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First name: Sebastian

Last name: Strauss

Organization:

Title:

Comments: Dear Forest Service Staff, Carolyn Upton, and Amanda Milburn,

Thank you for your and your team's hard work revising the Lolo National Forest management plan and for providing opportunities for public comment. I appreciate the challenge of compiling such a comprehensive plan with many competing interests and priorities.

My name is Sebastian Strauss. I am a Mechanical Engineer living in my chosen forever home of Missoula, MT. Though semi-retired, I still do some work as an independent contractor for another government agency, the FAA.

I grew up in East Germany, and some of my fondest childhood memories are foraging for mushrooms at 0-dark-hundred in the woods surrounding our little cabin outside of town. My favorites were Honey Mushrooms (*Armillaria Mellea*), which could often be found on piles of decaying wood. Coincidentally, my foraging experiences were formed around the same time that the last Lolo National Forests management plan was written. Little did I know at the time that mushrooms, the fungi's fruiting bodies, constitute only a small fraction of their vast network of mycelium hidden underground, which connect trees and plants across large areas. Thanks to my mother, I was at least aware that penicillin, which saved my life on at least 2 occasions, is the product of a fungus.

In my research for this comment I learned that the Lolo National Forests also did not seem to know much about fungi back in 1986. The word fungi appears twice in the 415 page document, both times in the glossary and only in negative contexts - whether the "Mountain Pine Beetle" or "Salvage Harvest". In those times I might have been forgiven for my ignorance as a middle-schooler. Similarly, the Lolo National Forest might have been forgiven for its ignorance about the crucial role of fungi in forest ecosystems because peer-reviewed scientific research about fungi and their mycorrhizal networks was sparse at best.

How much the times and knowledge have changed since then, though. The attached chart (see [https://www.frontiersin.org/files/Articles/1135263/ffunb-04-1135263-HTML/image\\_m/ffunb-04-1135263-g001.jpg](https://www.frontiersin.org/files/Articles/1135263/ffunb-04-1135263-HTML/image_m/ffunb-04-1135263-g001.jpg)) exemplifies how much the research on fungi and their critical role in ecosystems has mushroomed in the intervening years.

I have learned since then that one of the largest living organisms in the world may be a several thousand year old fungus of the species *Armillaria Ostoyae* spanning 2,000+ acres in eastern Oregon ([https://www.researchgate.net/publication/254903851\\_Coarse-scale\\_population\\_structure\\_of\\_pathogenic\\_Armillaria\\_species\\_in\\_a\\_mixed-conifer\\_forest\\_in\\_the\\_Blue\\_Mountains\\_of\\_northeast\\_Oregon](https://www.researchgate.net/publication/254903851_Coarse-scale_population_structure_of_pathogenic_Armillaria_species_in_a_mixed-conifer_forest_in_the_Blue_Mountains_of_northeast_Oregon)), this one being considered a pathogen.

Neighboring Forest Service agencies in the Pacific Northwest have published many papers related to forest fungi and their role in the forest ecosystem. For example, Molina et. al. published a paper in 2001 (<http://dx.doi.org/10.1017/CBO9780511565168.004>) that discusses an integrated ecosystems approach for the conservation and management of forest fungi. Notably, it lists four critical and beneficial ecosystem functions of fungi, such as "Nutrient cycling, retention and soil structure", underappreciated contributions to the food webs, fungal "... diseases as important processes that create forest structure vital to other species and processes.", and "Mycorrhizal mutualisms" with "efficient nutrient uptake", "enhanced resistance to drought stress" and "direct or indirect protection against some pathogens". They found that "... protecting the remaining old-growth forests is important for maintaining fungal species diversity".

Given this drastic increase in the available knowledge surrounding fungi and their essential contributions to the forest ecosystems, I am very disappointed to find that fungi are mentioned only once in a beneficial context in the 225 page 2024 plan (in the context of Fire refugia). This appears very much out of step with the status of the science and research even from within the US Forest Service. It appears as if the Lolo National Forest has not learned a thing about fungi since 1986.

I urge you to review the available literature and incorporate fungi explicitly into your plan, which can have far-reaching benefits. Specifically, I request that you:

- \* Incorporate "funga" as a third kingdom in your planning documents to recognize their significance for the Lolo National Forest ecosystem.
- \* Implement or develop a standard for determining the value of non-timber forest products (NTFPs) and consider that value in management decisions.
- \* Actively recognize the importance of mycorrhizal fungi during salvage logging sales and require the retention of coarse woody debris to enable the positive impact of Brown Cuboidal Rot (BCR) on water retention and seedling survival.
- \* Recognize fungi for their contributions to and necessity for effective carbon sequestration and soil carbon management.
- \* Consider and mitigate the negative impacts of logging operations, such as soil compaction, on fungi.

I thank you for your attention to this matter and look forward to seeing fungi fully integrated into the next revision of the management plan.

Respectfully, Sebastian Strauss