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The purpose of this letter is to provide a review of the forest management activities to date at the Haugh Tract, proposed January 6, 2020 as follows:

- Review Haugh Forest Management Plan
  - Review document, activities completed to date, and conduct field assessment
    - 2007 Forest Management Plan (2007-2018)
    - Make recommendations for 2021 update

On October 20th, 2020, I met with Ken Soder and Katie Ombalski on site at the Haugh Tract. We spent most of the day looking at each "Stand," or forest management unit. Prior to our meeting, I reviewed the Haugh Tract Forest Management Plan, dated 7/20/07, written by Brian C. Stiber – Stiber Forestry, and other appropriate documents. This report focused on the management units that are primarily forested. For each stand discussed in this report, you will see excerpts from the 2007 forest management plan, a listing of forest management activities since 2007, and my observations and notes.

Stand #10:

Stand 10

Land area: 11.0 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. Firewood cutting has been done in this stand in the recent past.

Forest Type: Dry oak – Mixed Hardwood Forest

Description of vegetation:
Stand 10 is predominantly white oak, red maple, scarlet oak, and black oak which represents 88% of the species composition. Chestnut oak, hickories, and bigtooth aspen are also present in the forest canopy. This is a medium sawtimber sized stand. Red maple saplings, black cherry saplings, hayscented ferns, and bracken ferns are present in the understory.

Management recommendations:

I would recommend conducting a regeneration harvest to establish more desirable oak seedlings in this stand. A shelterwood harvest should be conducted. This is where good seed producing trees are left and all other trees down to two inches in diameter are harvested. Approximately 50 to 60 percent of the canopy cover is removed in the initial harvest. This will provide both more sunlight and an available seed source to establish seedlings. A second harvest could be conducted to remove all or some of the remaining canopy trees after adequate seedlings have established or the canopy could be left as it is after the initial removal creating a two aged stand of mature overstory trees and dense understory seedlings.

There is an abundance of competing vegetation (red maple saplings and hayscented ferns) and heavy deer browsing pressure in this stand. Herbicide application and deer fencing to control competing vegetation and deer browsing would be required to establish a new stand of desirable seedlings (oak). The deer fence would be removed after an adequate amount of desirable seedlings are above the browse height of the deer. This would be temporary, about 5 or more years. This will provide early successional habitat for wildlife which would benefit species such as whitetail deer, turkey, and grouse. After the fence is removed, this would provide woody browse for whitetail deer.

- Forest Management Activities:
    - 2009-2010
        - Presumed herbicide work accomplished
        - Shelterwood harvest
        - Deer fence built after harvest
    - 2015
        - Deer fence removed
        - "Final" harvest conducted – removal of approximately 40% of seed trees

- Observations:

    The stand has regenerated well. There is an abundance of desirable seedlings in the stand, including oak species. Additionally, there is an abundance of blackberry and black raspberry, which is desirable wildlife food and cover as well as good ground-level plants that help promote regeneration of desirable tree seedlings. A small amount of invasive species were found, but do not seem to be an issue currently. Final density and spacing of residual overstory trees is adequate and is conducive to growing a new forest. Overall, the forest management activities in this stand, including the regeneration harvest sequence, has resulted in a successful young forest.

    Three items to note:

    - If the deer fence would have been left in place longer, the oak regeneration would have a better chance for increased survivability. Oak seedlings spend at least a few years growing strong roots. This causes oak seedlings to lag behind other species in height. While the other understory tree species are, on

average, taller than the deer can reach, the oak seedlings are still in the deer damage zone. Deer damage is evident on the oak seedlings.

