

This is an individual comment on the document “Sandwich Vegetation Management Project Draft Environmental Assessment and Preliminary Finding of No Significant Impact” dated July 2023. In addition to this comment, I have signed the comment letter from Ferncroft/Wonalancet area landowners, sharing a wide variety of concerns. Here I address two issues with more immediate personal bearing: 1) the proposal to relocate a section of Spring Brook Road currently occupying, without easement, land owned by me with my spouse Ruth Moscovitch and, 2) the assertion in the document that the proposed cuts will have no significant effect on below ground carbon stores.

Relocation of Spring Brook Road

Ruth and I were surprised to see that the Spring Brook Road relocation is presented as a given without alternative. We have been in communication with the Forest Service, both in writing and in person, regarding the possibility of resolving this issue without road relocation, with all the local ecological disruption relocation would entail. It was our understanding that we have an agreement in principle and we are currently awaiting a formal proposal towards that end from the Forest Service.

In this context, we are puzzled by a reference to decommissioning a portion of Spring Brook Road (Appendix C, Table 8). Specifically, the table states an intention to “Decommission: 1.000-1.476”. We are not sure whether this refers to proposed decommissioning of the portion of the road that now infringes on our property or to another portion of the road. We note that if this refers to our portion of the road, no decommissioning would be necessary if and when we reach agreement to avoid relocation. On the other hand, if such decommissioning were to come to pass, we anticipate that the Forest Service would negotiate with us any changes on our land associated with such decommissioning and note that this would be subject to approval by the Lakes Area Conservation Trust, which holds a conservation easement on the land in question.

Below ground carbon stores

This overlaps an area in which I have substantial professional expertise. I reproduce the section of the draft assessment on Climate Change and Carbon (p. 25) in its entirety:

“Climate Change and Carbon

The following summarizes the project-level carbon assessment (Colter 2021). The proposed action is consistent with internationally recognized climate change adaptation and mitigation practices and proposes specific actions to enhance compositional and structural diversity within the project area consistent with objectives of the forest plan. The proposed action would increase species and habitat diversity, which would improve the ability of the ecosystems within the project area to respond to change. Over a period of 5 to 10 years, the proposed silvicultural treatments would affect less than 1 percent of the total land acreage of the White Mountain National Forest.

The proposed action would largely be limited to carbon stocks stored in above ground live vegetation. Carbon stocks found in aboveground live vegetation comprise about 35 percent of the total ecosystem carbon stocks of the White Mountain National Forest (Dugan, Janowiak, and McKinley 2019). Ecosystem carbon stored in soils (approximately 39 percent in forests on the White Mountain National Forest) and

other pools are not likely to be affected by the proposed action. Proposed project activities affect a relatively small amount of forest land and carbon and, in the short-term, might contribute an extremely small quantity of greenhouse gas emissions relative to national and global emissions. Project activities would not convert forest land to other non-forest uses, and carbon would be removed from the atmosphere over time as the forest regrows. Therefore, effects of the proposed activities on carbon, greenhouse gases, and climate overall would be negligible.

To the extent that climate change measurably contributes to cumulative effects on specific resources, those effects were considered by resource as appropriate.”

I do not know what to make of the reference to the project-level carbon assessment in Colter (2021), since this document is not included in the reference section of the draft assessment (pp. 36-37). It is also impossible to judge the appropriateness of what are said to be “internationally recognized climate change adaptation and mitigation practices,” since these are unspecified and unreferenced.

I do know that the unsupported assertion that “carbon stored in soils...and other pools are not likely to be affected by the proposed action” is certainly inaccurate. Most of the carbon in soils like ours in the White Mountains is associated with plant roots, the associated microbial flora, and complex soil organic matter. A major portion of this carbon is tied up in mycorrhizal fungi, which live in symbiosis with plant roots, exchanging nitrogen and other soil nutrients for sugars produced by the plants. In our local forests, most trees support and depend on ectomycorrhizal fungi, which specialize in scavenging nitrogen from organic soil sources. Our ectomycorrhizal trees include oaks, beeches, birches, pines, firs, spruce and hemlock, which together comprise most of our forest cover. Other local trees are arbuscular mycorrhizal, associating with a different set of symbiotic fungi. These include maples and ashes.

The relationships among these fungi, their plant hosts and the insects that feed on their plant hosts are complex. I have written the most recent review of this subject, published a year ago in *Ecological Entomology*, a publication of the British Royal Entomological Society (<https://resjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/een.13192>). In each case, the mycorrhizal fungi depend on the trees for sustenance. When the trees are cut, mycorrhizal fungi die, to be replaced in part by saprotrophic fungi, free-living rot fungi that live on decaying organic matter, such as the roots of trees that have been cut. My neighbor and colleague Dr. Susan Goldhor has drawn attention to this in her comment on the draft assessment.

The bottom line is that cuts, particularly clearcuts of any size, are likely to have profound and largely unexplored consequences for carbon sequestration. We do know for certain that mycorrhizal fungi play a major role in the carbon cycle, both locally and at a global scale. I include references to papers documenting these effects in my review, which also includes a summary of the nature and properties of both ecto and arbuscular mycorrhizas.

Having brought this issue to your attention, I ask that you revise your assessment to take into account likely or possible consequences for the carbon cycle and carbon sequestration due to removing of host trees and subsequent loss of soil mycorrhiza. Dr. Goldhor and I would be pleased to guide you to the relevant literature.

I end by noting two minor errors associated with tables in the draft assessment. In Table 1 the number of treatment acres is listed as 648648. This is clearly a typo for 648. The former figure would encompass almost the entire White Mountain National Forest. Also, toward the bottom of p. 26 the reference to Table 4 with regard to sensitive species should instead be a reference to Table 5.

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