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Title:
Comments: To the USFS Regarding the GMNF Telephone Gap Integrated Resource Project, from the Save Public Forest Research Group

The first point we would like to make is that the comment period for such an involved, complex project is extremely insufficient, especially because of the timing.

Habitat

Before creating more early succession artificially through management by logging companies, an inventory of all the naturally occurring early succession forest openings, typically a quarter acre or less in area, should be done. It should first be evaluated to see the increases in downed trees due to the changes in Vermont precipitation, including increased, heavier rain events and heavy wet snows, as well as saturated, thawed soil layers throughout winter. It is inaccurate to only count logged land.

OUR PURPOSE: TO PRESERVE INTERIOR FOREST HABITAT AND NATURAL BIODIVERSITY PER PRESIDENTIAL EXECUTIVE ORDER #14072 (For the purpose of Biodiversity and Climate mitigation)

(?>>1.1.5 Decisions to be made by the Responsible Official: * Determine whether a finding of no significant impact or an environmental impact statement is warranted based on the disclosure of effects in the environmental assessment.)

From Preliminary Environmental Assessment, Forest Plan Goal 2 is to maintain and restore the quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals

While some of the composition and age class objectives may be met through natural processes, vegetation management such as commercial timber harvest, prescribed fire, (herbicides) and other treatments are often used to restore and enhance diversity of habitat types and structure

Table 1-3 highlights the gaps between existing and desired forest habitat composition within the project area. For example, the northern hardwood habitat type represents 75 percent of all NFS lands within the project area; however, northern hardwoods are expected occupy about 23 percent of the landscape based on its long-term ecosystem tendency (climate change).

Although the Forest Plan habitat type objective at the forest-wide level is 30 to 40 percent northern hardwoods, the HMU analysis indicates this habitat type within the project area should be 15 to 25 percent. To focus where vegetation management can be considered, about 93 percent of suitable lands within the project area are occupied by northern hardwoods and can be actively managed to alter habitat composition.

The plan calls for reducing the hardwoods from present 75% of forest to 20% Vegetation management is also used to enhance habitats and features of particular value to certain plant and animal species where habitat is uncommon in the forest, such as aspen, birch, and oak.

Together, Tables 1-3 and 1-4 illustrate the following important gaps between the existing and desired future condition for habitat composition and age class within the Telephone Gap project area:

* A substantial imbalance in desired composition among northern hardwood, mixedwood, and softwood habitat types, with mixedwood and softwood habitat under-represented.

* A low abundance of aspen and birch habitat occurring on suitable lands.

* An under-representation of oak forest habitat.

* A low abundance (less than 1 percent) or absence of regenerating age class (0 to 9 years old) across all habitat types.

-Aspen and Birch Habitat There is a need to regenerate aspen and birch habitats on suitable lands within the project area. Both of these habitats are early successional forest types and cannot occur without disturbance events to expose mineral soil, stimulate aspen suckering, and provide abundant light reaching the forest floor- Warming the environment, Carbon Storage loss

The HMU objectives for the regenerating age class range from 100 to 1,790 acres ?> This is up from non existent except for ?> there are 43 acres of existing upland openings providing early successional habitat, mostly occurring in utility corridors within the project area, there are no stands over one acre in the regenerating age class on suitable lands.

FW::: "Make sure utility corridors are serving this purpose.

??Ask the interstate system to create the pollinator corridor;

Ask the pastoral/homeowners of Vermont's open fields sector to create this pollinator migratory need: Don't take from Mature growth on PUBLIC LANDS- contrary to Executive Order for Old Growth.

From Indigenous community petition: Act 59

"And Whereas the Telephone Gap Forest Logging Plan contravenes Vermont's Community Resilience and Biodiversity Protection Act (2023) that announced intentions to increase protected landscapes and habitats thereby enhancing biodiversity"

Selective logging of spruce and other softwoods occurred during the 1800s reducing their relative proportion on the landscape by removing most seed-producing trees and led to a hardwood-dominated landscape.

Management since the creation of GMNF in 1932 has also affected the composition and structure of vegetation. Activities affecting the distribution of forest habitats have included conversion of hardwood or mixed stands to softwoods to improve habitat for deer, and maintenance of or conversion to aspen, birch, and upland openings in order to improve habitatbfor species associated with these habitats.

The majority of forested stands forest-wide are ecologically young second growth forests.

Until further guidance is available from the MOG inventory process to define mature forest based on ecological conditions at the national forest level, this analysis relies on the definition for late successional forest provided by the Forest Plan: "A forest beyond the age of economic maturity, generally beyond 100 years of age. These forests are older, have larger trees, and have more structural complexity than mature forest, and they are either in the process of or have developed old growth characteristics. They may exhibit evidence of past human or natural.

