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July 2, 2020

Dear Andy and Christina,

Thank you for the opportunity to review the "White Township Stewardship Plan," recently submitted to the PA Bureau of Forestry for approval. My only goal in participating with this work is to provide advice that will make a better outcome for White's Woods (and other White Township properties, as appropriate). From my initial, on-site review of White Township properties, it is apparent that following Millstone's plan creates the biggest risk to White's Woods. Millstone's plan was written to apply to all of White Township properties, and therefore this review (below) can apply to all locations. However, White's Woods is obviously at greatest risk for catastrophic results.

REVIEW OF WHITE TOWNSHIP STEWARDSHIP PLAN (prepared by Millstone Land Mangement, LLC)

Landowner's Goals for Woodlot Management of White Township Properties, page 2 and 3:

> The reality is, these are not forest stewardship goals, and maybe that is on purpose. The plan is titled a "Stewardship Plan" and not a Forest Stewardship Plan. Given this list of "goals," it would appear you not only need a qualified forester's review, but also that of a qualified Municipal Planner.
>
> As a qualified forester, I can certainly comment on "goals" 1 and 2 because the general idea behind both are common to many forest landowners. The goal to (#1) Improve Forest Health and Sustainability is great! Generally, I can agree with most of the ideas presented in Goal #1, however, there is actually a second goal presented here – Safety. I don't think you can lump the goal of safety in with the goal to improve forest health and sustainability. So, it seems to me White Township's top goal is forest health and its second goal is safety.
>
> Listed as goal #2 is to enhance recreational activities. I assume this should really be stated as enhance recreational opportunities. Most of the wording in goal #2 refers to White Township's commitment to recreation, as if maybe this is not really a goal to accomplish or aspire to, but rather a past success that just requires maintenance.
>
> Overall, the basis of each of the goals presented are fine. It is quite normal for forest owners to want to improve forest health and sustainability, improve safety, and increase recreational opportunities. It is well known that the landowners' goals are the building blocks of any successful plan. While the basis of each is fine, I do not see a clean, crisp presentation of goals here. Since the plan is built upon the goals, they should be well thought out and presented. As presented in Millstone's document, they are quite scattered and unfocused. The better the foundation is laid, the stronger the plan will be.

Worse than this, the parting thoughts in goals #1 and #2 refer to a much too simplistic way forward – contract with Mike Lawer. Goals can only be achieved through great strategy. The strategy part of the plan is the meat of the plan. A solution of blind trust, in any consultant, presented in the landowner goals section of the plan is misplaced. Alternatively, trust that well-presented goals can be accomplished should be put in a logical, biologically sound strategy presented in the meat of the plan (typically the recommendations section).

Millstone Land Management Objective for White Township Properties page 4:

First, the Consultant's "objectives" for any property should simply be to employ a logical, biologically sound strategy that will help the landowner meet their stated goals. That's it. Beyond this however, I feel it's necessary to also comment on the content presented in this section…

None of the information presented represents objectives, as the title of the section implies. Additionally, there are some foreign concepts presented such as (forest) mulching and mowing, selective objective timber harvesting, and utilizing sustainable selective harvests. Obviously the plan author has presented new ideas. While new ideas are often welcome when attempting to solve tough issues, a public property is hardly a place for experimentation. First, experimentation was not stated in the landowner's goals. Second, there are time-tested, logical, biologically sound practices that are available and could be employed. Anytime a "forester," timber buyer, or logger uses the word "selective," to describe a harvest the landowner should pause and notice a red flag. The word selective has been used by many to promote an idea of professional choice related to harvest decisions. The term has been used to put landowners at ease, i.e. "we won't clearcut, but rather we will be selective". The term selective harvest has been discussed, by forest health advocates, as the polar opposite of proper, sustainable harvesting for decades. In a 2016 Penn State Extension article by Dr. James C. Finley, Professor Emeritus of PSU Forest Resources, titled "Forest Stewardship: Timber Harvesting: An Essential Management Tool," Dr. Finley writes, "This misleading term –selective cutting—refers to a practice that has no basis in scientific forestry." Proper harvesting can only fall into one of two categories – thinning or regeneration harvesting. The goal of a thinning is to create additional space and increased growth for overstory trees. The goal of a regeneration harvest (shelterwood, seedtree, or clearcut) is to start a new forest. Any harvest plan that does not include the proper terms of thinning or regeneration harvesting and instead used the term selective harvest should at least raise concern.