- While the 2007 forest management plan briefly mentions a second/final harvest ("a second harvest could be conducted to remove all or some of the remaining canopy trees after adequate seedlings have established…"), the Activity Summary Table (the "to do" list for activities) on page 68 does not list a second harvest specifically. It must be assumed that there was plenty of observation and discussion with a professional forester (Brent Harding?) to make the decision to move forward. It is always best to amend the forest management plan in a case like this to keep things clear. Amending the plan shows how the activity was consistent with stated goals and documents the activity for future managers.
- Deer fencing is typically necessary in Pennsylvania when trying to regenerate a forest. Installing a deer fence after a harvest is logistically easiest, but installing a deer fence a few years prior to a harvest is preferred and typically produces improved results for regrowing oak. In a "pre-fence" scenario, invasive and competing plants are controlled and a fence is installed in year 1. This will ensure "advanced regeneration," or desirable seedlings that are present in abundance prior to a harvest. Harvesting can begin after adequate desirable seedling numbers are observed – typically after 3 or 4 years. For best results, deer fence should remain for 10+ years.

Stands #11, #17, and #18:

Stand 11

Land area: 2.29 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry Oak – Mixed Hardwood Forest

Description of vegetation:
This stand is predominantly white oak, scarlet oak, and red maple which represent 85% of the species composition of the growing stock. Black oak and black cherry are also present in the canopy. This is a large sawtimber stand. Desirable seedlings are very scarce. The understory is mostly open. Red maple and black cherry saplings are present in the understory.

Stand 17

Land area: 4.06 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry Oak – Mixed Hardwood Forest

Description of vegetation:
Stand 17 is predominately white oak, black oak, and scarlet oak which compose 89 % of the species composition of the growing stock. Chestnut oak and red maple are also present in the canopy. This is a large sawtimber sized stand. Seedlings of desirable species are scarce in the understory which includes small black cherry seedlings. The understory vegetation includes red maple saplings, hayscented ferns, and lowbush blueberry.

Stand 18

Land area: 2.64 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed..

Forest Type: Dry White Pine – Oak Forest

Description of vegetation:
Stand 18 is predominately chestnut oak and white pine which compose 85 % of the species composition of the growing stock. Black and scarlet oak is also present in the canopy. This is a medium sawtimber sized stand. There is an abundance of white pine saplings in the understory. There is also red maple saplings, lowbush blueberry, sassafras, and small chestnut oak seedlings present in the understory.

(2007 forest management plan provided the same recommendations for all 3 stands)…

Management recommendations:
I would recommend conducting a regeneration harvest to establish more desirable oak seedlings in this stand. A shelterwood harvest should be conducted. This is where good seed producing trees are left and all other trees down to two inches in diameter are harvested. Approximately 50 to 60 percent of the canopy cover is removed in the initial harvest. This will provide both more sunlight and an available seed source to establish seedlings. A second harvest could be conducted to remove all or some of the remaining canopy trees after adequate seedlings have established or the canopy could be left as it is after the initial removal creating a two aged stand of mature overstory trees and dense understory seedlings.

There is an abundance of competing vegetation (red maple saplings and hayscented ferns) and heavy deer browsing pressure in this stand. Herbicide application and deer fencing to control competing vegetation and deer browsing would be required to establish a new stand of desirable seedlings (oak). The deer fence would be removed after an adequate amount of desirable seedlings are above the browse height of the deer. This would be temporary, about 5 or more years. This will provide early successional habitat for wildlife which would benefit species such as whitetail deer, turkey, and grouse. After the fence is removed, this would provide woody browse for whitetail deer.

- Forest Management Activities:

    - 2012
        - Presumed herbicide work accomplished
        - Lighter harvest than recommended – more like a thinning, overall
        - Riparian areas well-protected with little harvesting along natural drainage

- Observations:

    The harvesting was appropriate for these stands. While the forest management plan called for a regeneration harvest sequence to create a new/young forest, the actual harvesting was more like a thinning and actually fits better in these narrow stands that contain a corridor of natural drainages. Because this thinning harvest did not remove as many trees as proposed in the forest management plan, a deer fence was not necessary. A deer fence works to protect a new forest – the goal of a regeneration harvest – but a thinning focuses on the continued growth of the overstory trees and is not intended to grow a new/young forest.