The mature stage of stand development generally begins when a forest stand moves beyond self-thinning,starts

to diversify in height and structure, and/or the understory begins to reinitiate. Structural characteristics that mark the transition from an immature to mature forest are unique to each forest type. Ecologically mature forests on GMNF are those considered to have structural complexity including multiple age classes and sizes, canopy gaps, abundant snags, large downed wood, maximum height growth, and understory development (USDA Forest Service 2023d, VANR 2021a, and D'Amato and Catanzaro 2019). They may include but are not limited to abundance of large trees, large tree stem diameter, stem diameter diversity, horizontal canopy openings or patchiness, aboveground biomass accumulation,stand height, presence of standing and/or downed boles, vertical canopy layers, or a combination of these attributes

Forest Health

Habitat fragmentation is major degradation of the forest. This study shows 70% of remaining global forest is within 1 km of the forest's edge, In the blow up of the United States, you can pick out the green area in the Northeast, which is the Adirondack Park, and beside and below it is all red and shades of orange indicating forests mostly under 300 meters to the forest edge. --- The study showed that fragmentation consistently degraded ecosystems, reducing species persistence, species richness, nutrient retention, trophic dynamics, and, in more isolated fragments, movement.

Carbon and Greenhouse Gas Emissions

The CFA 2024 and the PEA employ a confusing set of definitions relating to forest carbon stocks and flows that hinder understanding and sometimes work at cross purposes. Rather than trying to resolve this tangled mix of definitions, I use the following terminology:

Carbon stocks are the amounts of carbon contained in various reservoirs or pools at a given time, and carbon flows are transfers of carbon from one pool to another. Stocks are measured in units of mass, and flows are measured in units of mass per unit time; sometimes stocks or flows are given per unit area. For a given forest, what matters for the climate is the average long-term forest carbon stock summed over all carbon reservoirs or pools within the forest comprising living and dead biomass above and below ground as well as any free carbon that may be present. This forest carbon stock and the atmosphere are engaged in a dynamic interchange with carbon moving in both directions. Carbon moves into the forest via photosynthesis and moves out of the forest through a variety processes, which include respiration by living cells in plants, animals, and all other organisms (including decay organisms,) as well as losses from disturbance such as fire, storms, deforestation or harvest, together with much smaller flows of organic materials carried away by air or water. Respiration refers to the metabolic breakdown of food molecules to release energy for biological processes. For most organisms, respiration produces CO2, but some microorganisms produce methane instead when no oxygen is available.

Carbon sequestration occurs when carbon input exceeds carbon output so that the average forest carbon stock increases over a significant period of time; carbon sequestration is the same as accumulating or storing carbon in a carbon sink. For those of us concerned with the future of civilization, however, a significant period of time is very long time indeed (Archer et al. 2009, Solomon et al. 2009). The brutal fact is that our long-term climate future is dominated by the total amount of carbon dioxide added to the atmosphere during the fossil energy era, and it really doesn't make very much difference whether it's added now or a few decades from now, and plenty of disruption is already baked in. It is now abundantly clear (IPCC 2023) that it is not only necessary to dramatically reduce fossil carbon emissions into the atmosphere but also to remove enormous quantities of carbon from the atmosphere if we are to avoid a grim future of increasingly dangerous and long-lasting climate disruption.

Most so-called "climate-smart" forestry practices, such as non-commercial thinning, longer intervals between harvests, and more durable wood products do nothing more than shift the time when CO2 is released into the atmosphere by a few decades at most with little effect on climate change. That is why some are proposing and getting funding to harvest wood and lock it away in "wood vaults" (Zeng & Hausmann 2022) in what seems

to be an act of desperation. More viable options, such as wildland forest reserves and reduced consumption of wood products are gaining traction, even among foresters (Littlefield et al. 2024), and reserve expansion should be a policy priority in all national forests. Many of us, myself included, love the warm and wonderful beauty of wood, but wood is a finite resource and must be recognized as such. The only reliable way to keep more carbon in forests is also the most obvious: reduce the removal of carbon from forests.

Growth and Mortality of Trees and Forests:

Recent years have seen a growing body of scientific evidence showing that forests add more and more carbon as they age and continue to do so for centuries (Zhou et al. 2006, Luyssaert et al. 2008, Keeton et al. 2011, Pan et al. 2014, Curtis & Gough 2018, Leverett et al. 2021, Law et al. 2022, Birdsey et al. 2023). There is also evidence that many trees grow faster as they age (Stephenson et al. 2014) as suggested by metabolic scaling theory (Enquist et al. 1999, Enquist et al. 2009), and it is perhaps not surprising that carbon is concentrated in the largest trees in forests around the world, with the largest 1% containing 38% of total tree biomass in temperate plots studied by Lutz et al. (2018). These finding show that there is significant potential to store much more carbon in forests over decades and centuries, especially in mature and old forests, if they are allowed to continue growing and conditions don't change too much.

The fact that every living thing is certain to die eventually doesn't mean that the probability of doing so increases with age, although that is the case for our pets and ourselves. The process of increasing mortality risk with age is called senescence, but not all organisms senesce, and many tree species may l be examples of organisms in which the probability of death remains essentially constant or even increases once a certain size or age is reached (Bauditsch 2008). In any event, there is no foundation in ecological science for the notion that forests become tired and decrepit with age and need some "chainsaw medicine" to keep them vibrant and healthy, even though foresters often suggest as much. Indeed the very opposite may be true; the longer conditions allow forests to persist, the more richly connected, diverse, and resilient they become. This is a venerable idea in ecology that is gaining both empirical and theoretical support (Hatton et al. 2024).

