into old-growth character. There are numerous studies that show that mature and old-growth stands act as carbon sinks. Their benefits in carbon sequestration are more complex than indexing the rate of vegetative growth. Undisturbed forest stands sequester carbon not only in the trunks of trees, but in the understory and in soils, where fungi and microbes promote an active role in storing carbon and nitrogen. As was reported recently in *Nature*, old-growth forests accumulate carbon for centuries and contain large quantities of it. (Sebastiaan Luyssaert, E. , et. al. 2008)

Old Growth

Contrary to the hypothesis that old trees are ineffective at carbon sequestration, the research shows that young forests, rather than old-growth forests, are very often conspicuous sources of CO_2 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. (ibid. 2008) Indeed, there is research emerging that old growth stands are carbon-rich forests (Pichancourt, 2014) effective at accumulating carbon in their soils (Guoyi Zhou, Shuguang, et. al., 2006) and that the rate of tree carbon accumulation increases continuously with tree size. (Stephenson, et al., 2014)

Federal lands have a unique potential to be effective carbon sinks due to the ability to minimize anthropogenic changes to the landscape that would otherwise release carbon and/or decrease carbon carrying capacity (logging, roads, species conversion, etc). For example, a comparative study between the lands in Ft. Benning, Georgia and the surrounding region demonstrates how lands under a stable owner (the military) with stable management (little or no logging in much of its holdings) are much more effective at sequestering carbon than the mix of private and state lands surrounding it. (Shuquingzau, Shuguangliu, et. al. 2010)

We recommend that the Lower Cowpasture Project include a proposal for an expansive network of potential old growth/carbon reserves both for their positive ecological benefits and for their ability to offset carbon emissions produced by other aspects of the project.

Strategies for minimizing carbon output and improving carbon sequestration are critical at the project level and should lead to measurable goals or outcomes where success or failure can be gauged. Such strategies could be attached to specific outcomes: e.g. forest restored to natural range of variation; watersheds restored to functioning condition class; second-growth forests developing old-growth characteristics; estimates of carbon sequestered. When it comes to climate, nothing happens in a vacuum.

Research shows that the types of logging and thinning that attempt to create permanent wildlife openings and early successional habitat are unsustainable and create long term increased carbon emissions. (Hudiburg, 2013) The majority of the projects considered in the Lower Cowpasture Project—vegetation management, regeneration cuts, thinnings, wildlife openings, timber management and prescribed fires—separately and together, are net carbon dioxide producers, reducing carbon uptake and producing increased carbon emissions when compared to leaving these areas be. It will result in a 10 year program of continual contributions to increasing amounts of GHGs in the atmosphere. The Lower Cowpasture Project has the potential to put into place a methodology that considers no climate impacts insignificant and that evaluates the cumulative impacts of all projects projects affecting carbon storage, carbon sequestration, and carbon releases to the atmosphere both from the project itself and the subsequent uses including incineration, burning, transporting or refining of any carbon-based forest products extracted.

We request that the Lower Cowpasture Project NEPA analysis address carbon and climate effects in this project. In addition, the project analysis should acknowledge the effects that the no action alternative has on maintaining and increasing the ability of the project area to mitigate climate change currently and over time.

The beneficial results of the no action alternative would include, but not be limited to:

- Eliminating actions that do not maximize carbon storage in vegetation, in soils and in terrestrial stocks.
- Eliminating actions that accelerate the rate of carbon released into the atmosphere both in the extraction and the use—incineration—of the forest resource.

- Eliminating actions which accelerate the rate of evaporation from soils and that can potentially increase erosion
- Eliminating actions that reduce the rate of evapotranspiration to the atmosphere
- Eliminating actions where prescribed burning result in reduction of biomass and carbon storage in vegetation and soils.
- Eliminating prescribed burning activities that result in large releases of carbon dioxide and particulates to the atmosphere.

We further request that the project provide a monitoring framework that identifies measurable goals and objectives for climate adaptation and mitigation and monitors progress towards them. We further request that an analysis of the range of alternatives compare long term Net Public Benefits with respect to climate mitigation, CO_2 emissions, and carbon sequestration.

Biomass

Logging the Lower Cowpasture Project area for purposes of biomass incineration and energy generation is a contentious issue. We are aware that WestVaco has put on line a 85MW biomass incinerator that will power its Covington operations. The Covington mill and plant has for years been the single largest user of power from Dominion Power. The Lower Cowpasture Project has been considered a source of trees and wood fiber to fuel these operations. Commonwealth transportation credits also make possible the logging in the Lower Cowpasture Project for energy fuel markets and Dominion Power biomass burners in central and eastern Virginia.

It needs to be noted that the current Land and Resource Management Plan makes no mention timber as an energy resource. There is no reference to the extraction, removal or use of timber resources to be used as energy.

Because of this, we maintain that the use of timber and vegetation management resources for use in energy generation is an incompatible use of forest resources.

Environmental Impacts of Incineration and Burning

It is important to note that the Lower Cowpasture consider the impacts of the uses of forest products in its environmental impact statement as well as the impacts of the simple extraction of resources. That would include, but not be limited to CO2 emmissions and 2.5 ppm and smaller particulates from incineration (biomass burning or prescribed burning) and cumulative effects analysis—projected and actual—for the entire time duration of the project. This should include the aforementioned impacts at a district, forest, landscape, state and regional level. This information is critical to assess the effects of the Cowpasture Project in conjunction with other projects for assessing their contributions to human health problems and climate change acceleration.

