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Christopher Thornton, District Ranger
Attn: Houston South Vegetation Management and Restoration Project Supplement
811 Constitution Avenue
Bedford, IN 47421

Re: Houston South Vegetation Management and Restoration Project Supplement

Thank you for this opportunity to submit the following comments regarding the U.S. Forest Service's (Forest Service) draft Supplemental Environmental Assessment (SEA) for the Houston South Vegetation Management and Restoration Project Supplement.

The outdated 2006 Hoosier National Forest Land and Resource Management Plan must be revised:

The draft SEA states that "the Houston South Vegetation Management and Restoration Project would move the Forest toward its desired future condition as identified in the 2006 Hoosier National Forest Land and Resource Management Plan (Forest Plan)" (SEA, p. 3). The National Forest Management Act requires that the Forest Plan be updated at least every 15 years, so the Hoosier National Forest (HNF) plan is overdue for revision. I'm also aware that current forest planning regulations, the 2012 Planning Rule, went into effect on May 9, 2012; however, a U.S. Department of Agriculture (USDA) webpage states that "all existing forest plans have been developed using the **1982** (*emphasis mine*) planning rule procedures" (https://www.fs.usda.gov/main/planningrule/101).

On April 3rd I attended the public meeting in Paoli, Indiana regarding the Forest Service's proposed Buffalo Springs Restoration Project in HNF, which was attended by both Senator Mike Braun and Dr. Homer Wilkes, Under Secretary for Natural Resources and Environment, USDA. At the end of the meeting, Dr. Wilkes stated the following commitments to attendees: 1) that the U.S. Forest Service would begin work on revision of the outdated 2006 HNF Forest Plan and 2) that the public would be invited to provide input. As there has been no follow-up on these commitments to date, I wrote to Dr. Wilkes on November 12, asking that he initiate the revision process. In my letter I mention the congressional Consolidated Appropriations Act, 2021, section 407, which states that there is no exemption for the Forest Service to operate with an outdated Forest Plan "if the Secretary is not acting expeditiously and in good faith, within the funding available, to revise a plan for a unit of the National Forest System" and indeed, that in such case, "a court of proper jurisdiction may order completion of the plan on an accelerated basis" (https://www.congress.gov/116/plaws/publ260/PLAW-

116publ260.pdf?fbclid=IwAR2A5HWNJ-AClQupCtnyv1MLjpUdBoEhELY8_QBzuCByCHjyA-tNTc9BuOO). As I point out, "the Forest Service will not be acting in good faith if it pushes ahead with the massive, multi-year Houston South and Buffalo Springs projects, both strongly opposed by numerous local citizens, without having fulfilled its obligation to revise an outdated Forest Plan that is uninformed by the newest scientific research relating to forest ecosystems and climate change" (letter attached as separate PDF).

Conservation/expansion of mature and old growth forest should be prioritized:

The draft SEA mentions two important measures relating to climate change that postdate submission of the final Environmental Assessment (EA) in 2019 and respond to President Biden's April 22, 2022 *Executive Order On Strengthening the Nation's Forests, Communities, and Local Economies*: 1) Agriculture Secretary Vilsack's June 23, 2022 memorandum directing the Forest Service to "inventory and protect mature and old-growth forests to aid in climate resilience and carbon stewardship" and 2) a joint announcement by the USDA and Department of the Interior (DOI) on April 20, 2023 of "actions to foster forest conservation, enhance forest resilience to climate change, and inform policymaking on ensuring healthy forest on federally managed lands administered by the USDA Forest Service and the Bureau of Land Management (BLM)" (SEA, pp. 16-17). The SEA also mentions development of the report *Mature and Old-Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and BLM* (Mature and Old Growth Report).

The SEA states that the above report "provides guidance on how this information can direct current and future management at the National Forest level" and that "while the report does not alter existing Land Management Plans it provides the framework for an adaptive management process with the most recent science, local partnerships, and social science which will improve the U.S. Forest Service and BLM's knowledge regarding mature and old-growth forests" (SEA, p. 17). There is no acknowledgement that the HNF's Forest Plan is outdated, nor any discussion of how the Mature and Old Growth Report might inform/alter management goals and project design relative to the Houston South project. How is the Forest Service implementing an "adaptive management process" in this context?