Thresholds of Concern:

Two broad issues related to forest carbon are listed in Table 3.7 (PEA, pp. 59-60) along with their "thresholds of concern." The first is that "Timber harvesting of forested stands, especially with mature or late successional forest attributes, may [actually, will] reduce GMNF forest's ability to sequester carbon and mitigate greenhouse gas emissions." One threshold of concern is that "Level of carbon loss results in GMNF to shift from a carbon sink to a carbon source." Really? We need be concerned only when the entire GMNF shifts from sink to source? Obviously, significant harm to sequestration capacity occurs long before the arrival of such an extreme situation, and arguably well before the other stated threshold: "Level of carbon removed if allowable sale quantity harvested is realized."

The second issue focuses on emissions: "Harvest of trees and prescribed fire will increase carbon emitted into the atmosphere." And the thresholds of concern are that emission levels have "a measurable adverse effect" or exceed "the amount emitted if an "allowable sale quantity harvest is realized," with the ASQ amounting to 19.7 million board feet per year based on the outdated Forest Plan of 2006, which didn't even mention carbon sequestration. Harvesting between 143,992 metric tons (Alternative D) and 213,401 metric tons (Alternative B) of carbon dioxide equivalent (to say nothing of the risible 2,202,244 metric tons of the 15-year total ASQ considered reasonable by the outdated Forest Plan) as listed in Table 3.10, the great bulk of which end up in the atmosphere over the next few decades, certainly looks like a significant environmental impact.

Estimating the size of this impact, or the "social cost of carbon" (SCC) is fraught with complications and depends on how much value is placed on future generations. In 2020, New York adopted an estimate of $125 per metric ton of CO2 released into the atmosphere, and this is likely a serious underestimate. A comprehensive analysis

reported in Nature suggested a value of $185 (Rennert et al. 2022), and this is similar to estimates accepted by the federal government (EPA 2023). The SCC, of course, continues to increase over time as carbon emissions grow and more potential future harms are realized. Whichever estimate we may choose, we are talking about tens of millions of dollars, if not more. Surely this is a "measurable adverse effect" and of considerable significance. Only Alternative A with no harvest fails to exceed the threshold of concern, and should be the only acceptable alternative.

These concerns emphasize the need for an undated Forest Plan that is far more cognizant of the global climate emergency. They also provide another compelling reason for a full Environmental Impact Statement for the Telephone Gap Project.

Carbon in Harvested Wood Products:

Considerable emphasis is placed on the purported importance of carbon stored in harvested wood products (HWP). At any given time, of course, there is a large pool of carbon that is associated with humans, either in active use or in the waste stream, but the size of this HWP stock is always shrinking from fire or decay and only grows by removing more carbon from forests. The overall amount of carbon kept out of the atmosphere only increases when the replacement of harvested carbon in the donor forest exceeds the loss of carbon from fire and decay plus all the losses incurred during harvest and manufacture. Only a small fraction of harvested biomass ends up in the HWP pool. As shown in Table 3-10 (PEA p. 63), the amount of carbon estimated to still be present in the HWP pool after 100 years under current conditions is subtracted from total harvest quantities to obtain "net harvest emissions." But this makes little sense because the 100 year cut off date is entirely arbitrary and meaningless as far as the climate is concerned. Moreover, conditions certainly won't remain the same. Higher temperatures and larger and more frequent storms are both expected consequences of climate change; the former will increase decay rates and the latter will increase the rate at which wood must be replaced.

Pro-logging groups often speak of the potential of increasing the average durability or residence time of carbon in the HWP as a means of climate mitigation, but even if average durability is increased by an optimistic few decades there would still be little effect on the climate. It's rather like moving money from a fund that is always growing to one that is always shrinking in the hope that leaving it in there longer will overcome the losses. The struggle for a stabilized climate is a long term one and not a once and-done deal of meeting some particular goal, such as net-zero by 2050 or the size of the HWP pool in a hundred years, and then getting back to normal. The total amount of carbon dioxide released during the fossil-energy era must be kept to a minimum. The the world's forests can help if we set aside sizable area as permanent climate reserves (Law et al. 2022).

Another argument for increasing the size of the HWP pool is that wood could, in principle at least, substitute for more carbon intensive materials, such as cement or steel. Leaving aside the potential for reducing the carbon costs of producing steel and cement, there is little reliable evidence that increased wood usage would actually displace rather than supplement alternative materials. In any event, the issue of substitution has been a controversial one beset with inflated claims of high displacement factors that fail to survive close scrutiny, see Leturcq (2020) on the "Myth of Substitution." Here, as elsewhere, there is no mention of literature expressing views that run counter to those advanced in in the Telephone Gap documents.

