Proposal title: Modeling the productivity of edible ectomycorrhizal forest mushrooms
Investigators: Waring, R., Pilz, D., and Molina, R.

International commerce in chanterelle and matsutake mushrooms harvested from coniferous forests of the northern hemisphere exceeds a billion dollars annually. Picking these mushrooms has little impact on subsequent fruiting, but forest management critically influences their productivity because they are ectomycorrhizal with trees. Our goal is to modify a forest carbon allocation model to predict edible mushroom productivity and to test the model's generality over a range of environmental and stand conditions that constrain potential photosynthesis and influence mushroom production. Our hypothesis is that> 75% of the variation in mushroom productivity (among forest stands) can be explained by two factors, (1) the food resources available to ectomycorrhizal fungi in the stand and (2) the percent occupancy of a site by that mushroom species. Coastal, interior, and montane coniferous forest stands will be selected for study in Oregon. Mushroom productivity will be sampled on these sites and carbon allocation budgets will be calculated from stand, climate, and edaphic data. Occupancy of the sites by chanterelles and matsutake will be estimated using immunoassays of ectomycorrhizal root tips, olfactory sampling of mycelial mats, and spatial distribution of sporocarps. Site indices, carbon allocated below ground, and tree growth efficiency ratios will be analyzed in conjunction with fungal site occupancy estimates to fit response curves that predict mushroom productivity within and among seasons. Resultant models will be tied to economic value of the mushroom resource and designed as practical management tools. This approach will give forest managers a practical tool for sustaining mushroom crops in synergism with management for other forest products and amenities. The models also will enhance the ability of policy analysts to evaluate resource trade-offs.

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International commerce in chanterelle and matsutake mushrooms harvested from coniferous forests of the northern hemisphere exceeds a billion dollars annually.
Axiom and implied rationale.

Picking these mushrooms has little impact on subsequent fruiting, but forest management critically influences their productivity because they are ectomycorrhizal with trees.
Assumptions? It would be hard to judge whether these are known (i.e., axioms) without reading the proposal. Are these statements related to the rationale for the research? I'm not sure.

Our goal is to modify a forest carbon allocation model to predict edible mushroom productivity and to test the model's generality over a range of environmental and stand conditions that constrain potential photosynthesis and influence mushroom production.
There are two related objectives here (i.e., modify the model, and then test the model). These are mostly method-based objectives (i.e., "Our goal is to <u>modify</u>…" Why not, "Our goal is to be able to predict edible mushroom productivity…"? No long-term goal has been stated: why do they want to do this?

Our hypothesis is that> 75% of the variation in mushroom productivity (among forest stands) can be explained by two factors, (1) the food resources available to ectomycorrhizal fungi in the stand and (2) the percent occupancy of a site by that mushroom species.
Nice clear hypothesis, although "food resources" (in particular) will need to be defined.

Coastal, interior, and montane coniferous forest stands will be selected for study in Oregon. Mushroom productivity will be sampled on these sites and carbon allocation budgets will be calculated from stand, climate, and edaphic data. Occupancy of the sites by chanterelles and matsutake will be estimated using immunoassays of ectomycorrhizal root tips, olfactory sampling of mycelial mats, and spatial distribution of sporocarps.
Methods.

Site indices, carbon allocated below ground, and tree growth efficiency ratios will be analyzed in conjunction with fungal site occupancy estimates to fit response curves (**Methods)** that predict mushroom productivity within and among seasons. (**Objective).**

Resultant models will be tied to economic value of the mushroom resource and designed as practical management tools.
Methods and objective (i.e., their objective is somehow tied to these "practical management tools," but it is bit unclear how they will use these tools, despite the last paragraph.

This approach will give forest managers a practical tool for sustaining mushroom crops in synergism with management for other forest products and amenities. The models also will enhance the ability of policy analysts to evaluate resource trade-offs.
Significance.

Conclusion: Most elements are present, but the goals and objectives could be better described.