    One item to note:

    1. While the decision to conduct a lighter harvest in these stands was wise, it is always best to amend the forest management plan in a case like this to keep things clear. Amending the plan shows how the activity was consistent with stated goals and documents the activity for future managers.

Stand #16:

Stand 16

Land area: 20.89 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. Firewood cutting has been done in this stand in the recent past.

Forest Type: Dry Oak - Heath Forest

Description of vegetation:
Stand 16 is predominately chestnut oak, black oak, and scarlet oak which compose 85 % of the species composition of the growing stock. White oak, red maple, and pitch pine are also present in the canopy. This is a small sawtimber sized stand. Seedlings of desirable species are scarce in the understory which includes small chestnut oak, white oak, and black oak seedlings. The understory vegetation includes lowbush blueberry, bracken ferns, sassafras, black gum, and American chestnut sprouts.

Management recommendations:

Maintain this stand in its current condition. The white, chestnut, black, and scarlet oak in the canopy and lowbush blueberry and sassafras in the understory are good food sources for wildlife. Protect the chestnut sprouts from damage. Protect vernal ponds.

- Forest Management Activities:
    - 2017
        - Presumed herbicide work accomplished
        - Shelterwood harvest
        - Deer fence built after harvest (only 66% of total area due to trail/access purposes)

- Observations:

    The stand has regenerated well. There is an abundance of desirable seedlings in the stand, including oak species. Additionally, there is an abundance of blackberry and black raspberry, which is desirable wildlife food and cover as well as good ground-level plants that help promote regeneration of desirable tree seedlings. Current density and spacing of residual overstory trees is adequate and is conducive to growing a new forest. Overall, the forest management activities in this stand, including the regeneration harvest sequence, has resulted in a successful young forest, especially inside the deer exclosure (2/3rd of total area). The unprotected 1/3rd should be observed closely for deer damage, especially to oak regeneration. Deer impacts are already evident and we discussed some options while on-site to add some protection from hungry deer (dropping less valuable trees and leaving large tops on the ground, building a number of small deer exclosures, etc).

    Three items to note:

    1. Because this stand was all treated the same, but only 2/3rd of it was fenced, there will be ample opportunity to observe regeneration differences in coming years. It will be a good opportunity to see the value of your deer fence investments.
    2. The 2007 forest management plan did not call for a harvest in this stand. While the success of the regeneration harvest is obvious, it is always best to amend the forest management plan in a case like this to keep things clear. Amending the plan shows how the activity was consistent with stated goals and documents the activity for future managers.
    3. Deer fencing is typically necessary in PA when trying to regenerate a forest. Installing a deer fence after a harvest is logistically easiest, but installing a deer fence a few years prior to a harvest is preferred and typically produces improved results for regrowing oak. In a “pre-fence” scenario, invasive and competing plants are controlled and a fence is installed in year 1. This will ensure “advanced regeneration,” or desirable seedlings that are present in abundance prior to a harvest. Harvesting can begin after adequate desirable seedling numbers are observed – typically

after 3 or 4 years. For best results, deer fence should remain for 10+ years.

Stand #23 and #24:

Stand 23

Land area: 12.03 Acres

Landuse history:
This area was an orchard in the past.

Forest Type: Early successional habitat, overgrown orchard

Description of vegetation:
The overstory of stand 23 is predominately red maple, black cherry, bigtooth aspen, and scarlet oak. These trees are scattered and patchy. Most of this area is covered by shrub vegetation. Bush honeysuckle, multiflora rose, blackberry, privet, autumn olive, and highbush blueberry are some of the shrubs present in this stand. Scrub oak, hawthorn, and scattered old apple trees are also present in this stand. There is an abundance of invasive species in this stand which include bush honeysuckle, multiflora rose, autumn olive, and privet.