Foregone Sequestration:

The section on "Lost Growth Potential" (PEA, p. 64) raises additional concerns and more confusion. Noting that the proposed harvest methods are mostly "selective uneven-aged or thinning (81 to 95 percent of total treatments)," it is then concluded that "Past studies in similar hardwood-dominated forests in the northeastern U.S. indicate thinning may have little to no effect on net primary productivity or even increase carbon accrual compared to un-thinned stands," citing Hoover and Stout (2007) in support. What is not mentioned is that this study showed only that no thinning or non commercial thinning narrowly focused on the removal of the smallest

trees showed a significant increase in net primary productivity, while any thinning that included removal of merchantable timber (as is overwhelmingly the case in the Telephone Gap Project) showed no significant increase or an actual decrease over the 25-year course of the study. Trees remaining after a harvest may show a burst of new growth as a result of more light or water, but the removal of large trees leaves a carbon stock deficit that may require decades to replace. It may be further noted that trees surviving a thinning event are likely to suffer increased mortality because of higher wind velocities and greater fire risk in more open forests.

As shown in table 3-10 (PEA, p. 63), estimated foregone sequestration over 20 years are reported as 41,474, 36,793, and 27,240 metric tons of carbon dioxide for Alternatives B, C, and D, respectively, compared to the no-harvest Alternative A. These are serious underestimates. Twenty years is really "short-term" compared to the decades or even centuries required to restore the carbon stock to pre-harvest levels, but rather than estimate foregone sequestration over much longer and more reasonable time frames, it is claimed that "Over the long-term (50 to 100 years) timber harvesting (including clearcutting) does not typically have negative effects on total carbon storage," citing Davis et al. (2009) and Nunery and Keeton (2010) to this effect. First note that "50 to 100 years" is certainly not "long term" where forests and their effects on the climate are concerned since many trees can survive for centuries, and forests are potentially everlasting. Note also that the Nunery and Keeton study actually shows the opposite: unharvested forests continued to add carbon over the entire 160 years of the reported simulation while accumulating much more carbon as any of the wide variety of alternative logging regimes considered. Finally, the study by Davis et al. doesn't actually show that timber harvesting usually has no effect on "total carbon storage" over "50 to 100 years." The Davis et al. study is based on Net Primary Production (NPP) "estimated as a biomass or C assimilation rate, i.e. photosynthesis minus autotrophic [plant] respiration (Ra)[hellip]" As such, NPP measures how fast a forest is adding biomass but tells us nothing about how big the carbon stock is, just as the interest rate on your savings account tells you how fast your current savings are growing but not the size of your account.

In terms of the climate, we are interested in how much carbon has accumulated in the forest and how much more could be added going forward. In mathematical terms, what matters is the cumulative carbon stock curve (as in Birdsey et al. 2023), that is, the size of the carbon stock over time, and NPP is the first derivative or slope of that curve which may be increasing or decreasing depending on carbon losses from all causes, including all respiration (and not just Ra,) as well as disturbances such as fire or storms and human activities of which deforestation and harvesting have been by far the most important during the 400 years since the European invasion. (Note that Figure 9 in the CFC 2024 purports to show Total Accumulated Carbon but actually shows a rate, i.e. the amount of carbon added each year. Carbon stocks increased every year since 1950 but the rate of increase peaked in the 1980s, according to this figure.) As already noted, what matters for the climate is the long term average size of the forest carbon stock.

Carbon Accounting across Managed and Unmanaged Lands:

Reference to carbon accumulation on unmanaged land to support logging on actively managed land is misleading and unfair. If we want to understand how logging affects carbon dynamics, we need to focus on actively managed lands themselves. Matched comparisons between passively managed and actively managed lands provide information about differences between the the two approaches, but mushing all lands together in order to "provide context" simply confuses matters. Something similar happens whenever Bill Gates walks into a room full of people - average wealth shoots up, but nobody is better off. In 2006, according to Appendix D of the outdated Forest Plan, there were roughly 190,000 acres of "lands suitable or tentatively suitable for timber production," and our focus must be on these lands if we want to understand how active management has affected carbon dynamics. Aside from direct comparisons with passively managed land, what happens elsewhere is simply irrelevant.

This is a very common and widespread obfuscation (Mackey et al. 2022, Peng et al. 2023). Everything is fine as long as more wood or carbon is added by growth somewhere in the forest, whether it is under active

management or not. This makes it look like logging is having a smaller effect on managed lands than it actually is. By this logic, I should be able to spend down my savings as long as the total of everyone's savings increases even more.

Conclusion:

The discussions of carbon flows and stocks in the PEA and CFC 2024 documents are unnecessarily sloppy, repetitive, convoluted, confusing, and difficult to understand. They reveal too much inside forestry group think and too little engagement with scientific literature outside of the forestry bubble, especially in terms of ecology and climate science. Most importantly, there is an overall failure to fully grasp and deal with the implications of global climate disruption for current and future forest management. There is a clear and present need for an updated Forest Plan that fully incorporates current understanding of ecology and climate science before further treatments are planned or approved. Ideally, the Telephone Gap Project would be postponed until after such a plan was developed, otherwise the inadequate PEA should be abandoned in favor of a comprehensive Environmental Impact Statement.

