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Comments: Thank you for the opportunity to comment and for the detailed project documents you have prepared. The proposed project certainly is a larger one for this part of the Rochester and Middlebury Ranger Districts, and I know you and others have put much thought and planning into this.

There is so much unknown about the establishment ecology in the fire-adapted natural communities on the Escarpment. That makes it difficult to understand a baseline, and along with the now rapidly shifting climate, speculating on the future of the forest, especially portions like the Escarpment, becomes even more difficult.

As an ecologist I tend to think about dominant processes inherent to landscape ecosystems, but even though there are one or two studies, the historic longer-term (500+ years let's say) processes on the Escarpment are not well known in the xeric ecosystems. Rather than focus on what we don't know, my comments will address other details. I'm thinking that we don't know pre-settlement fire regimes and we don't know how involved in fire management the Abenaki and other indigenous peoples who inhabited and managed the landscape were. I suspect that were peoples to use fire management for promoting berry crops, these xeric ecosystems would be good choices. Also, we don't know whether the fire regime of 200-300 years ago was similar to that of 1,000 years ago. We do know that many of the plant species of the xeric ecosystems tend to establish and recruit when fire is part of the ecological processes, and that fire on parts of the Escarpment was a bit common in the 19th and early 20th centuries, at least more common than it has been in the last 50 or so years.

Ecological benefits for pitch pine, red pine, chestnut oak, early azalea and a number of herbaceous plant species are hoped for under the plan proposed. And I hope for those as well. I much appreciate the species diversity and unique ecosystems on the Escarpment. The physiography, soils, hydrology, and microclimate come together there in ecologically interesting ways and heterogeneity of conditions (including historical events) and natural communities is high in that landscape. The project maps indicate some of that heterogeneity!

1. One aspect of the project, proposed Action 4, the treatments proposed for hemlock natural communities, greatly confuses me. I have not read the literature about silvicultural approaches for managing the two non-native invasive pests that have devastated hemlock further to our south and are encroaching northward, but it seems to me that treating intact hemlock forests with cutting that leaves only 10-20 crop-tree hemlock per acre has little assurance of increasing the resilience of these stands. I'm interested in learning if there is research and literature to support such a measure, especially in a zone that does not currently have either of those insects. I also am confused about the fencing or obstructions of 0.25-acre patches around up to 168 acres of hemlock forest. I figure, perhaps, that is about keeping deer browse of hemlock regeneration to low levels in such fenced patches, but it is not clear in the documents.

Continuing with hemlock, the Design Features document, page 2, notes under Ecology and Habitat that state-significant hemlock natural communities are to be designated "ignition is excluded." I am curious why these exemplary natural communities would not be designated for "no action" at all? I would not want to see any project-related disturbance in those ecosystems.

1. Pile burning actions, Proposed Action 3, is another curiosity to me. I could foresee many 5-meter diameter areas ending up with scarred soils. I read that this action, related to cutting of sprouts that are judged to negatively compete with regeneration of desired species, is proposed in order to reduce fuel loads. We don't know how much of a concern fuel loads will be, but we do know that naturally ignited fires in the project area have been very rare over the past half century, and that fires tend to be small and controlled by weather events or mesic "holding" stands. I am suggesting that pile burns be relatively few and be targeted only to areas that

present a threat at the WUI.

2. The Oxbow area is one that I know quite well. I was surprised to see that the sliver south of North Branch Road is included in the area for proposed actions. I am wondering what sort of fire-holding feature is envisioned at the boundary line of GMNF and Middlebury College lands. Of course, by the time this project might be implemented, that might not be an ownership boundary. Regardless, I was surprised to see that North Branch Road would not be utilized as a "hard" fire break, with no prescribed fire on the side down to the Middlebury River and coming close to some of the houses on the road. Using an Adaptive Management approach, one might consider that if burning is seen to be successful in meeting ecological objectives in the larger part of the Oxbow area, then and only then might it be considered for this "gorge sliver."

3. In general, I am curious about the expected responses of some of the oldest trees. I know of numerous older (some large, some not) hemlock, red pine, white pine, and chestnut oak in this landscape. I glean that the fire intensity is not planned to be hot and, ideally, few trees would torch and most older, thick-barked trees of the fire-resistant species are not intended to be killed. But, I'm just not so sure, particularly for older ones that might have less vigor yet might, without fire, live for another 100-200 years as extremely valuable legacy trees. (I think of oak, particularly, as "dying standing up"; that is, large portions of the crown die at different times while the tree continues to live long. Their "death" is a much longer process than an animal's death, or than a red pine's for example.) My concern suggests to me that an experimental approach be initiated if this project moves to implementation. Try the prescribed burn on small areas. Monitor and measure responses, and all that. I do comprehend that this is more expensive due to economies of scale, but the learning and the ability to actually meet objectives suggest that it is a better approach.

1. Similar to responses of the oldest trees to fires, and perhaps fires more intense than is hoped for, I am very curious about the response of beech understory. At the Oxbow there are patches heavy to small-diameter beech, and I know this is the case in other parts of the project area as well. If the fire is the low-intensity burn proposed, will beech respond vigorously and "require" resource-intensive post-burn management and control?

2. Related to the post-burn control of the mesophytic trees, the plan proposes mechanical control and/or herbicidal control. I do not support use of herbicides for the purposes in this project. Again, I will mention starting with a small-scale, adaptive-management approach. We do know the challenges silviculturists and ecologists have had with oak regeneration, and we do know that red pine and pitch pine regeneration on the Escarpment are not exactly "worked out" scientifically. Why not run smaller-scale burn experiments?

3. The Pitch Pine Treatment Area is one that I also know quite well. I know that there is complex topography, complex microclimates, complex hydrology, and complex wind patterns. I am wondering about all this complexity leading to surprises. Fire racing up steep slopes. Burns leading to excessive erosion. Xeric holding features not holding fire. I also note that east of York Glen Trail there are talus slopes and talus woodlands that are not shown on the map. They have grown into denser shrub and tree cover in the last 15 years. More needs to be known about fire behavior in such areas, and the likelihood of "surprises" given the aspects of complexity just mentioned.

Once again I thank you for your consideration of my thoughts.