Management recommendations:
Maintain this stand in its current condition. The blackberry, grapevines, hawthorn, apple trees, highbush blueberry and black cherry are good food sources for wildlife. Treat invasive species with herbicide to prevent them from spreading further.

Stand 24

Land area: 21.08 Acres

Landuse history:
Part of this stand was a Chinese chestnut orchard in the past. The Chinese chestnut are still present in the overstory of this stand.

Forest Type: Aspen Forest

Description of vegetation:
The overstory of stand 24 is predominately bigtooth aspen and red maple. Black cherry, pitch pine, black oak, white oak, scarlet oak, and Chinese chestnut are also present in the canopy. This is a small sawtimber sized stand. Lycopodium, mayapple, hayscented ferns, lowbush blueberry, sassafras, black gum, bush honeysuckle, barberry, and multiflora rose are also present in the understory of this stand. Red maple saplings and black oak and black cherry seedlings are also present in this stand. Chinese chestnut sprouts are scattered throughout the stand. Invasive species of concern include bush honeysuckle, barberry, and multiflora rose.

(same recommendations for both stands)…

Management recommendations:

Maintain this stand in its current condition. The Chinese chestnut, scarlet oak, white oak, black oak, lowbush blueberry, mayapple, sassafras, black gum, and black cherry are good food sources for wildlife. Protect Chinese chestnut trees from disturbance. Protect the vernal ponds. Treat invasive species with herbicide to prevent them from spreading further.

- Forest Management Activities:
    - None were observed or communicated
- Observations:

    Since no forest management activity has taken place in these stands, there has not been much change, except for a likely increase in tree size as well as a likely increase in invasive plant abundance. Original recommendations to control competing plants in these stands still applies. The highest priority in this stand would be to control the most aggressive invasive species.

Stand #21 and #22:

Stand 21

Land area: 6.74 Acre

Landuse history:
This stand was farmed in the past. This is evidenced by the field stone piles and stone rows present in this area.

Forest Type: White Pine – Northern Hardwood Forest

Description of vegetation:
Stand 21 is predominately white pine, red maple, and black cherry which compose 96 % of the species composition of the growing stock. White oak is also present in the canopy. This is a medium sawtimber sized stand. Lycopodium, barberry, hayscented ferns, multiflora rose, and huckleberry are present in the understory of this stand. Small black cherry, red maple, and white oak seedlings are also present in this stand. Invasive species of concern include multiflora rose and barberry.

Management Recommendations:
I would recommend conducting a regeneration harvest to establish more desirable seedlings (black cherry and white pine) in this stand. A shelterwood harvest should be conducted. This is where good seed producing trees are left and all other trees down to two inches in diameter are harvested. Approximately 50 to 60 percent of the canopy cover is removed in the initial harvest. This will provide both more sunlight and an available seed source to establish seedlings. A second harvest could be conducted to remove all or some of the remaining canopy trees after adequate seedlings have established or the canopy could be left as it is after the initial removal creating a two aged stand of mature overstory trees and dense understory seedlings.

There is an abundance of competing vegetation (red maple saplings, hayscented ferns, and barberry) and heavy deer browsing pressure in this stand. Herbicide application and deer fencing to control competing vegetation and deer browsing would be required to establish a new stand of desirable seedlings (black cherry and white pine). The deer fence would be removed after an adequate amount of desirable seedlings are above the browse height of the deer. This would be temporary, about 5 or more years. This will provide early successional habitat for wildlife which would benefit species such as whitetail deer, turkey, and grouse. White Pine seedlings and saplings would provide good winter thermal cover for wildlife.

Stand 22

Land area: 7.81 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry Oak – Mixed Hardwood Forest

Description of vegetation:
Stand 22 is predominately red maple, white oak, and bigtooth aspen which compose 88 % of the species composition of the growing stock. Scarlet oak, black oak, hickories, and black cherry are also present in the canopy. This is a medium sawtimber sized stand. Lycopodium,

hayscented ferns, herbaceous grasses, and red maple saplings are present in the understory of this stand. Black cherry, red maple, white oak, and black oak seedlings are also present in this stand.