The idea of utilizing mulching and mowing is ok in an old-field setting or where coppice forestry (creating and maintaining an early-successional habitat) is the goal. However, in a mature forest setting, tilling the soil to a depth of 6 inches (as stated in multiple Millstone documents) should again raise a red flag. As I stated in my June 24th report, there is not a soil compaction problem in White's Woods. Soil compaction is the result of running heavy equipment like skidders, dozers, or even a skid-steer over the forest. These activities have been absent for many decades in White's Woods. Additionally, think of how many leaves fall to the forest floor every year in the Park. Every fall, dead leaves create a new richness for the forest soil. This has been happening

there for hundreds of years. Annually, freezing and thawing loosens the soil above the frostline. Also, contrary to popular belief, the top six inches of forest soil contains many tons of roots per acre. These roots, close to the surface, are an important asset for healthy trees. Damaging these roots through compaction and breakage through tilling could have devastating effects on the health and vigor of all the trees of the forest. Root damage results in top dieback, increased root rot, and unnecessary tree stress which invites problems from a host of dangerous pathogens.

In addition, some of the invasive plants, like Japanese stiltgrass and garlic mustard are excellent seeders. These invasive plants produce an abundance of small, hard seeds year after year. These seeds can lay dormant for a decade – waiting for best conditions to germinate and spread. Running equipment across the soil and disturbing the soil will greatly increase these troublesome competitive plants. The seeds are already present and are easily spread by the mechanized process to every disturbed area. Unfortunately, this will certainly create a very undesirable and worse forest understory condition across the property. Competitive native plants that spread aggressively by rhizomes, like hayscented fern, will also greatly increase from running equipment around. Hayscented fern, Japanese stiltgrass, and garlic mustard are all abundant on White Township properties.

The Properties Within the Landscape page 7:

The reason the PA Bureau of Forestry wants a section like this in a plan is because every landowner should have an understanding that their own property is not an island. Each forest ownership is surrounded by other forest ownership as well as non-forest ownerships. Additionally, each forest property plays an important role within a watershed. The purpose here should be to help the landowner understand how their decisions effect surrounding properties, surrounding resources, and surrounding people. It is good that the plan author has named each of White Township's properties as a park and used considerable descriptions of public use and recreational activities to prove the labels.

What Millstone's section lacks is a discussion of how proposed activities can and will impact many surrounding properties. If, for example, a misguided treatment strategy were to be employed that actually decreased forest health (through root damage) or increases invasive plants (through seed spread), there would be a negative impact on surrounding properties. On the flip side, a process that maintains or improves the natural resources on White Township properties can and will have a positive impact on the surrounding landscape. There should also be substantial discussion on the water resources within and outside the White Township lands.

Species of Special Concern page 8:

PNDI report actual results:

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	**Conservation Measure**	**No Further Review Required, See Agency Comments**
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Conservation Measure**	**No Further Review Required, See Agency Comments**

U.S. Fish and Wildlife Service
RESPONSE:
Conservation Measure: Voluntary implementation of the following recommendation(s) will contribute to the conservation and recovery of endangered and threatened species. To conserve foraging and roosting habitat for endangered bats, while also carrying out the proposed conservation, restoration, or stewardship project/activity, conserve and protect forested areas. Emphasis should be placed on retaining (or restoring, if not already present) mature forests with at least 60% canopy closure. Also, retain all hickory trees, and large diameter (>12 inches d.b.h.) snags, dying, and injured trees to ensure a continuing supply of potential roost trees for bats. If agricultural lands are proposed for inclusion in the conservation project/activity, use Integrated Pest Management, with an emphasis on avoiding or minimizing the use of chemical pesticides, and review this project under the appropriate "Agriculture/Farming" project categories. If any timber harvesting or tree cutting is proposed, review this project under the category "Timber harvesting and Vegetation Management" -- "Timber sale/harvest."

The U.S. Fish and Wildlife Service (as well as the PA Game Commission) are recommending only forest management activities that retain greater than 60% canopy cover and other conservation practices. Notably, a regeneration harvest would surely open the canopy beyond the recommended level.

Management of Goals and Objectives for Two WT Properties page 14, 15, 16, 17:

White Township Recreational Complex page 14

This section amounts to a version of a harvest plan. A harvest plan can be a part of a forest management plan, but the most important parts of a forest management plan are landowner objectives and the professional forester's recommendations. The recommendations are written by a forester and lay out the strategy – how will the forest be managed and what are the necessary steps to accomplish the stated goals. A harvest plan is typically something of an addendum to a forest management plan. It is typically put together after a forest management plan has been approved and it is then utilized to accomplish a portion of the recommendation. As stated, a harvest plan can be stuck in a forest management plan, but it is not common.

