I am commenting on the DEIS for Amendment to the Northwest Forests Plan.

Based on the assumption that facts, including scientific facts, are to be the primary determinant of a course of action, then the balance of values among the proposed amendments are of critical interest. I believe the. USFS has neglected to include certain critical values, a in its considerations, and herein I attempt to remedy that unsatisfactory situation. These values relate to economics and public health and medicine, and are elaborated further below.

In the United States in 2021,

. In the United States in 2022, 608,366 people died of cancer. (source: CDC) Factors related to the state of and advances in cancer. Chemotherapy should therefore be of prime interest to the United States Government. Taxol®, which is also known as paclitaxel, is a chemotherapeutic agent widely used to treat different cancers.. The first identification of Taxol was carried out by Dr. Jonathan L. Hartwell (National Cancer Institute, NCI) in the 1960s, when a screening program for antitumor agents in the plant kingdom was carried out by the NCI and the U.S. Department of Agriculture, identifying Taxol from *Taxus brevifolia* (*T. brevifolia*) as a potent anticancer drug. The structure of PTX was published in 1971 and clinical trials began in 1984 The high demand for Taxol due to these clinical trials led to a severe depletion of *T. brevifolia* in the wild. Furthermore, the cost of manufacturing Taxol from *T. brevifolia* was 10 times the budget available for the trials. These events led to a race to develop a chemical synthesis route for PTaxol which was finally produced in 1994 this was a semi Dash synthetic approach based upon the use of a biosynthetic intermediate, for Taxol synthesis, found in other species of Yew that did not produce the final Taxol product…

Other importantTaxol derivativesAre also regularly employed and have captured a significant market also. global sales have been in the millions since it began to be marketed, reaching 1.5 billion dollars in 2000. other Taxol formulations, such as Abraxane® [

How big is the Taxol market?

The injection market is estimated to be valued at USD 7.15 Bn in 2025 and is expected to reach USD 16.51 Bn by 2032, growing at a compound annual growth rate of 12.5% from 2025 to 2032.

Global Paclitaxel Injection Market Size and Trends

Coherent Market Insights

https://www.coherentmarketinsights.com › industr

USFS And the American public should certainly place. A high value ar on what has preceded from a singular tree in the Pacific Northwest forest; namely, the Pacific you. As of this date, no other cancer, chemotherapy drug comes close to full the past sales and future production of sales that *taxus bbrevifolia* has accomplished. When considering commodity values of timber extracted from Pacific Northwest forest, the numbers captured by Taxol are most impressive and need to be considered as a part of the final solution going forward.
I do not mean to imply that the Pacific, you, an old growth, forest is required somehow now for Taxol production. It is not. However, what the Taxol example shows is the unrealized potential of what still wise ahead in landscape size ecosystems, such as old growth forests. In this, we consider more than just the trees in the forest, per se. There are uncounted, undescribed, and under investigated micro organisms that dwell in the soil's of old growth forest. That alone is sufficient reason to preserve these areas, and to ensure their perpetuity as they are evolving systems that can develop new solutions as they change. This certainly means recruiting as much mature forest into old growth status as is possible. And short, the real treasure of Pacific Northwest, for us lies below the surface – of the soil. This concept will be further expanded in the following section which speaks of the need for novel antibiotics.

Facts mentioned in the above paragraphs are found in the following publication cited below.
Molecules
. 2020 Dec 17;25(24):5986. doi: 10.3390/

https://pmc.ncbi.nlm.nih.gov/articles/PMC7767101/#:~:text=Taxol®%2C%20which%20is%20also,most%20widely%20e

I am commenting here on amendments to the north west forest plan.

I am disappointed in what I have seen in this attempt to modify the northwest Forest plan. The forest service claims to wish to employ the best available science and its decision making. In fact, the documents revealed a twisted myopic view of the values contained within the northwest forest. I am trying to remedy that situation by providing information that details one of the reasons the amendments to the plan so badly missed the mark. I refer to the inordinately high values to science and medicine of the forest as a fulsome operating functioning ecosystem. One cannot look at the forest is solely a production vehicle for logs. That does a huge injustice to present inhabitants of the earth as well as many generation of future inhabitants. Within this document, I have simply pointed out a few of the many research articles, which prove, that just one aspect of the subject, namely, fungal, metabolites, provide massive amounts of value that are incalculable on any scale.