The SEA also notes: "Although much of the project area is characterized by mature hardwood stands in silvicultural terms, it is not considered old growth forest. Rather, the entire project area is defined as low mature/low old growth" (SEA, p. 17). It concludes that "forests in the project area do not meet Old Growth characteristics as defined in the Mature and Old Growth Report" (SEA, p. 18). Is the Forest Service suggesting that mature forest on its way to attaining older growth characteristics does not merit consideration in terms of conservation? Secretary Vilsack's directive calls for protection of *both* mature and old-growth forest, so why does the SEA seemingly dismiss (or leave unstated) any implications for Houston South?

On November 2, 2017, 240 Indiana scientists sent a letter to Governor Holcomb noting the sharp increase in state forest logging since 2002 and asserting that "large tracts of contiguous mature forest are necessary to preserve the rich biological diversity of central hardwood forests." Furthermore, they stated that:

> Our forest ecosystems cannot be sustainable if the only old growth forest is in nature preserves and state parks, which contain only one third of one percent of Indiana forest land. Our state forests and **Hoosier National Forest** (*emphasis mine*) are the only publicly owned forest acreages extensive enough to conserve biological diversity on a viable landscape scale (https://drive.google.com/file/d/1x1i3pm5z9jEWZuPNvsUKf8JVnkJkfjbp/view).

The writers also stress the vital role of older growth forest in mitigating the effects of climate change. As they point out:

> Multi-aged forests that include areas of old growth have greater resilience and supply more pathways to recovery from unpredictable disturbances, such as drought, increased storms, and invasive pests . . . We cannot predict the arrival of new pests, so we need the diversity of intact, mature forests to ensure that there are some unaffected trees remaining. In addition, old trees continue to absorb and store carbon from the atmosphere; the rate of tree carbon accumulation increases with tree size.

This latter assertion is supported by research presented in the article "Rate of tree carbon accumulation increases continuously with tree size" (Stephenson et al., 2014), the work of an international team that "directly estimated mass growth rates from repeated measurements of 673,046 trees belonging to 403 tropical, subtropical and temperate tree species, spanning every forested continent" (https://www.nature.com/articles/nature12914). As summarized in the abstract:

> Our ability to understand and predict changes in the forest carbon cycle—particularly net primary productivity and carbon storage—increasingly relies on models that represent biological processes across several scales of biological organization, from tree leaves to forest stands. Yet, despite advances in our understanding of productivity at the scales of leaves and stands, no consensus exists about the nature of productivity at the scale of the individual tree, in part because we lack a broad empirical assessment of whether rates of absolute tree mass growth (and thus carbon accumulation) decrease, remain constant, or increase as trees increase in size and age. Here we present a global analysis of 403 tropical and temperate tree species, showing that **for most species mass growth rate increases continuously with tree size. Thus, large, old trees do not act simply as senescent carbon reservoirs but actively fix large amounts of carbon compared to smaller trees** (*emphasis mine*); at the extreme, a single big tree can add the same amount of carbon to the forest within a year as is contained in an entire mid-sized tree. The apparent paradoxes of individual tree growth increasing with tree size despite declining leaf-level and stand-level productivity can be explained, respectively, by increases in a tree's total leaf area that outpace declines in productivity per unit of leaf area and, among other factors, age-related reductions in population density. Our results resolve conflicting assumptions about the nature of tree growth, inform efforts

> to understand and model forest carbon dynamics, and have additional implications for theories of resource allocation and plant senescence.

