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Paul L Larrivee, Jr. LF 3306

To: Amanda Stearns and Lucky D'Ascanio
From: Paul Larrivee, LF 3306
Re: Pine Grove Preserve

Amanda and Lucky,

As you both know I have spent considerable time reviewing Pine Grove Preserve with you both, the LMAC, Maine Forest Service District Forester and various staff from the Maine Forest Service. My belief is that this is one of the more challenging sites that the town is responsible for managing. Walkers and children from the pre-school spend considerable time in the preserve on a regular basis. Having large white and red pines trees declining and falling from the stand every time the wind blows complicate the management of this parcel. I wish I could offer a simple solution for correcting the issues with the trees, but I can't. To understand the current situation with the forest, we need to look at its history first.

Background:

Pine Grove Preserve is like most forests in southern Maine, best classified as an intermediate forest. Foresters recognize four phases of forest succession following a disturbance, (1) Stand Initiation, (2) Stem Exclusion, (3) Understory re-initiation and (4) Steady State.

- Disturbance: Pine Grove's major disturbance was the conversion of forestland to agricultural land in southern Maine. The majority of the current forests in southern Maine are the result of clearing forests for agriculture and then the abandonment of the agricultural land in the mid 1800's to early 1900's. There were many reasons for the abandonment of farmland in Maine, with the two major reasons being the invention of refrigeration and the generally young poor soils.
- Stand Initiation: Based on core samples of downed trees, it appears that Pine Grove's Forest initiated between 100- 150 years ago. The exception to this is the area that was mined for gravel for the construction projects in the past on Route 1. As the agricultural stand was abandoned, white pine and birch were likely the two primary pioneer species. The result was an even aged stand.
- Stem Exclusion: Pine Grove was more than likely in the Stem Exclusion phase decades ago. In this stage the trees all race towards the sun and a closed canopy condition exists. No sunlight on the forest floor excludes the growth of a new age class of trees. As the pine overstory races towards the sun, the amount of live crown ratio declines. Ultimately under a forest management scenario the crop trees would be lightly thinned to increase vigor of the live crown, which in turn establishes a healthy root system.
- Understory re-initiation: Currently this is the phase of succession that Pine Grove Forest is in. As overmature, sick, diseased trees fall from the canopy a new age class of trees is establishing in the understory in the openings created. The smaller the openings, the more hardwood that establishes. The bigger openings, caused by recent wind storms, has some white pine regenerating in the understory. White pine seed likes disturbance to the duff layer of the soil.

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The seed establishes much easier with exposed mineral soil. Given the thick duff layer of this forest's floor, re-establishment of white pine will be more of a challenge. The other challenge to the establishment of future forests are invasive species creeping in from the edges. Buckthorn and knotweed were witnessed and should be addressed immediately.

- Steady State: Pine Grove is headed towards this phase. Just because Pine Grove is dominated by white pine at this time, it will likely be much more of a mixed forest as it transitions to the "steady state" phase and designation as a climax forest. In areas where the pine has fallen from the stands, hardwood species now dominate the understory. This will likely continue. Areas in which the wind toppled larger portions of the stand will likely regenerate with a combination of hardwood and pine species. Given the density of trees within the stand, live crown ratios of the overstory (amount of live green crown in relation to its height) are low. Root structure is (mass) is usually related to the size of the live crown. Basically, the larger the live crown the larger the root mass. Trees with small live crown ratios generally have smaller root mass, which in turn makes them more susceptible to the wind.

Pine Grove's current forest structure has had some exceptions to its natural succession process. Some of those exceptions are:

- There is a large old burrow pit that was likely used during the construction of Route 1. This pit is currently forested but with a different structure than other areas.
- It appears some planting was done, especially nearer Route 88 and around the monuments. The red pine is very weak and most if it is falling from the stand. Red Pine is especially vulnerable to Armillaria Root Disease and it appears this may be present in the dead and dying red pine. Armillaria is naturally occurring in Maine, but spreads rapidly in weak and stressed trees.
- Harvesters with oxen removed trees near the trails that were a danger to the public. Arborists also removed trees at various times after storm events.
- It appears that members of the public with chainsaws are also cleaning the trails up as trees continue to fall.
- Recreation trails have been placed throughout the entire parcel. While I'm not opposed to recreation trails, placing trails in a forest in Maine that is transitioning through successional phases has challenges to recreation and safety. Natural succession is messy. People need to be made aware that natural succession does not look like a park, it is messy.

Foresters practicing sound forest management activities that mimic the natural successional phases account for these additional uses of the land and capture trees before they decline and become hazards. This is accomplished through the thinning process. The thinning process also allows residual trees to develop higher live crown ratios, which in turn creates larger, stronger root masses. Openings created during the thinning process allow for sunlight to reach the forest floor, which in turn establishes a new age class of trees in the stand.

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Summary for Pine Grove:

Pine Grove has been managed much like a “park”. When trees become an “issue” for the recreational trails, they are removed. The current options for forest management activities are limited for Pine Grove Preserve. “Thinning” the dominant white pine trees is really not an option at this point in many areas of the forest. Their age, low live crown ratios and current blow-down areas make the likelihood of success low.

As a licensed forester it is difficult to inform a landowner that lack of past management limits options for future options. It is a difficult situation for a forester to recommend future management options for a forest like Pine Grove. There is no way to guarantee success and to make every party involved happy with the decision.

For Pine Grove, I would make the following recommendations:

- Begin work on invasive species ASAP. Begin the discussion with neighbors who also have invasive species that are spreading onto Pine Grove.
- Create and educational campaign similar to what has been done for past harvesting activities in Falmouth. Offer tours before, during and after the harvesting activities.
- Currently, nature has introduced wind disturbance into the forest. Future management should mimic what is currently happening. Large declining white pine should be removed in small patches that mimic the natural disturbance regime. This will also serve to create new openings for the establishment of white pine seedlings. Healthy white pine trees with high live crown ratios should be maintained as a future seed source and biological legacy within the stand. The removal will likely exceed 50-60% of the current white pine.
- The red pine is mostly dead or in decline. Red Pine should be removed in favor of the native hardwood regeneration that has established in the understory. The red pine will continue to decline and the rate will only increase in years to come.
- Hardwood trees should be maintained throughout the forest. Removal should focus only on pine trees in decline.
- Clean-up of current blow down areas will be time consuming and cost money. The trees have no financial value as they have been dead and, on the ground, too long. These trees will need to be chipped when removed.
- As a licensed forester I have a fiduciary responsibility to the town of Falmouth. My goal will be to utilize any live trees removed to their highest and best use. Revenue generated from these trees will be used to offset the cleanup of all the dead, downed trees in the blow down areas. It is difficult to make predictions about revenue from the timber at this point given the number of defects that exist. Some of the timber products or chips could be saved by the town for use by the public (chips at transfer station for compost).

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*White pine blow-down area now dominated by hardwood saplings.

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*Invasive species creeping in from an abutter's property. Knotweed.