I am just not satisfied by any other provided alternatives.

Alternatives, B & D are unsatisfactory since they raise the logging levels to as much is over 1 billion board feet annually. That's more than double the current annual cut, which is just over 500,000,000 acres annually.. That is too much disturbance in too short of time and will rig havoc with wildlife, and water courses. Alternative C would be favored by me if there were certain specific changes to it. Very critical is the need to maintain the originalLSR restriction by exempting 80 year plus trees instead of defining mature growth as 150 your trees plus in wet regions and lowering the mature, forest definition to 80 years Plus instead of raising the minimum age? to 120 years old in dry regions. Until old growth forest reaches levels that existed before the rampage of cutting in the second half of the 20th century, forest of younger trees should be continually recruited to existing old growth stands to build them out and protect them from degradation.

Existing old growth stands, especially those in the matrix area. Should be buffered with existing younger forest, swaths of for instance, 50 yards to help and cheer against exotics and invasive intrusion, wind, throw, sunlight, penetration, and other edge effects which can substantially compromise the stand because of the distance from the edge, which of these effect can manifest damage.

Surveys for rare and endangered species should be continued on land that is slated for cutting. Otherwise there is no way of knowing what potential harm is extant.

Antibiotic discovery

There is an enormous untapped potential for discovery of novel antibiotics in the ecosystems of old growth, forest, as the articles cited below demonstrate. Most especially, fungi provide a deep and largely unknown potential for drug discovery.

“Antibiotics are a staple in current medicine for the therapy of infectiousdiseases. However, their extensive use and misuse, combined with the high adaptability of bacteria, has dangerously increased the incidence of multi-drug-resistant (MDR) bacteria. This makes the treatment of infections challenging, especially when MDR bacteria form biofilms. The most recent antibiotics entering the market have very similar modes of action to the existing ones, so bacteria rapidly catch up to those as well. As such, it is very important to adopt effective measures to avoid the development of antibiotic resistance by pathogenic bacteria, but also to perform bioprospecting of new molecules from diverse sources to expand the arsenal of drugs that are available to fight these infectious bacteria.

A

End of thetic fungi are associated with the tissues of plants, whereas mycorrhizal fungi are only associated with the roots of plants.

Endophytic microorganisms are to be found in virtually every plant on earth. These organisms reside in the living tissues of the host plant and do so in a variety of relationships ranging from symbiotic to pathogenic. Endophytes may contribute to their host plant by producing a plethora of substances that provide protection and ultimately survival value to the plant. Ultimately, these compounds, once isolated and characterized, may also have potential for use in modern medicine, agriculture, and industry. Novel antibiotics, antimycotics, immunosuppressants, and anticancer compounds are only a few examples of what has been found after the isolation and culturing of individual endophytes followed by purification and characterization of some of their natural products. The prospects of finding new drugs that may be effective candidates for treating newly developing diseases in humans, plants, and animals are great."Other applications in industry and agriculture may also be discovered among the novel products produced by endophytic microbes. "
Excerpt from reference
https://pubs.acs.org/doi/10.1021/np030397v#:~:text=Preamble,-Click%20to%20copy%20section%20link

Based on the facts and conclusions of. The scientific articles contained herein.

There are many substantial reasons to conserve and preserve old growth forests. I'

Those are largely contained within the article found at
https://link.springer.com/article/10.1007/s10311-021-01372-y

Forest Ecology and Management
Volume 457, 1 February 2020, 117678

How does forest management affect fungal diversity and community composition? Current knowledge and future perspectives

Old forests containing ancient trees are essential ecosystems for life on Earth

Among these are carbon sequestration, nitrogen, fixation, habitat for many animal and plant species, such as neotropical migrants,, and rare, threatened, and endangered species,. Such forests also sustain and nurture bryophytes, lichens, cyanobacteria, and fungi, all of which are central to sustenance of complex forest ecosystems. Old growth forest also sustain growth of young trees, and provide superior genetics for their offspring.