Management recommendations:
Maintain this stand in its current condition. The white, black, and scarlet oak and black cherry in the canopy are good food sources for wildlife.

- Forest Management Activities:
    - 2013
        - Presumed herbicide work accomplished
        - Shelterwood harvest
        - Deer fence built after harvest
        - Deer fence removed 2018

- Observations:

  The stands seem to be regenerating pretty well. There are desirable seedlings in the stand, including some oak species. Current density and spacing of residual overstory trees is adequate and is conducive to growing a new forest. Overall, the forest management activities in this stand, including the regeneration harvest sequence, has resulted in a successful young forest. Timing of next steps (final harvest?) – should be discussed in detail.

  Three items to note:

  1. The 2007 forest management plan did not call for a harvest in Stand 22, however, it is understandable why the decision was made to combine these two stands for this regeneration harvest. While the success of the regeneration harvest in both stands is obvious, it is always best to amend the forest management plan in a case like this to keep things clear. Amending the plan shows how the activity was consistent with stated goals and documents the activity for future managers.
  2. Deer fencing is typically necessary in PA when trying to regenerate a forest. Installing a deer fence after a harvest is logistically easiest, but installing a deer fence a few years prior to a harvest is preferred and typically produces improved results for regrowing oak. In a "pre-fence" scenario, invasive and competing plants are controlled and a fence is installed in year 1. This will ensure "advanced regeneration," or desirable seedlings that are present in abundance prior to a harvest. Harvesting can begin after adequate desirable seedling numbers are observed – typically after 3 or 4 years. For best results, deer fence should remain for 10+ years.
  3. A descriptive sign was noted on the west side of these stands, along a well-used trail. The sign described the forest management activities and included a nice map of the harvest area. This is a great mechanism for public education and understanding of forest management activities. The sign noted that a forest management plan is in place and being followed

and even provided contact information for questions/comments. I would make only one small suggestion for future signage and that is to be sure to properly identify and name the specific silvicultural practice as well as the intent of the activity. For example, if the activity is a regeneration harvest, the sign could say, "This shelterwood harvest is designed to regrow a new/young forest." If the activity is a thinning, the sign could say, "This thinning harvest is designed to improve the growth (crown size, mast production, carbon storage capacity, etc) of the unharvested, most productive trees by removing less productive trees."

Stands #1 and #5:

Stand 1

Land area: 14.85 Acres

Landuse history:
This stand was farmed in the past. This is evidenced by the field stone piles and stone rows present in this area.

Forest Type: Red Pine Plantation

Description of vegetation:
The overstory of stand 1 is dominated by red pine which represents 95 % of the species composition of the growing stock. Very scattered white pine, red maple, black cherry, and Scotch pine are also present in the forest canopy. The trees that make up the overstory of this stand are overcrowded. This is a small sawtimber sized stand. Desirable seedlings are scarce in the understory. There are some very small red maple, black cherry, white oak, and black oak seedlings, less than 1 foot in height, present. Red maple saplings dominate the understory. White oak and black oak saplings are also present. There is also sassafras, false sarsaparilla, Virginia creeper, lowbush blueberry, bush honeysuckle, and some bryophytes present in the understory. Invasive species of concern in this area includes bush honeysuckle that is present on the margins of this stand near the field. However, it is not abundant throughout the entire stand.

Management Recommendations:
Due to the overcrowded conditions of the overstory, I would recommend conducting a thinning harvest in this stand. I would recommend conducting a thin from below harvest which would remove mainly trees in the lower canopy positions that are less productive, smaller in diameter, and have smaller crowns. This may also involve completely removing a few of the planted rows of red pine. Several small openings could also be created where there are abundant oak, cherry, and maple seedlings and saplings present.