Underlying everything is the assumption that wood production is by far the most important benefit forests provide. This mostly unspoken assumption has been fundamental to US Forest Service policy since its founding in 1905 under the leadership of Gifford Pinchot who believed that America's forests were so vast and productive that, under careful management, they could provide all the wood products the nation could ever need. Pinchot's stirring words - "the greatest good to the greatest number for the longest time" - first uttered more than a century ago are still inspiring today, but they must be understood in the context of the biophysical realities we now face. Pinchot's cornucopian vision must be tempered by the recognition that forests are a limited resource that must serve many needs extending far beyond wood products. Now, more than ever, our forests are needed to address the present and growing crises of climate disruption and biodiversity decline by protecting more of them so they can get on with their essential work of storing carbon and supporting biodiversity.

Threatened, Endangered and Sensitive Wildlife

In regards to creation of early successional habitat, the Forest Service has not demonstrated "need" for these projects that justifies trading-off the greater value of retaining intact forests.

The so-called wildlife/carbon trade-off, invented by Littlefield and D'Amato (20212), suggests that "imperiled" species be used as the threshold for deciding if and when to recreate a natural disturbance by artificial means. However, the animals cited in the Telephone Gap proposal and environmental assessment as those projected to be the beneficiaries of early successional habitat creation are not imperiled species, as identified by NatureServe and the State of Vermont. In fact, all early successional species mentioned in the Telephone Gap documents are ranked by Vermont as, "demonstrably secure." In an EIS, a basic question centers on Need for the project, and does that need justify the proposed action. The issue of need has not been demonstrated for the Telephone Gap project

There have been no biological and ecological assessments of the species and ecosystems that would be negatively impacted by harvest treatments. The Forest Service narratives about harvest treatments to create or improve wildlife habitat only discuss the few species that will benefit. But, a new habitat cannot be made without destroying another. Sending a forest back to year 0 is a violent act, taking many species with it. An EIS would require the Forest Service to provide a biological and ecological assessment of the impacts to forest biodiversity from all harvest treatments. What species (e.g., birds, plants, pollinators, insects, soil organisms, fungi, etc.) would be lost? Although the Forest Service has mostly fulfilled its requirements under State and Federal Endangered Species regulations, simply focusing on rare species is a woefully incomplete assessment of the biodiversity in a forest. With little to worry about regarding regulated species, the FS is free to pursue management actions that damage entire ecosystems and their myriad unregulated species.

Proposals that alter natural ecosystems, for example controlled burning to create habitat for oaks, have not been critically reviewed by conservation biologists.

The Preliminary Environmental Assessment does not show interest in ecosystems, only habitat, which is undefined. Habitat for a black-throated blue warbler is relatively easy to define, forest habitat or early successional habitat is not. A project designed to "improve forest habitat" needs further definition.

This project's disinterest in ecosystems is reflected in the numerous ways planned to alter forest ecosystems in order to supposedly improve their resiliency to climate change, insect invasion, and other natural disturbances, and to improve their capacity to supply wood products.

At its most outrageous, the Telephone Gap proposal includes over 400 acres to be periodically burned as a management action to accelerate the change from northern hardwood forest to an oak forest. Essentially, redesigning an ecosystem without any recognition of how the biodiversity of the burned areas would be completely altered by the introduction of a new disturbance regime (periodic fire) to the GMNF. Ecosystem-changing proposals of this magnitude must be vetted by professional ecologists through the EIS process.

Aquatics / Invasive Species

Aquatic invasives will be a new threat to water bodies, as will invasive earthworms, unless strict measures are implemented to manage boating and fishing activities.

Regarding invasive species, the EA from 2010 is already outdated / expired. The two primary threats to forest health and regeneration, based on all I have seen and read over recent years, is the steady spread of non-native earthworms and a handful of grasses / herbaceous species.

Other conservation / stewardship organizations have recognized that conditions continue to shift in favor of the non-natives, and any type of human activity that includes DISTURBANCE must be avoided at all costs (conversation with Chesapeake Bay Foundation staff). Timber harvesting is not necessarily the most disruptive activity humans can impose on the land, but the Forest Service has shown zero interest over time in developing lighter-touch management methods and less disturbance. Harvest equipment is heavy and obtrusive and designed for efficiency; the occasional improvements we see (temp bridges at stream crossings) serve only to extend the harvest season or deepen our reach. There has been no evolution of the extraction mindset over recent decades. The result of this mindless aggression will be fragmentation of intact forest blocks and complete overrun by invasive species. No question that the grasses and the earthworms will change soil composition and chemistry if human - imposed disturbance is not halted outright. This applies to timber operations as well as to more aggressive recreational pursuits. Human history has already shown that self-regulation is not feasible; there is no time or room for the failings that will inevitably occur.

The GMNF Invasive Plant Control EA of 2010 states on page 5 that most roads, trails, and areas of interior forest have NOT been surveyed for exotic plant species. The EA itself was based on data from the 2008 growing season and earlier, so we are working with data that is outdated where it exists, and largely absent as a start point. We have no grasp of "the current condition."

While we may not know current conditions, one often hears as a statement of fact that southern VT is worse off than northern regions in terms of invasive plants overall. I personally agree that such is the case, and would then ask: "If we know the southern regions are much more "invaded" than northern areas, why would we begin harvest operations in the south and move progressively further north?" The wiser move would have been to harvest "cleaner" areas first, operations thus beginning in the north. Too late now.