Here, and I am focusing on one particular critically important reason to preserve old growth forests; namely, they are value as a treasure trove of novel natural products as new pharmaceuticals. In particular, ice dress, the importance of fungi in the drug discovery process.

Has amply illustrated in table one below, pho have lead to valuable new therapeutic agents that have been approved by the United States food and drug administration and the corresponding agencies of other

Tables one, and two, are taken from the following publication:

BIOMOLECULES 2023 Jun; 13(6): 986.

Published online 2023 Jun 14. doi: 10.3390/biom13060986

PMCID: PMC10296638

PMID: 37371566

Fungal Drug Discovery for Chronic Disease: History, New Discoveries and New Approaches

countries. Table 1 reveals 22 approved drugs from fungi. These have been responsible for saving millions of lives. They include pharmaceuticals to treat infectious diseases and many chronic diseases, including cancer, cardiovascular, Aziz, and multiple cirrhosis. It is noteworthy, that two of these drugs s,Fingolimod and lovastatin, have been blockbuster drugs, garnering sales of at least $1 billion a year. In fact, lova statin, lead to Lipitor, a similar Staten, which has brought in more than $130 billion in sales for Pfizer

Table 1

Approved drugs of fungal origin, including their natural product parent molecule and where relevant their synthetic derivates. Notes on their use and mechanism of action are also given. Note fusafungine has now been withdrawn from use in many jurisdictions.

Additionally, note, although the design of fingolimod took inspiration from the structure of myriocin they have different mechanisms of action==

Natural Product	**Synthetic Derivative**	**Original Source Organism**	**Use**	**Mechanism of Action**
Penicillin G	-	*Penicillium rubens*	Antibiotic	Inhibition bacterial cell wall peptidoglycan synthesis
Penicillin V	-	*Penicillium rubens*	Antibiotic	Inhibition bacterial cell wall peptidoglycan synthesis
Cephalosporine C	Cephalosporins	*Acremonium chrysogenum*	Antibiotic	Inhibition bacterial cell wall peptidoglycan synthesis
Fusidic acid	-	*Acremonium fusidioides*	Antibiotic	Inhibition of bacterial protein synthesis, prevents translocation of elongation factor G

Natural Product	Synthetic Derivative	Original Source Organism	Use	Mechanism of Action
Pleuromutilin	Retapamulin	*Clitophilus scyphoides*	Antibiotic	Inhibition of bacterial protein synthesis. Binds to 50S ribosome subunit and inhibits peptidyl transferase centre
Fusafungine	-	*Fusarium lateritium*	Antimicrobial and anti-inflammatory	Inhibition of cytokine expression from alveolar macrophages by various mechanisms
Griseofulvin	-	*Penicillium griseofulvum*	Antifungal drug	Interferes with fungal microtubule polymerisation
Echinocandin B_0	Anidulafungin	*Aspergillus spinulosprous*	Antifungal drug	Inhibits fungal cell wall synthesis by inhibiting glucan synthase

Natural Product	Synthetic Derivative	Original Source Organism	Use	Mechanism of Action
FR901379	Micafungin	*Coleophoma cylindrospora*	Antifungal drug	Inhibits fungal cell wall synthesis by inhibiting glucan synthase
Pneumocandin B_0	Caspofungin	*Glarea lozoyensis*	Antifungal drug	Inhibits fungal cell wall synthesis by inhibiting glucan synthase
Enfumafungin	Ibrexafungerp	*Endoconidioma carpetanum*	Antifungal drug	Inhibits fungal cell wall synthesis by inhibiting glucan synthase
Mycophenolic acid	Mycophenolate mofetil	*Penicillium brevicompactum*	Immunosuppressant	Inhibition of lymphocyte proliferation (inosine-5′-monophosphate dehydrogenase inhibition)
Mizoribine	-	*Penicillium brefeldianum*	Immunosuppressant	Inhibition of lymphocyte proliferation (inosine-5′-