These findings challenge the SEA's statement in response to Issue 12 (Harvesting timber could decrease the rate of carbon sequestration) that "any initial carbon emissions from the proposed actions would be balanced and possibly eliminated because the remaining trees and newly established trees typically have higher rates of growth and carbon storage" (SEA, p. 35). The SEA also refers to the Hoover and Smith 2023 study "Aboveground live tree carbon stock and change in forests of conterminous United States: influence of stand age" (https://cbmjournal.biomedcentral.com/articles/10.1186/s13021-023-00227-z), stating that "recent research has shown that in the absence of management, forest stands in the central states region will continue to age and, due to tree senescence outpacing growth, become net carbon emitters" (SEA, p. 49). I have read this article and do not think the SEA's summarization accurately reflects its thrust. On page 2, Hoover and Smith comment:

> One area of ongoing discussion is the role of older versus younger forests . . . While many studies of forested ecosystems find that the rate of carbon accumulation decreases with age [5-8], others have reported that old-growth forests continue to accumulate carbon [9, 10]. These differing results drive an ongoing discussion of the "best" strategies for managing the forest carbon sink.

In their Conclusion, the authors' report that "carbon stock (per hectare) increased with age in all regions, although in some instances the oldest age class showed a slight decline." However, for the Central States region, carbon density *increased* even in the oldest age class, from a mean C density (tC/ha) of 14.1 in the 0-20 age class to 76.7 in the 121+ age class. While Hoover and Smith find that carbon "accumulation rates are highest in the younger age classes and decline with age" (p. 2), they are looking at stand level productivity, versus Stephenson et al., who measure productivity at the scale of the individual tree, reporting that "although growth efficiency often declines with increasing tree size, increases in a tree's total leaf area are sufficient to overcome this decline and cause whole-tree carbon accumulation rate to increase" (Stephenson et al., 2014, p. 3).

Hoover and Smith also state:

> Because multiple forest management objectives are often considered and tradeoffs need to be assessed, we recommend considering both measures—standing stock and average annual change—of carbon storage. The relative importance of each component depends on management and policy objectives and the time frame related to those objectives.

But how can the Forest Service make such determinations without scrutinizing and revising its Forest Plan, especially in light of Secretary Vilsack's June 23, 2022 directive regarding protection of mature and old-growth forests "to aid in climate resilience and carbon stewardship"?

The proposed project risks DECREASING forest diversity and health:

The Background section of the SEA states that "the U.S. Forest Service proposes to treat vegetation and conduct related management activities to improve forest health and sustainability of the oak-hickory ecosystems while also improving fish and wildlife habitat" (SEA, p. 3). The SEA further notes that "the oak-hickory forest type currently dominates canopies in the Houston South Project area, covering 69 percent of all forested NFS land within the project boundary" (SEA, p. 8). By contrast, beech-maple forest comprises only 2,280 of 10,071 total acres of NFS land in the project area, or approximately 23 percent. The oak-hickory forest type is also dominant throughout Indiana as a whole. According to the USDA report *Forests of Indiana, 2016*: "Hardwood species are the dominant species in Indiana . . . The oak/hickory group alone occupies 71 percent of forest land . . . (1.5 million acres)" (https://www.fs.usda.gov/nrs/pubs/ru/ru_fs127.pdf).

We cannot be certain how different forest types will respond to a changing climate. *Indiana's Future Forests: A Report from the Indiana Climate Change Impacts Assessment* (May 2018) discusses various factors likely to affect forest composition, including projected warmer, wetter springs and hotter, drier summers; increased spring flooding/runoff and summer drought; and changes in the abundance of herbivores and understory plants. Concerning oak-hickory habitat in the Indiana Southern Hills, the report predicts a decrease for northern red oak, pignut hickory, shagbark hickory; no change for white oak; an increase for black oak and cherrybark oak; and new habitat for black hickory, blackjack oak, water oak, and willow oak. It also mentions that "some species beneficial to wildlife are projected to lose suitable habitat, while others, such as some oak species, may thrive under a changed climate, providing more food for mice, wood rats and deer that feed on acorns and other seeds" (https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=foresttr).