Apparently the GMNF does not enter known infestations into the iNaturalist database, since it shows no wild chervil sites along the Bingo Brook road network where timber projects are underway. Chervil is now present in the harvested areas and log landings of the Robinson Project above Bingo Brook. This validates the problem with the lack of survey data, or perhaps there is also a reporting gap. Either way, the species is now established and eradication would theoretically require many years (5-10) of treatment. Cost estimates would depend on treatment goals, but the most likely outcome is that no treatment / control will ever happen.

Japanese stiltgrass is another herbaceous / grass species of concern that has been reported and confirmed near Brandon and Middlebury. Disturbance will open access corridors for this exotic species; no state has yet found any enduring solution for Japanese stiltgrass. The impact on forest regeneration will be severe, just as other states are presently seeing.

Exotic earthworms will be equally impactful on the areas of interior forest proposed for management. The ONLY method for slowing the spread of these earthworms (some brought in from Asia, some from Europe) is to STOP road-building and recreating and accessing of deep forest stands. The earthworm populations have been reported on all sides of the national forest, in every direction; essentially they go where the people go.

Soil

In our temperate forests, the carbon stored in soils is often greater than the amount stored aboveground in living and dead plant biomass. .https://www.fs.usda.gov/ccrc/topics/forest-soil-carbon#:~:text=In%20temperate%20forest%20ecosystems%2C%20the,is%20a%20substantial%20carbon%20pool.

Logging damages soil carbon retention with all types of logging, including selective logging and shelterwood cut. Heavy equipment, road building, moving the litter layer during skidding, deep rutting and severe compaction, exposing mineral soil, mixing soil layers, nutrient loss, leaching, runoff. In numerous studies around the world, research is showing that carbon storage in soils is much more important than previously thought, holding more than the woody biomass, and being more than doubled in the old-growth forest. As stated elsewhere, this activity also decimates the organisms living in the soil. The damage to the soil horizons is effectively irreparable.

Air Quality

Air quality and temperature is better in and around mature and old forests than in or near fields, early and mid succession, and human development. In and beside mature and old forests of the northeastern states, the temperatures are more moist and cooler. Logging the forest diminishes that quality. In addition, sending any biomass from the GMNF to be used to generate heat or electricity should not be allowed at any amount. That biomass is best used as habitat for myriad plant, animal and fungal species, soil building and old growth forest characteristics. Burning forest biomass emits more carbon dioxide than any fossil fuel including coal. Emissions from wood (at all stages of the process) exceeds that of fossil fuels, affecting not only climate, but also human health. Health organizations including the American Academy of Pediatrics, and the American Lung Association, sent a letter to senators and representatives that says burning biomass creates proven harm to human health through direct air pollution impacts. Air quality is lowered by logging alone, and even further by burning the wood.

Recreation

The Telephone Gap area gets heavy recreational use - boating, fishing, hiking,

hunting, camping, swimming, mountain biking, and snowmobiling. For alternatives B, C, and D, recreation or water quality management is tied to logging treatments. Improving unsafe trails and parking areas, replacing a culvert such as that on Forest Rd. 57 to allow for fish and other species passage and reducing sedimentation and

erosion, should occur in all alternatives, including alternative A. In all sections of this public recreational area, you are required to correct unsafe infrastructure or infrastructure inhibiting wildlife movement regardless of harvest or other logging plans.

There should be no logging within a 1/2 mile of the shoreline of Chittenden Reservoir and Lefferts Pond. A beautiful recreational resource like Chittenden Reservoir should have a significant buffer zone around it, free of cut stumps, soil compaction, scars from heavy machinery, and timber removal. Big, old trees are a significant habitat, carbon and hydrology component, but also for the soul. Forest bathing is an important activity in the recreation category that was not well known in the United States when the 2006 Forest Plan was written. It is impacted negatively by any forestry treatments.

The view shed from the reservoir and pond will be negatively impacted by the proposed logging treatments on the east side, including C145, stands 45,42,35 and C147, stand 79, and on the northwest side, C144, stand 17.

The recreational trail system around the reservoir, up to North Pond, to South Pond and to Mt. Carmel, are heavily used by hikers. They should have buffers with no logging, similar to the Long Trail,

Logging roads and skidder tracks upslope of the reservoir will negatively impact reservoir water quality with erosion and sedimentation, regardless of attempted best management practices in the treatment plans.

We oppose the proposed hut at South Pond. Hiking up to a beautiful somewhat secluded place and finding a building is not within the scope of what a forest should hold. In winter snow mobiles would most likely be the most frequent users. There is no need for more disruptive noise in the woods in the winter. If a shelter is necessary, a 3 sided lean-to is more than sufficient. This is not the place for development with buildings.

The cumulative impacts of a Velomont trail must be assessed before any new trail is constructed.