Natural Product	Synthetic Derivative	Original Source Organism	Use	Mechanism of Action
				monophosphate dehydrogenase inhibition)
Cyclosporin A	-	*Tolypocladium inflatum*	Immunosuppressant	Inhibition of T lymphocyte proliferation (binds to cyclophilin A inducing inhibition of calcineurin)
Myriocin	Fingolimod	*Melanocarpus albomyces*	Immunosuppressant, (multiple sclerosis)	Myriocin inhibits of sphingolipid synthesis. Fingolimod is a sphingosine 1-phosphate receptor agonist
Mevastatin	-	*Penicillum citrinum*	Cholesterol lowering	Inhibits cholesterol synthesis by inhibition of HMG-CoA reductase

Natural Product	Synthetic Derivative	Original Source Organism	Use	Mechanism of Action
Lovastatin	-	*Monascus ruber, Aspergillus terreus*	Cholesterol lowering	Inhibits cholesterol synthesis by inhibition of HMG-CoA reductase
Ergotamine	Ergotamine tartrate	*Claviceps purpurea*	Antimigraine agent	Cerebral vasoconstriction (alpha-adrenergic blocker)
Ergometrine	Ergometrine maleate and other compounds	*Claviceps purpurea*	Management of postpartum haemorrhage	Induces uterine contraction via agonist effects on myometrial 5-HT2 receptors
Ergocryptine	Bromocriptine	*Claviceps purpurea*	Hyperprolactinaemia related conditions in obstetric medicine	Dopamine agonist blocks the release of prolactin from the pituitary gland
Lentinan	-	*Lentinus edodes*	Adjuvant for cancer chemotherapy	Immunomodulator, binds to and

Natural Product	Synthetic Derivative	Original Source Organism	Use	Mechanism of Action
				actives various extracellular receptors in monocytes and neutrophils

Compound	Synthetic Derivative	Original Source Organism	Therapeutic Area	Mechanism of Action
Wortmannin	PX-866	*Talaromyces wortmannii*	PX-866 for metastatic castration-resistant prostate cancer, (2019 phase II clinical trial).	Phosphatidylinositol 3-kinase inhibitor
Halimide	Plinabulin	*Aspergillus* sp. CNC-139 *Aspergillus ustus*	Plinabulin for prevention of docetaxel-induced neutropenia during cancer	Plinabulin is a microtubule polymerisation inhibitor and separately

			treatment (2022 phase III clinical trial).	stimulates T-cell activation
Illudin S	Irofulven	*Omphalotus illudens*	Irofulven for recurrent or persistent intermediately platinum-sensitive ovarian or primary peritoneal cancer (2010 phase II trial).	Irofulven is a DNA alkylating agent
Hypothemycin	E6201	*Hypomyces trichothecoides*	E6201 for advanced solid tumours, expanded to advanced melanoma (2018 phase I trial).	E6201 is an ATP-competitive MEK1 kinase inhibitor
Radicicol	Ganetespib	*Monosporium bonorden*	Ganetespib with docetaxel for advanced non-small-cell lung cancer (2019 phase III).	Ganetespib is an inhibitor of the molecular chaperone HSP90

Antroquinonol	-	*Taiwanofungus camphoratus*	Cancer, (non-small cell lung cancer) (2014 phase II).	Inhibits Ras and Rho signalling through inhibition of isoprenyltransferase
Cordycepin	NUC-7738	*Cordyceps militaris*	NUC-7738 for patients with advanced solid tumours or lymphoma (2021 phase I trial).	Cordycepin is a nucleoside analogue, inhibits transcription, inhibits 3′ end processing of mRNAs, activates AMP-activated protein kinase. NUC-7738 shown to be pro-apoptotic and NFKB inhibitor in human patients
Muscimol	-	*Amanita pantherina*	Drug-resistant epilepsy (2019 phase I).	Receptor agonist for $GABA_A$-R subtypes
Psilocybin	-	*Psilocybe mexicana*	In 2018 U.S. Food and Drug administration granted breakthrough therapy status for	Psilocybin binds with high affinity to the 5-HT_{2A} serotonergic receptor subtype

			treatment-resistant depression.	

Table to above presents nine drug candidates that are undergoing clinical trials. For certain, not all of these candidates will succeed to obtain FDA approval. Nonetheless, some will make it through phase 3 trials, and be approved for use in humans.