Regarding the content, there's a good bit worthy of debate. In Phase 1, I don't see how a process of mowing/mulching followed by Conservation Mix seeding could result in any substantial long-term improvements. Mowing/mulching does not eliminate invasive seed, instead it will spread it. Seeding with an Ernst Conservation seed mix can produce a beautiful initial site with good germination, but these plants get eaten or out-competed within just a couple years. Think about the vast wildflower plantings PA DOT used to do on PA highway medians…beautiful year 1, about 50% as nice in year 2, gone by year 3. Also, I did not read anything about soil testing in the plan, but if soil tests were to be conducted, soil analysis would likely recommend lime applications at a rate of at least 2 tons/acre for improved results.

In Phase 2, there's the subject of a timber harvest. As I stated in my June 24th report, whatever you add light to is what you will grow… 'if you want to know exactly what will grow back after a timber harvest it is quite simple – just look at what is on the forest floor before the harvest and you can know for sure. If there are invasives, you will grow invasives. If there are competing plants, you will grow competing plants. If there is nothing, you will make the perfect environment for increased invasives. Even if you kill all the invasive and competing plants first, you should definitely not add any light until you have an abundance of desirable, protected seedlings in place. The reason is simple…the invasives will come back much faster than any desirable native plant that is a target for deer." And to add to this, if you plant wildflower seed and then add light, you will get both wildflowers (temporarily) and invasives resprouting or germinating. The invasives will dominate after a short term.

WT Recreation Complex Timber Assessment page 16, 17

"Total Standing Price" – assuming this is actually referring to what the industry calls "stumpage value." Stumpage value is the value of standing trees. Stumpage value is less than "log value" or "log price" because there is an expense involved in cutting, skidding, and hauling to a sawmill. The industry does not reduce stumpage value due to costs of cutting, skidding, and hauling. Stumpage value can be reduced due to quality/grade, additional site access expenses, terrain, etc. So, there seems to be at least a misnomer in the "total standing value" designation. In Millwork's projections, after cut/skid/haul costs, the stumpage value of the timber sale is estimated at $9,259.26. Of all the forest consultant fees I'm aware of, the highest cost for a forester to prepare a timber sale prospectus, create contracts, and oversee the harvest work is approximately $1,400 on a sale this size. While a "forester" can charge whatever he/she wants in an open market, it should raise a red flag for a landowner to be paying almost 80% instead of industry standard 10-15%. Of course, there may be undocumented costs/fees involved that are not listed in the projections.

Whites Woods Tract #1 page 18 - 22

Again, this is more like a harvest plan.

Regarding the content, again, there is much worthy of debate. Remember this as you read through the following sections…the primary objective (of Millstone's work in White's Woods) is to improve forest health, wildlife habitat, and recreational opportunities for the community.

My June 24th report describes, in detail, issues related to deer. Yes, they are a problem. Conservation mix seeding cannot begin to solve the problem. It is good that Millstone's wording includes "based on observation, other methods may be evaluated such as deer fencing or a controlled deer harvest". However, this is like considering the purchase of insurance after having a car wreck. Of course the "observation" will require new control methods – they will just be too late following increased light.

Phase 1 quick debate points…

1. Japanese barberry is one of the easiest invasive plants to control and is never a problem if controlled properly, with proper timing of treatment.
2. Soil is not compacted
3. Mulching will damage tree roots, increase invasive sprouting, and spread invasive seeds of the most difficult problem plants
4. Overseeding with a conservation mix is pointless in the forest understory
5. None of the proposed steps will meet the primary objectives
6. Costs are very high

Phase 2 quick debate points…

1. If there is "zero desirable regeneration," DON'T add light until there is an abundance of desirable regeneration
2. The stand is not "over-stocked". This could be a term associated with a thinning, but cannot be a term associated with a regeneration harvest.
3. A high canopy does allow filtered light to the forest floor and our PA trees can and will germinate and begin to grow in the shade of a closed canopy because the shade is high (not low like that from hayscented fern which can prevent germination and growth) and there is filtered light.
4. Deer and now also competing plants that deer do not eat are the reasons there is zero desirable regeneration.
5. None of the proposed steps will meet the primary objectives

"Total Standing Price" – assuming this is actually referring to what the industry calls "stumpage value." Stumpage value is the value of standing trees. Stumpage value is less than "log value" or "log price" because there is an expense involved

in cutting, skidding, and hauling to a sawmill. The industry does not reduce stumpage value due to costs of cutting, skidding, and hauling. Stumpage value can be reduced due to quality/grade, additional site access expenses, terrain, etc. So, there seems to be at least a misnomer in the "total standing value" designation. In Millwork's projections, after cut/skid/haul costs, the stumpage value of the timber sale is estimated at $39,965.44. Of all the forest consultant fees I'm aware of, the highest cost for a forester to prepare a timber sale prospectus, create contracts, and oversee the harvest work is approximately $5,990 on a sale this size. While a "forester" can charge whatever he/she wants in an open market, it should raise a red flag for a landowner to be paying almost 38% instead of industry standard 10-15%. Of course, there may be undocumented costs/fees involved that are not listed in the projections.