Visuals and Recreation Opportunity Spectrum

The view shed from the reservoir and pond will be negatively impacted by the proposed logging treatments on the east side, including C145, stands 45,42,35 and C147, stand 79, and on the northwest side, C144, stand 17. Throughout the GMNF, the appearance after logging and all through the young forest stage is inferior to old forest appearance unless it is in small patches of a size that occurs naturally, in other words, about an acre or less. To the human psyche, more than that size is not a serene opening in the woods, but instead indicative of a major, catastrophic event. It doesn't "feel" good, it feels unnatural. Reference should be made to the numerous articles in "Journal of Leisure Research", also Managing the Sense of a Region, Kevin Lynch, and "Humanscape, Environments for People, Kaplan, S. and Kaplan, R.

Roadless Areas

The USFS itself states: "The 2001 Roadless Rule establishes prohibitions on road construction, road reconstruction, and timber harvesting on 58.5 million acres of inventoried roadless areas on National Forest System lands. The intent of the 2001 Roadless Rule is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management." The logging of Roadless Areas that were inventoried after 2001 is not within the intent of the Roadless Rule and should not be included in any harvest plans.

Additionally, in order to comply with the Executive Order of increasing old forest, the most logical way to do that would be to stop logging trees for any reason in mature and old forests of 80 years or more in age, and including all designated roadless areas, regardless of the date that they were designated. The USFS is using loopholes to create logging roads in order to harvest trees in roadless areas. There should be no activity whatsoever in the

roadless areas. The Roadless Area Conservation Rule was adopted by the U.S. Forest Service on January 12, 2001 to conserve wildlands, watersheds and wildlife habitat within national forest lands.

We oppose logging in roadless areas. Deep interior forest free of "treatments" are special places utilized by as many or more species of concern as early successional environments. There is a need for "wild" in the human psyche.

Assisted Migration.

The concept of moving species beyond their current distribution for conservation purposes has been debated by conservation biologists for several decades, but those debates centered on using this adaptation tool only as a last resort in preventing a species extirpation.

Recently, the concept of assisted migration has been adopted by foresters, not as a mechanism to preserve a rare species, but to preserve the forest as a resource. The oaks they plant now will provide the wood for future generations, but only if they burn the oak woods regularly, creating a fire-dependent ecosystem at the expense of the native hardwoods that rarely see fire.

The consensus among conservation biologists concerning assisted colonization (migration) is encapsulated in a 2008 opinion article in Trends in Ecology and Evolution, by Anthony Ricciardi and Dan Simberloff - Assisted colonization is not a viable conservation strategy.

Here is their summary paragraph:

Ecological gamboling versus the precautionary principle. Those proposing assisted colonization as a conservation tool have argued that the risks of large-scale species translocations must be 'weighed against those of extinction and ecosystem loss', but the latter risks are precisely those posed by introducing species outside their historical range. At present, these risks cannot be reliably estimated or anticipated, which underscores our need to develop a predictive power, assisted colonization is tantamount to ecological roulette and should probably be rejected as a sound conservation strategy by the precautionary principle. Despite initial intentions to use such a strategy only as a 'tool of last resort', there could be growing pressure to move species long before their populations begin to decline and their densities become low, because these conditions reduce the success of translocation. We are concerned that increasing consideration of assisted colonization will promote unauthorized introductions of species by well-intentioned individuals, impede efforts to preserve habitat and, ultimately, create more conservation problems than it solves."

The key piece of wording here is "unauthorized introductions of species by well-intentioned individuals". (They should have also included any group or agency without review by an outside scientific authority). But as with most of the project proposal, the ecological and biodiversity impacts of the harvest activities are not addressed. According to the Forest Service there are only benefits to wildlife and habitat diversity, nothing suffers.

But, in order to create a habitat favored by one group of species, you need to destroy a habitat for a different group. The choice: Early successional habitat with a 20-year lifespan and minimal diversity, or mature forest with a timeless life span and species richness?

The overall conclusion of my comments will address the need for an EIS, everything I am reviewing regarding biodiversity and related topics demands a proper biological assessment. There is no scientifically-supported need demonstrated for conducting harvest activities in the GMNF to create early successional habitat, or any habitat treatment. Furthermore, there is no biological assessment of the ecological impacts of proposed activities. And the incorporation of new ecological processes (fire) to support new species (oaks) is a proposal that should be thoroughly vetted through the EIS process.

Adaptation.

The focus of the pro-logging community is adaptation, which is essentially inventing techniques to help "adapt natural ecosystems to the anticipated effects of climate change." Everything to know about this subject is found in Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers, a Forest Service publication out of the Northern Research Station.

This publication identifies Transition as an adaptation strategy that "actively facilitates or accommodates change[hellip]..facilitates community adjustments through species transitions." A suggested approach, "introducing species that are expected to be adapted to future conditions", has an example, "plant swamp white oak to replace ash lost to decline resulting from emerald ash borer."

There are eight suggestions:

1. Favor or restore native species that are expected to be adapted to future conditions.

2. Establish or encourage new mixes of native species.

3. Guide changes in species composition at early stages of stand development.

4. Protect future-adapted seedlings and saplings.

5. Disfavor species that are distinctly maladapted.

6. Manage for species and genotypes with wide moisture and temperature tolerances.

7. Introduce species that are expected to be adapted to future conditions.

8. Move at-risk species to locations that are expected to provide habitat.

Several notes about this list.