Treat bush honeysuckle with herbicide to keep it from spreading further. Protect intermittent drainage

Stand 5

Land area: 8.04 Acres

Landuse history:
This stand was farmed in the past. This is evidenced by the field stone piles and stone rows present in this area.

Forest Type: Red Pine Plantation

Description of vegetation:
The overstory of stand 5 is dominated by red pine which represents 98 % of the species composition of the growing stock. Very scattered white pine, red maple, and black cherry are also present in the forest canopy. The trees that make up the overstory of this stand are overcrowded. This is a large poletimber sized stand. Desirable seedlings are scarce in the understory. There are some very small red maple, black cherry, white oak, and black oak seedlings, less than 1 foot in height, present. Red maple, white oak, and black oak saplings are present in the understory. There is also sassafras, false sarsaparilla, Virginia creeper, lowbush blueberry, bush honeysuckle, and some bryophytes present in the understory. Invasive species of concern in this area includes bush honeysuckle that is present on the margins of this stand near the field. However, it is not abundant throughout the entire stand.

Management Recommendations:
Due to the overcrowded conditions of the overstory, I would recommend conducting a thinning harvest in this stand. I would recommend conducting a thin from below harvest which would remove mainly trees in the lower canopy positions that are less productive, smaller in diameter, and have smaller crowns. This may also involve completely removing a few of the planted rows of red pine. Several small openings could also be created where there are abundant oak, cherry, and maple seedlings and saplings present.
Treat bush honeysuckle with herbicide to keep it from spreading further.

- Forest Management Activities:
    - 2011
        - Presumed herbicide work accomplished
        - Presumed thinning from below or row thinning
        - Planted 2,500 white pine seedlings
    - 2019
        - Overstory removal of pine

- Observations:

    As stated in the forest management plan, the purpose of the 2011 thinning was to reduce overcrowding, to remove less productive trees, and to release small patches of hardwood seedlings, where present. Because of the recent 2019 harvesting in these stands, all evidence of the 2011 thinning activity is gone. I can only assume it was done well and

lead to a successful outcome. Only the results of the 2019 harvest are evident now. Because the 2019 activity was not part of a plan and not matched to written goals, I have to make an assumption about the purpose of the work. I assume the purpose of the overstory removal of 2019 was to convert the stands from plantation/softwood stands to (future) hardwood stands. While there are some pine seedlings present in the understory, there are not nearly enough to repopulate the site. It seems there was a desire to reduce pine cover and to refocus growth on what is more natural for the site – primarily hardwoods with a small mix of softwoods. When prescribing and implementing an overstory removal, the ground layer vegetation has to be the focus, as the goal of an overstory removal is to release the **present** understory. However, the present understory, in stands 1 and 5, does not include enough desirable seedlings (hardwood or softwood) to successfully regenerate these two stands. In order to regenerate the next forest, these stands will likely need significant management effort including planting, managing invasive and competitive plants, and protection from deer.

Five items to note:

1. The prerequisite to the prescription and implementation of an overstory removal has to be abundant, desirable, and protected advanced regeneration (seedlings present prior to any harvest). Prior to the overstory removal in these stands, apparently there was not enough desirable advanced regeneration and what may have been present was unprotected. The result is a fairly vacant understory – at least vacant of desirable hardwood and softwood seedlings in the numbers necessary to become a new forest. Old plantations are a challenge, for sure. A landowner who has old plantations is faced with some tough decisions. For the purpose of this review, it is certainly not pertinent to second-guess the work, rather, it is important to help to overcome the challenges now at hand.

2. On the postive side, going from a (likely) stagnant old plantation to a fresh overstory removal will create incredible increases in species diversity and wildlife usage. If you can manage the inflow of invasive species and overbrowsing by deer, you should see abundant native wildflowers, forbs, grasses, and other herbaceous plants thrive. Additionally, habitat has improved greatly for insects, birds, and small mammals. If the goal of the overstory removal of pine was to create all this, then I say it's a success. However, if the goal was to (someday) grow a new forest in these stands, it will be an uphill battle.