Monitoring

Historically, projects in the GWNF were not monitored to assess to what degree the projects were successful in achieving their objectives, purpose and need. This is a question of both cost and will. The GWNF lacks both the funding to do the monitoring and the will to allocate scant financial resources to projects after they have been completed.

We have great concern that many aspects of the Lower Cowpasture Project will not meet restoration objectives. The public and the agency need to know if they do in order to inform future projects. We submit that sufficient monitoring is critical to the success of any restoration project.

We suggest that money saved from low cost passive restoration and scaled back fire, vegetation management, early-successional habitat creation and below-cost timber sales be redirected to a clearly defined monitoring program for each of the projects umbrellaed under the Lower Cowpasture Project. Monitoring should continue from 5-10 years in order to assess how well each project achieved its objectives, purpose and need.

Restoration and Restraint

One of the great concepts and actions that need to be restored to our forests is that of appropriate scale. There is great value restricting our actions, taking only what is needed from the environment and leaving the rest for future generations. The USFS can play a very important role by pr encouraging a reduction in consumption and limit to extraction of our natural resources. No one can predict the needs of the future but if we are to take our cues from the "best available science" then we know how important our intact forests are to our future.

Rewilding of the Forest

The forest need not be restored to a snapshot that may have existed at some point in time within the last century and a half. Our forests do not need to be restored, they need to be *rewilded*.

We all need to look beyond the last century that has been characterized by a forest recovering from massive desecrations. And we should do so in both directions, looking both back to the past and forward to the future. We should be giving full reign to natural succession and natural processes that maximize the potential of the forest to produce widespread mature forests. These forests, and their variety and distribution of natural disturbances throughout including naturally-occurring fire, windthrow, ice storms, flooding, mortality, insect predation and decomposition produce a diversity of habitat that maximizes plant and animal diversity. They produce pure, cold water streams and warmer more diverse wetlands that reduce erosion, mitigate flooding and maximize the storage of surface and ground water. And mature forests maximize carbon storage to provide true resiliency and mitigation to slow climate change which otherwise poses forest changes that would significantly reduce the vital ecosystem services to the project area, region, state, nation and planet.

So what would rewilding our forests entail? Taking down fences, closing unnecessary roads, removing culverts and recontouring rutted drainages. Removing stream impoundments and dams that impede upstream spawning and downstream migration. Bringing back food webs and trophic functions that have been so radically simplified. Reestablishing top predators like wolves and cougars and keystone species that create diverse habitats and opportunities for many other species. And large expanses of old growth forests.

The Lower Cowpasture, Calfpasture and Jackson watersheds once boasted a series of dynamic wetlands and that dynamism creates diverse micro and macro habitats for all manner of freshwater fish and wildlife. Increasing the populations of beavers, natures great engineers, would go far to make this again a reality.

American Chestnuts that once were the dominant canopy species in Virginia's forests can now be successfully reintroduced and because they are shade tolerant, do not need clearcuts to be reestablished throughout the forest. Their nuts quickly become food for wildlife and promise more chestnuts extending their range and numbers.

"Rewilding is about making connections. Forging connections through corridors. Creating linkages across landscapes and responsible econopmic relationships between protected areas and people. Forging links between ourselves and the intact ecosystems we need to survive." (Fraser, 2009)

The largest physical impediment is I-64. It slices through the southern portion of the project area, cutting offScale the southern James River Ranger District and the northern boundary of the Jefferson National Forest. Consideration needs to be given to long-term possibilities of creating a series of passages beneath the interstate, in the Longdale Furnace area south of Mill Mountain and areas on the west and east sides of Covington, that allow passage of wildlife north and south. The Lower Cowpasture Project can plant the seeds for this by initiating discussions with VDOT, VDGIF and DNH, and USFWS regarding species reintroduction and connecting key blocks of habitat.

USFS can also do a better job at educating local communities of the value of ecological restoration and all the ecosystem services it can provide local communities. It will take positive relationships with local landowners, farmers and woodlot owners that can result in possibilities such as acquisition of lands within the proclamation boundary of the GWNF and private conservation easements that reconnect fragmented habitat. This project can be a vehicle to help make that happen.

Perhaps even more important is what rewilding of the landscape means to our own lives. When we allow nature to do its own thing, our lives become part of those dynamic processes and we are rewarded with much more rich, exciting and mysterious ecosystems to explore and discover, mountains to climb, and rivers to run. Wildness enriches all of our lives and fills them with wonder, enchantment, and reverence, just what is necessary for us in a world that our actions might otherwise extinguish.

Thank you for the opportunity to participate in the preplanning process of the Lower Cowpasture Project. We look forward to our continuing positive discussions about how our recommendations might be incorporated into the project.

We want to acknowledge the contributions of our friends and colleagues whose work and vision contributed to these comments including Sherman Bamford, Steve Krichbaum, David Hannah, Davis Mounger, Jim Scheff, and especially the late Robert F. Mueller who laid the groundwork for the restoration and rewilding of his beloved George Washington National Forest.

Sincerely,

Ernie Reed, Conservation Director
Wild Virginia
P. O. Box 1065
Charlottesville, VA 22902
lec@wildvirginia.org
www.wildvirginia.org

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