The above data in table 1 and table 2, notwithstanding, drug discovery, from any source is not a trivial undertaking. For the case of drug discovery from fungi, it has been said that the low hanging fruit has been picked. Therefore, drug hunters are actively exploring more recent advances in biotechnology, such as DNA, sequencing and RNA sequencing, to tease out, which fungi may have a promising new discovery for clinical application.

The discovery problem complexity might be appreciated. If one understands that we don't even know how many fungi

exist. A study done using high throughput sequencing. Suggest there may be at least 5.1 million species of fungi. only about 140,000 have so far been identified. This begs the question: how do you find the next clinical candidate? Many bungle species are impossible or near impossible to cultivate

so that modern sequencing methodology is required to interrogate there. Genomes. Finding finding new species of fungi is not so simple as finding a new mushroom or collecting truffles.

WARRING FUNGI

I'LL INCLUDE A PDF FILE ON THE ABOVE TOPIC TO ILLUSTRATE SEVERAL IMPORTANT THEMES ABOUT DRUG DISCOVERY FROM FUNGI.

THE PHRASE, WARRING FUNGI IS USED BECAUSE FUNGAL LIFE IS A CONTINUAL COMPETITION OF EACH FUNGUS FOR A PLACE OR A HABITAT, FOR NUTRITION, REPRODUCTIVE POTENTIAL, AND A DEFENSE AGAINST OTHER FUNGI AND OTHER MICRO ORGANISMS. TO DEFEND THEMSELVES, FUNGI, GENERATE NATURAL PRODUCTS WITH PROPERTIES. THAT MAY REPEL OR KILL A COMPETITOR FUNGUS. THIS ARSENAL IS PART OF WHAT WE DRAW UPON FOR NEW MEDICINES.

AS I MENTIONED, PREVIOUSLY, FINDING NEW FUNGI IS NOT AN EASY TASK, BECAUSE THEY MAY BE IMPOSSIBLE OR VERY DIFFICULT TO CULTIVATE. NONETHELESS, DNA SEQUENCING COMES TO THE RESCUE. WE CAN INTERROGATE THE GENOME OF A FUNGUS TO DECIPHER WHAT PROTEINS OR ENZYMES OR NATURAL PRODUCTS THAT IT MAY BE PRODUCING. IT TURNS OUT THAT FUNGI, LIKE PLANTS, NEST CERTAIN ENZYMES FOR THE SYNTHESIS OF A PARTICULAR NATURAL PRODUCT, ALL IN A CLUSTER ON A GENE. IT'S LIKE A FACTORY SET UP TO CARRY OUT A COMPLICATED PROCEDURE. BY DISCOVERING THE DNA SEQUENCE OF THESE CLUSTER SEQUENCES, CALLED BIOSYNTHETIC, GENE CLUSTERS, OR BG C'S, WE CAN GET A GOOD IDEA OF WHAT THE FUNGUS IS MAKING, WHETHER IT IS SIMILAR TO UNKNOWN COMPOUND, ALREADY DISCOVERED, OR THAT IT MIGHT BE A POSSIBLE CANDIDATE FOR A NEW

DRUG. THIS APPROACH TO BIOSYNTHETIC, GENE CLUSTERS, SOLVES, TWO PROBLEMS. FIRST IT HELPS ELIMINATE THE PROVERBIAL PROBLEM IN ALL DRUG DISCOVERY: THE DISCOVERY OF THE SAME COMPOUND OVER AND OVER AND OVER AGAIN. ON THE SECOND FRONT, ONCE THE BIOSYNTHETIC GENE CLUSTER IS KNOWN, IT CAN BE CLONED INTO AN EXPRESSION VECTOR LIKE A YEAST, ARTIFICIAL CHROSOME OR YAC. A C. THIS ALLOWS GENERATION OF QUANTITIES OF THE NATURAL PRODUCT SO THAT APPROPRIATE BIOLOGICAL TEST CAN BE RUN AND THAT ITS STRUCTURE CAN BE DETERMINED BY CHEMICAL AND INSTRUMENTAL METHODOLOGIES.

APPLICATION OF THIS BIO TECHNOLOGY AND MORE. SIMILAR TECHNIQUES, WELL FORGE, A NEW PATHWAY FOR DRUG DISCOVERY FOR FUNGI, IF WE HAVE NOT DESTROYED THE FUNGI.WARRING FUNGI FUNGAL CONSERVATION IS, THEREFORE, OR SHOULD BE, A HIGH PRIORITY OF THE FOREST SERVICE.