3. The 2019 harvesting was not called for in the 2007 forest management plan, so the goals are not clear. An advantage to having a forest management plan is to have a goal (a target). When you aim at a target, it's easy to judge your result. Did you hit your mark? Did you miss your mark? Then, after judgement comes learning and adaptation, if necessary.

4. If new forest cover (someday) is the goal, I suggest immediate deer protection as well as a routine treatment of invasive plants. Planting may also be necessary.

5. If a wildlife meadow is the goal, you will be on your way with some routine invasive treatments and probably some well-spaced, well-protected planting of small fruit producing trees and shrubs.

Stands #2, #3, and #4:

Stand 2

Land area: 3.9 Acres

Landuse history:
This stand was farmed in the past. This is evidenced by the field stone piles and stone rows present in this area.

Forest Type: Dry White Pine - Oak Forest

Description of vegetation:
The forest canopy of stand 2 is dominated by red maple, scarlet oak, and white oak which represents 87% of the species composition of the growing stock. White pine and bigtooth aspen are also present in the forest canopy. This is a large poletimber stand. Desirable seedlings and saplings present in the understory include white pine, black cherry, black oak, and red maple. Other vegetation present in the understory includes lowbush blueberry and sassafras

Management recommendations:
Maintain this stand in its current condition. The white and scarlet oak in the canopy and lowbush blueberry and sassafras in the understory are good food sources for wildlife. Protect the intermittent drainage.

Stand 3

Land area: 6.46 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry White Pine – Oak Forest

Description of vegetation:
The overstory of stand 3 is dominated by white oak, scarlet oak, black oak, and red maple which represents 93% of the species composition of the growing stock. White pine and red oak is also present in the forest canopy. This is a small sawtimber stand. Red maple and white pine saplings dominate the understory. There are also some small white oak and black oak seedlings that are below the browse height of the deer. American chestnut sprouts are present throughout the understory. Most have cankers from the chestnut blight. Other vegetation present in the understory includes lowbush blueberry, bracken ferns, and sassafras.

Management recommendations:
Maintain this stand in its current condition. The white, black, and scarlet oak in the canopy and lowbush blueberry and sassafras in the understory are good food sources for wildlife. Protect the American chestnut sprouts from damage.

Stand 4

Land area: 2.77 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry Oak – Heath Forest

Description of vegetation:
Stand 4 is predominantly white oak, scarlet oak, and black oak which represents 90% of the species composition of the growing stock. Red maple and chestnut oak is also present in the canopy. This is a large poletimber stand. Desirable seedlings are scarce and are predominately small white and black oak seedlings. Lowbush blueberry, sassafras, bracken ferns, white pine saplings, and American chestnut sprouts are also present in the understory.

Management recommendations:
Maintain this stand in its current condition. The white, chestnut, black, and scarlet oak in the canopy and lowbush blueberry and sassafras in the understory are good food sources for wildlife. Protect the chestnut sprouts from damage.

- Forest Management Activities
    - None noted
- Observation:

    Combined, these stands include 13.13 acres of forest. These stands are fairly similar, with only slight differences in species, and size and age of trees – primarily due to past land use. The 2007 forest management plan included similar recommendations for each – "maintain stand in its current condition." No management has occurred, as prescribed. Invasive plants were not mentioned in the 2007 plan, but it is likely that there are some to consider treating.

Stand #26:

Stand 26

Land area: 19 Acres

Landuse history:
This stand has been in forest cover for many generations in the past. No recent forest management activities were observed.