Phase 3 quick debate points…

1. The proposed invasive treatment will not improve wildlife habitat
2. Additional trails are not necessary in White's Woods
3. The proposed methods will not establish a healthy, diverse ecosystem

Management Recommendations for all WT Properties page 23-26

Quick debate points…(that haven't already been presented)

1. Fascines are typically vigorous sprouters. Typically made up of bundles of willow-type species are placed in the ground and will create (for White's Woods) a very unnatural-looking, shaggy growth along stream banks. The majority of species making up the fascine bundles would be out of place on a property like White's Woods.

Recommended Schedule page 27, 28

Quick debate points…

1. In only the second year of the schedule (summer/fall 2021), regeneration harvesting on 50 acres of White's Woods will be begin. The added light will NOT be on desirable seedlings and saplings, but rather (maybe) some wildflowers and of course invasives.

2. Question – what does "evaluate timber" mean (fall 2022 and fall 2024)? Is this a code for timber harvesting? Page 23 (2a) recommends to "evaluate and select trees for a timber harvest." If all acres of White's Woods receive a combination of mechanical/chemical treatment as proposed, we can only assume "all acres" of White's Woods are to be harvested similarly to White's Woods Tract 1. Based on all above information in this review…this is a scary thought.

3. A sustainable forest regeneration plan for a property like White's Woods should take 10-15 years, not just 4 as proposed in this schedule. And, this is for each unit. To sustainably regenerate a forest of any size, or any portion of a forest of any size (as described in my June 24 report) takes at least 10-15 years. To sustainably regenerate White's Woods Tract 1…10-15 years; Tract 2…10-15 years, Tract 3…10-15 years, etc. Anything less is an impossibility with a forest in its current condition. It is very important to remember, there has to be desirable seedlings in place before any light is added. This takes time.

Appendix 3 – Millstone Land Management Sustainable Forestry Philosophy

Quick debate points…

Paragraph 1: Soil

I called Soil Scientist, Ron Andrasko (Andrasko and Associates, Inc.) to discuss Millwork's basis for soil aeration (to a depth of 6"). Millwork claims that the soil in White's Woods and other White Township properties are compacted and lays blame on soil compaction for lack of desirable regeneration. I described the White's Woods property to Ron, including past logging history. Ron's response was, "it is a ludicrous claim." Ron said, "it has nothing to do with compaction of soil." He added, "taking a machine into a forest area results in compaction. Only manipulation (of any kind) of forest soil results in compaction. Only time, through annual freeze/thaw and shrink/swell decreases compaction."

Paragraph 2:

Millstone's plan to reintroduce native plant species refers to overseeding with a customized Ernst Conservation Seed Mix. This is not the native species that will result in improved habitat and forest ecosystem health. Native hardwood seedlings, resulting from White's Woods overstory seed production, germination, and growth are the only solution. The seed mix prescribed by Millwork will not result in desirable natural regeneration of the types of trees currently found in White's Woods. However, skipping the soil aeration, skipping the overseeding, and simply erecting a deer exclusion fence and killing competing plants WILL provide the desired results.

Paragraph 3:

Light is the enemy to an unhealthy forest understory. In my June 24th report, I detail the health of the understory in White's Woods. It is obviously unhealthy. ALL of our native PA trees can germinate and begin to grow in a shaded understory – especially when the shade level (height) is high, like that created by the overstory tree canopy. A tight canopy is NOT the issue in White's Woods. I recommend to NEVER add light to a forest floor until after desirable seedlings are sufficiently present.

Again, I thank you for requesting my input. White Township has some tremendous lands that are an asset to all the residents of White Township and Indiana Borough. I am quite impressed with the properties and their community usage. Forest management, public park management, and municipal planning are very complex today. It is my hope that this review, as well as my June 24th report can be used to move White Township in the direction of a sustainable outcome. In my opinion, because the properties are so incredible, there is much to lose if a wrong direction is chosen. I honestly do not see ill-intent, just a lack of fundamental understanding of silviculture, sustainable forestry practices, and how forests grow and develop. The "Forest Stewardship Plan" you asked me to review is intensive and was obviously written with passion. When this type of passion is mixed with the right knowledge and strategy there is no doubt a positive outcome can be reached. However, as this review and my previous report point out, while the proposed strategy may be well-intentioned, for many reasons, it will not produce a positive outcome.

Feel free to follow up with me at your convenience.

Sincerely,

Michael T. Wolf
Forester