The SEA strongly emphasizes oak-hickory regeneration and the value of these trees' hard mast as food for wildlife; however, beech-maple forest also offers sustenance to a variety of species that thrive in a moister mesic environment. An Indiana Division of Fish & Wildlife "Forest Habitat Improvement" fact sheet lists grouse, quail, turkey, squirrels, and songbirds as consumers of the soft mast produced by black, red, silver, and sugar maples; while hard beech mast is attractive to deer, squirrels, chipmunks, turkey, ruffed grouse, pheasant, songbirds, and woodpeckers (https://www.in.gov/dnr/fish-and-wildlife/files/fhimprove.pdf). In his 2013 article "Know Your Deer Plants: American Beech," certified wildlife biologist, licensed forester, and National Deer Association Director of Conservation Matt Ross explains that "this high level of attractiveness to a variety of wildlife is directly related to the fact that American beech nuts are high in both protein (20 percent dry matter) and fat (50 percent dry matter), something that acorns are not; with over 1/3 of its composition made up from carbohydrates." He also mentions that "American beech . . . provides nesting habitat for a variety of birds, and cavities within older trees provide dens for owls, squirrels and other mammals" (https://deerassociation.com/know-deer-plants-american-beech/).

Not so long ago, historically speaking, Indiana's forests were considerably more diversified. The USDA publication *Indiana Forests, 2013* notes on page 13 that "the forest composition and size structure in

Indiana . . . are dynamic and are a product of past disturbances. Sixty years ago forests in Indiana were dominated by oaks (Winters 1953), but the original land surveys prior to widespread European emigration indicated **a balanced mix of oak and beech-maple forest**" (*emphasis mine*) (https://www.in.gov/dnr/forestry/files/fo-IN_Forests_2013.pdf). The SEA focuses almost exclusively on the importance of oak-hickory forest for wildlife habitat, but certainly there was no scarcity of wildlife in the more diversified forest characteristic of the pre-European settlement period. In our current context of changing climate patterns, it seems prudent to allow natural succession of beech-maple forest in areas well-suited to this type. With so many uncertainties, the Forest Service needs to be cautious and flexible, allowing the forest's own adaptive strategies to work.

The SEA also stresses creation of early successional habitat, stating that "stand data in the proposed silvicultural treatment area shows no stands in the 0 to 9-year age class" (SEA, p. 4), and uses this as a partial rationale for large-scale harvesting and up to 20 years of repeated prescribed burns. But what about the early successional habitat on privately owned acreage—440,000 acres, or approximately 68 percent of the total HNF purchase area? The Forest Service would do better to promote creation and maintenance of young forest habitat on these tracts rather than carve up large areas of mature forest that are far more valuable for their carbon storage capacity and as habitat for interior forest species.

A 2021 article titled "Addressing the Early-Successional Habitat Needs of At-Risk Species on Privately Owned Lands in the Eastern United States" argues that

> privately owned lands are especially important when addressing the needs of at-risk taxa because these lands support populations of more than two-thirds of the species listed under the U.S. Endangered Species Act, with 10% of the listed species occurring only on private lands [2]. Additionally, hundreds of species that are in documented declines occur on private lands [2] (https://www.mdpi.com/2073-445X/10/11/1116).

The SEA mentions a goal of creating early successional habitat "for a wide variety of songbirds, as well as ruffed grouse and American woodcock, both of which are Regional Forester Sensitive Species" (SEA, p. 9). Further on it notes: "Ruffed grouse were last spotted in the Forest in 2016. This species may be extirpated from Indiana without promotion of early successional forests; thus, the species would benefit from the proposed actions" (SEA, p. 29). I know that some hunters in Indiana advocate logging on publicly owned forest lands specifically to increase young forest for ruffed grouse, a predominantly northern species that has declined in this southern portion of its range. However, this decline may have as much or more to do with climate change than lack of suitable habitat. Referencing the Audubon Society report *Survival by Degrees*, the 2019 article "Grouse Range and Hunting Opportunities Vulnerable to Warming Conditions" states:

> Even if the temperature rises by another half a degree Celsius, Audubon expects the ruffed grouse range to shift north out of much of its current American range. The remaining range will likely occupy primarily northeast Minnesota, north central Wisconsin, the Upper Peninsula of Michigan, New England, and some isolated pockets in

upstate New York, the Appalachians, the Rockies, and the Cascades (https://www.nwf.org/Outdoors/Blog/10-14-19-grouse-range-and-hunting-opportunities-vulnerable-to-warming-conditions).