Forest Type: Dry Oak – Mixed Hardwood Forest

Description of vegetation:
The overstory of stand 26 is predominately white oak, scarlet oak, bigtooth aspen, and red maple which compose 91 % of the species composition of the growing stock. Red oak, black oak, black cherry, black locust, and hickories are also present in the canopy. This is a small sawtimber sized stand. Hayscented ferns, bracken ferns, false sarsaparilla, lowbush and highbush blueberry, blackberry, Virginia creeper, sassafras, mayapple, bush honeysuckle, winged euonymus, and multiflora road are present in the understory of this stand. Red maple saplings and white oak, black oak, and red maple seedlings are also present in the understory. A few American chestnut sprouts were observed in this stand. Invasive species of concern include bush honeysuckle, winged euonymus, and multiflora rose.

Management recommendations:
Maintain this stand in its current condition. The blackberry, blueberry, mayapple, sassafras, oaks, hickories, and black cherry are good food sources for wildlife. Protect the relics of the Scotia mines. Protect American chestnut sprouts from damage. Protect the vernal ponds. Treat invasive species with herbicide to prevent them from spreading further.

- Forest Management Activities:
    - 2010
        - Presumed herbicide work accomplished
- Observation:

    This stand is quite beautiful with a large population of white oak. Much of the stand is visible from Scotia Range Road. While herbicide work called for in the 2007 forest management plan may have been accomplished in 2010, invasive species are quite obvious and abundant. The largest populations of invasive species are on the road side of the stand, but are also present throughout. It would be wise to begin controlling the understory vegetation in this stand immediately. Overstory growth and development has been good in this stand. There are abundant mast producing trees that, according to the forest management plan, are approaching 100 years old. The stand contains high valued historic elements related to iron ore mining and the town of Scotia.

Final Thoughts:

Overall, the Haugh Tract is an incredible property and well-deserving of all the care and attention it receives from its stewards – the Patton Township Board of Supervisors, the Patton Township Open Space Stewardship Committee, and the people of Patton Township. Fortunately, the Haugh Tract has been under the care and management of Patton Township officials and professional Foresters for over a decade. The love of the property by all involved definitely shows.

The 2007 forest management plan was well-written and has put the property on a sustainable trajectory. Most of the forest management activities on the property have been well documented and precisely implemented to date. Thanks to all the great work and investment over the years, the Haugh Tract forests have a great potential to be sustained for many generations to come.

The definition of forest health, is to have a forest in strong enough condition that it can sustain itself – no matter what challenges it may face through time. Forest challenges typically come in the way of unadvisable forestry practices, invasive plant establishment, storm damage, insect damage, and disease outbreaks. The forests of the Haugh Tract contain multiple age classes and enough species diversity to weather many "storms." Overall, the Haugh Tract forests are not perfect – there are some challenges. However, I have faith that the diligence of the aforementioned stewards will take the necessary steps and make the necessary improvements that will ensure sustainability and improved forest health.

There is great evidence of good stewardship over much of the Haugh Tract's forestland. Since the forest management plan was written in 2007, most of the forest management recommendations have been followed and most of the activities have been successfully implemented. This is rare. Additionally, it is rare for a landowner to go through a thorough review process like this report presents. You all can be proud. The Haugh Tract is in good hands.

As stewards of the Haugh Tract, after essentially completing the recommendations of the 2007-2018 forest management plan, it is time to enter a new era. From this point forward you will be working on forest management activities that are beyond your original written plan – meaning, your "to do" list created in 2007 is practically complete. Forest management plans are written to encompass approximately 10 years for a reason – things can change, learning has taken place, adaptations may be necessary, new goals are developed, and some successes may need to be maintained. In the coming decade, there will still be work to do, so the time has come for a new plan to be your guide through 2031.

Your next forest management plan will create a new "to do" list and will guide you through the coming decade of forest management improvement activities. Ask yourself, where would you be today if it weren't for the plan that was written and accepted in 2007? Similarly, where will you be 10 years from now without a new plan in place?

Anyone can feel free to contact me anytime by phone (814) 659-1280 or email mike.wolf.afc@gmail.com. Thank you all for the opportunity to present this review.