According to the manual, a species is maladapted "when its environment changes at a rate beyond the species' ability to adapt and accommodate those changes."

The words "expected to" are used three times in the list; "future-adapted" is used once. Both phrases imply that little consideration has been given about the unexpected consequences of introducing any species beyond its current distribution. The first questions should be, why isn't the subject species where you want it? What are the ecological factors governing its range limits?

"Introducing species expected to be adapted to future conditions" is also known as assisted migration. Forest Adaptation Resources states: "One type of assisted migration, sometimes called forestry-assisted migration, focuses on moving species to new locations in order to maintain forest productivity and health under climate change."

The examples offered in the handbook include:

1. Planting oaks, pines, and other drought-tolerant species on sites within the current range that are expected to become drier and that have not been historically occupied by those species.

2. Planting flood-tolerant species, such as swamp white oak and silver maple, on sites expected to become more prone to flooding and that are currently not occupied by flood-tolerant species.

3. Planting southern species, such as shortleaf pine, north of its current range on suitable sites based upon its projected range expansion/

4. Planting disease-resistant cultivars of elm or chestnut where they are likely to have suitable habitat.

Also recognized in the handbook is "species-rescue assisted migration" that focuses on species at risk. Suggested options for this group includes:

1. Planting or seeding a rare or threatened plant species that is at risk for extinction to a newly suitable habitat outside its current range.

2. Assisting the migration of wildlife around barriers from low to high elevations by trap and release in newly suitable locations.

3. Moving plants or animals from a mountaintop to another mountaintop north of their current range.

Contrary to the title of this advertised program, forests do not migrate. Some of the species that occupy forests, most notably birds, migrate, but trees do not move from place to place to take advantage of resource availability. Trees can expand their range if favorable habitat exists within reach of their propagules (seeds), depending on the mode of dispersal. Wind-dispersed seeds facilitate quicker expansion than heavier nuts that must rely on mammals to plant them.

Assisted migration, or more appropriately assisted colonization, was first considered as a conservation tool circa 2000. It is commonly understood as the intentional movement and release of an organism to regions outside of its native range. Originally, this tool was suggested for species whose native habitat was expected to disappear due to climate change and brought to new areas expected to be suitable habitat. In short, assisted colonization is a mechanism to support range shifts.

Assisted colonization was specifically developed as a tool to preserve plants at risk of extinction due to climate change. It is a last resort option that has yet to be used in the conservation of any listed species. The New England Plant Conservation Program (NEPCoP) was formed in the mid-90s as a consortium of Federal agencies (including the Forest Service), State Natural Heritage Programs, and NGOs to develop policies regarding plant conservation in New England. Although habitat protection is the best option for conserving rare plant populations, other management techniques may be considered for species with low population numbers.

For several reasons, the digging-up and moving of plants (i.e., plant rescue) is never a viable option. Instead, seed collections are made and plants propagated ex-situ for eventual return to the wild, which can be accomplished by augmenting current populations, for reintroduction to former sites, or introduction to new suitable habitats.

Although Nature's Trust (formerly New England Wildflower Society) maintains an extensive seed collection of New England's rare plants, there are few instances in which plants have been moved out. One notable example was the augmentation of the only known population of Potentilla robinsiana on Mt. Washington that was threatened by an existing trail.

The idea of assisted migration was considered by NEPCoP, but at the time (early 00) there was not enough information to base a policy on, and there was a great deal of concern about the detriments of the technique. This concern was addressed by Ricciardi and Simberloff in a 2009 paper entitled, "Assisted colonization is not a

viable conservation strategy."

According to the April 2023 publication (from fulfillment of EO 14072) by the USFS, Mature and Old-Growth ForestsL Definition, Identification, and Initial Inventory, To be considered old growth, FIA plot measurements had to meet thresholds for stand age (100-160 years) and density (5-20 trees ac-1) of large trees at least 12- to 20-in DBH. Therefore, those stands falling within the limits should not be cut. Our opinion is to include forests that have reached a minimum of 80 years since the last harvest.

A review of literature shows that carbon storage and sequestration, biodiversity, and the overall health of the forest will be best preserved or enhanced by taking a no cutting tactic. In forestry terms, that would be no management, or Alternative A. We believe that the management of invasive non-native species should be allowed for, using mechanical methods, and potentially, with well documented, proven safe biological controls such as galreucella for control of lythrum salicaria, for example. As stated earlier, restoration of natural processes should be part of Alternative A, rather than no action at all, it should be only ecosystem restoration with no logging.

In conclusion, The Green Mountain National Forest management and planning documents are all outdated and irrelevant, using obsolete ideas. The USFS staff has stated unavailable funding to update its Forest Plan. IWithout adequate funding, staff, time, and expertise, the USFS should not be managing the Green Mountain National Forest at all. The Preliminary Environmental Assessment is extremely biased in favor of logging and has not addressi=ed issues in a scientifically accurate way. We call for a complete Environmental Impact Statement to address the issues brought up in this comment letter.

Save Public Forests Scientific Research Group