Since ruffed grouse are not globally at risk, with an estimated breeding population of 18 million (https://pif.birdconservancy.org/ACAD/Database.aspx), I consider this a case where habitat restoration efforts are best focused on private land. Supporting this strategy, the 2019 article "Reversing Ruffed Grouse Declines in Indiana" by Ryan Lisson notes that 87% of Indiana forest is privately owned and that USDA, NRCS, IDNR, etc. have programs to assist private landowners with forest management, including "cost share programs and tax incentives." He concludes: "If each private woodland owner created young forests on 10-15% of their wooded acreage with each timber harvest, we would be well on our way to bringing back important habitat that's been missing in Indiana for decades" (https://ruffedgrousesociety.org/reversing-ruffed-grouse-declines-in-indiana/). I strongly urge the Forest Service to support/promote maintenance of early successional forest for ruffed grouse and other species with similar habitat needs on private land within the HNF purchase area, rather than pursue plans for extensive logging and prescribed burns on our public lands.

Minimize use of prescribed fire as a management tool:

I appreciate inclusion of new information in the SEA regarding the 2022 National Prescribed Fire Program Review initiated by Forest Service Chief Randy Moore "as a result of a wildfire incident that occurred in New Mexico in 2022" (SEA, p. 18). More specifically, this would be the Calf Canyon and Hermits Peak fires, two prescribed burns that joined to create the largest wildfire in the state's history, ravaging 340,000 acres and destroying hundreds of homes. I am glad that the Forest Service has developed more stringent prescribed burn protocols, but this does not allay my concerns regarding their proposed extensive use over a 20-year period for the Houston South project.

The SEA argues that "without prescribed burns, forest succession would continue contributing to the loss of fire dependent oak/hickory ecosystems" (SEA, p. 22) and that "the lasting effects of keeping oak in the ecosystem, through prescribed fire, outweigh the short-term negative effects. Oak forests provide habitat for insects and birds that other forest types do not" (SEA, p. 29). Again, I think the Forest Service overestimates the fragility of oak-hickory forest, which dominates in HNF and throughout the state, and undervalues the importance of less well-represented forest types such as beech-maple, which provide equally valuable habitat for a different or sometimes overlapping range of species.

The SEA also maintains that proposed action would increase forest resistance to wildfire (SEA, p. 34); however, unlike forests in drier, hotter regions of the United States, our eastern temperate forests are little threatened by wildfire. In their recent article, "New Trees Are No Substitute for Old Trees," Norm Christenson, professor emeritus and founding dean of the Duke University Nicholas School of the Environment, and Jerry Franklin, professor emeritus of forest ecosystems at the University of Washington, discuss the ecological value of mature, moister, closed canopy forest, such as we have in Hoosier National Forest, as follows:

> The forest continues to thin as it approaches maturity. The surviving trees will get bigger, accumulating additional carbon and storing some of it within the debris of the forest floor. In a mature stage, the shady understory of the forest keeps things moist, and much of the debris consists of larger logs that are not easily ignited, so the "dead stuff" is less likely to serve as fuel for a fire. This mature forest has many fewer but much larger trees and its ecosystem becomes more complex — translating into an increasing number of plant and animal species.

The authors further note:

> In moister regions, canopy openings allow shade-tolerant trees to flourish, creating a complex system with large amounts of carbon stored in standing dead trees and fallen logs, contributing to a high amount of biological diversity. The oldest and largest trees in these forests can be several hundred to several thousand years old, and they play a vital role in carbon absorption and storage. These old and diverse forests are resistant to wildfires due to the size and moisture content of the dead wood.