Endophytic Fungi: : a new hope for drug discovery?

The article below – in abstract form here – describes yet another kind of fungus.
www.sciencedirect.com/science/article/abs/pii/B9780128210062000042#ab0010

- Endophytic fungi: A new hope for drug discovery

New and Future Developments in Microbial Biotechnology and Bioengineering

Recent Advances in Application of Fungi and Fungal Metabolites: Applications in Healthcare

Abstract

The emergence of drug resistance to all forms of synthetic drugs has changed the direction of drug discovery to microbial sources, either actinomyces or endophytes. Endophytic fungi are gaining importance due to their ability to produce plant-associated bioactives as metabolic products. These fungal endophytes are an excellent source of biologically active compounds. Large numbers of plants are still unexplored for these endophytic fungi (microbes). Fungal endophytes release metabolites that tend to suppress cancer, microbial growth, and insects. Endophytic metabolites represent various organic compounds including alkaloids, terpenoids, peptides, hydrocarbons, and aromatic compounds. An important role is played by these compounds to mediate host-microbe interaction. The discovery of Taxol from endophytic fungi and the emergence of drug-resistant pathogens impose pressure on researchers to explore these microbes for drug discovery. Although work on these fungi began a few decades back, their potential was not fully explored. The scope always exists for the extraction and recovery of new and novel metabolites from endophytic fungi that will be useful to counter resistance to existing drugs.

- Previou

Mature old growth forests as sanctuaries of diverse fungal species

Following my comments, here, I have included selected verbiage from an article from the journal forest management and ecology. The included material and the entire journal article – available with a subscription – is foundational to USFS decision, making, regarding the future of old growth forests in the United States. It is also highly pertinent to any civil, cultural strategy going forward if, in fact, adequate consideration of all factors involved is going to be undertaken.

Hi, I have quoted here several critical passages that are self-explanatory, and must be a key part of any decision making process.

To increase Vizza Bility of this information, I have used bold text.

The reviewed studies reported a positive correlation between fungal diversity and stand structure variables such as canopy cover, basal area of the stand and tree species diversity, particularly for mycorrhizal species. Abundance and diversity in size, tree species and decomposition stage of deadwood are reported as positively related to richness of wood-inhabiting fungi.

The main findings about the effects of silvicultural practices suggest that the higher is the management intensity the lower is the

diversity of ectomycorrhizal and wood-inhabiting species,

at least in the short term.

As a result, forest fungal diversity faces multiple potential threats such as habitat loss and fragmentation (Grilli et al., 2017), nitrogen deposition (Lilleskov et al., 2011, Lilleskov et al., 2019), climate change (Dahlberg et al., 2010) or wildfires (Salo and Kouki, 2018). Declining area of old-growth forests and intensification of timber production have been also reported as disturbances for fungal diversity in forest ecosystems since they can cause a lack of ecological continuity (Dahlberg et al., 2010).

Fungi are an extremely diverse group of organisms critically important to forest ecosystem functioning. Particularly, ectomycorrhizal and saprotrophic fungi play important roles in nutrient cycling (Cairney and Meharg, 2002) and are recognized as fundamental components of biodiversity and ecosystem functioning (Clemmensen et al., 2015, Steidinger et al., 2019). Indeed, ectomycorrhizal fungi are mutualists with plant roots but can also act as decomposers by oxidizing organic matter to obtain nitrogen (Lindahl and Tunlid, 2014), whereas saprotrophic fungi are the main responsible of hydrolytic degradation of organic matter (Hobbe et al., 1999). Preserving fungal diversity in forest ecosystems is important since (i) a positive relationship between microbial diversity (fungi and bacteria) and ecosystem multifunctionality has been shown in several ecosystems (Delgado-Baquerizo, 2016, Duffy et al., 2017, Laforest-Lapointe et al., 2017). From a broad perspective along the successional forest ecosystem stages, (ii) forest ecosystem development and associated processes have been shown to be tightly linked to the composition of the fungal community (Clemmensen et al., 2015); therefore, maintaining diverse communities at landscape level should result in enhanced ecosystem succession. In addition, (iii) despite the specific functions from several fungi are still not known, a growing body of the literature is showing how specific fungal species develop crucial ecosystem processes. For example, specific *Cortinarius* species are involved in the oxidation of the organic matter in boreal ecosystems (Kyaschenko et al., 2017) and specific fungal species