While acknowledging that warmer, drier conditions brought on by climate change can make even such mature forests more wildfire-prone, they conclude:

> We need to both protect as much of our remaining forests as we can, but — importantly — we also must let them get old. New trees are no substitute for old trees and the ecosystems they nurture. Letting our current mature forests age further is our best opportunity to diminish carbon emissions and mitigate catastrophic wildfires that threaten the health of humans and of our planet (https://www.politico.com/news/magazine/2023/06/11/to-fight-wildfire-our-forests-need-to-grow-old-00101360#:~:text=New%20trees%20are%20no%20substitute%20for%20old%20trees%20and%20the,humans%20and%20of%20our%20planet).

As acknowledged in the SEA, use of prescribed fire could increase the presence of non-native invasive species and negatively impact native species such as bats and timber rattlesnakes. The 2016 article "Fire Effects on Wildlife in the Central Hardwoods and Appalachian Regions, USA" comments that "research investigating fire effects in eastern US deciduous forests is in its infancy compared to other regions and many questions remain unanswered (Stambaugh *et al.* 2015), particularly as related to wildlife." The authors note that "for a few species (e.g., timber rattlesnake [*Crotalus horridus* L.] soon after emergence from hibernacula, and eastern box turtle), a significant portion of the local population can be affected by a single fire (Beaupre and Douglas 2012, Howey and Roosenburg 2013)." Additionally:

> Research on wildlife population response and season of fire in the Central Hardwoods and Appalachians also is limited. Concern has been expressed over potential effects of

> growing-season fire on herpetofauna (Russell *et al.* 1999, Renken 2006). Beaupre and Douglas (2012) reported that a local population of timber rattlesnakes declined dramatically following an early growing-season fire (April) that occurred soon after the snakes emerged from a den complex" (https://fireecology.springeropen.com/articles/10.4996/fireecology.1202127).

The SEA states:

> In order to achieve the desired objectives for each burn, individual burn plans are developed. These plans identify very specific weather parameters (wind speed and direction, smoke dispersal, temperature, and relative humidity) and site conditions that are required for a prescribed burn to be successful. **Historically, in the Houston South project area, these conditions only occur twelve to thirteen days a year, primarily the first three weeks of April** (*emphasis mine*). After that timeframe, it becomes unlikely that the needed parameters will occur because the trees will be leafed out shading the fuels on the ground (SEA, p. 19).

Regarding timber rattlesnakes, it mentions that they "likely exist in the project area" and that "prescribed burning may impact this species, but ample refugia habitat exist in the surrounding area. Prescribed burning during the dormancy season should have no effect, while burning during the late growing season could have negative effects" (SEA, p. 30). This raises two questions: 1) Would the Forest Service likely conduct prescribed burns outside the first three weeks of April when weather and site conditions are historically most favorable—for example, during "the late growing season," as mentioned above? 2) If prescribed fires conducted in April happened to coincide with emergence of timber rattlesnakes from hibernacula in the treatment area, how would these animals benefit from "ample refugia habitat" in surrounding areas?

Overall, given that Indiana is little threatened by wildfire, I fear that increased use of prescribed fire in forest management will lead to more harm than benefit and could interfere with the forest ecosystem's own natural adaptations to climate change.

There is no new information presented in the draft SEA that lessens my concerns regarding the potential negative impacts of the massive, multi-year Houston South project. I urge the Forest Service to focus its efforts on:

- Reviewing/revising the outdated 2006 HNF Forest Plan
- Conserving mature forest that will become tomorrow's old growth forest
- Supporting creation of early successional habitat on private land within the HNF purchase area
- Minimizing use of prescribed fire as a management tool
- Repairing "poorly maintained roads and eroded areas to reduce sediment deposition into streams and lakes" (SEA, p. 10)
- Improving "stream flow for aquatic organism passages" (SEA, p. 10)

Thank you for your consideration of my comments regarding the Houston South Vegetation Management and Restoration Project Supplement.

Respectfully,

Karen S. Smith