(i.e. *Meliniomyces*, *Cenococcum*) with structures resistant to degradation (e.g. melanin) may be contributing to soil C storage (Fernandez et al., 2019). In addiction, other fungal species (i.e. cord forming species such as *Suillus*) have been shown to efficiently transfer N to their hosts, promoting higher primary production (Clemmensen et al., 2015), as compared to other symbionts. Diversity and abundance of forest fungi also support diversity and abundance of other taxonomic groups. Thus, forest fungi are an important food source for wildlife (Worthen and McGuire, 1990). In addition, fungal fruit-bodies of these two functional groups also provide important provisioning and cultural ecosystem services, as they constitute the main resource of socioeconomic activities based on mushroom picking for both recreational and commercial purposes (Martínez de Aragón et al., 2011, Górriz-Mifsud et al., 2017). Moreover, soil fungal mycelium is also an important food source for other organisms living in soils, such as collembolan species (Hedĕnec et al., 2013) or fungal mycoparasites (Lindahl et al., 2010). Therefore, fungal diversity conservation is essential to maintaining the provision of multiple ecosystems services that are crucial to both forest ecosystem functioning and human well-being (Millenium Ecosystem Assessment, 2005, Heilmann-Clausen et al., 2014). Any loss of fungal diversity is potentially harmful, even though some functional redundancy may exist among several groups of fungi (Talbot et al., 2014).

Many different factors drive fungal species diversity and community composition. Forest landscape attributes, soil properties and climatic conditions are well-known drivers of both ectomycorrhizal and saprotrophic fungal diversity at multiple scales (Jansa et al., 2014, Andrew et al., 2016, Alday et al., 2017, Schappe et al., 2017). Moreover, forest fungi are also highly sensitive to vegetation composition, shifts and dynamics (Packham et al., 2002, Lauber et al., 2008, Landi et al., 2015). As a result, forest fungal diversity faces multiple potential threats such as habitat loss and fragmentation (Grilli et al., 2017), nitrogen deposition (Lilleskov et al., 2011, Lilleskov et al., 2019), climate change (Dahlberg et al., 2010) or wildfires (Salo and Kouki, 2018). Declining area of old-growth forests and intensification of timber production have been also reported as disturbances for fungal diversity in forest ecosystems since they can cause a lack of ecological continuity (Dahlberg et al., 2010).

Be rational conclusion to draw from the above assembled facts is that the maintenance of a rich and diverse, productive, fungal community, requires old growth, forest conditions. Plantations and timber harvesting are inconsistent with and in opposition to a healthy fungal community. The fundamental interests of United States, citizens, as well as society in general is to the discovery and production of entities that protect, adding a rich human life.

The following specifics are endorsed by me. No entry of wilderness areas for any purpose. The protection of aw, roadless areas and preparation of recommendations for wilderness status for these areas to be submitted to Congress. All old growth stands within the current timber matrix should be absolutely sacrosanct from any kind of silvicultural operations.

The minimum age for termination of all growth status should be reduced from 150 years and 120 years back to 80 years. This is needed to expand the area of old growth forest, which has been substantially reduced due to past logging activity. From 80 years on, stands begin to approximate old growth conditions. Furthermore harvest of such matureing timber will impact the area and, as that is quoted above, have determined, reduce the diversity and vibrance of fungal communities, which intern will affect the entire ecosystem, holding it back from its full potential to benefit wildlife and humans.

- While the DEIS identified the need to provide a more predictable supply of timber it does not provide sufficient guidance to ensure that the goal of increasing the supply of timber does not conflict with economic opportunities well-known to provide higher economic values, such as outdoor recreation, clean water, fisheries., and Discovery of novel medicines. These must be addressed in the final EIS.

Therefore, the absolute conservation of old growth is

an must.