MILL CREEK METROPARKS

September 1, 2023

Mr. Geoff Westerfield
Ohio Department of Natural Resources: Division of Wildlife
912 Portage Lakes Drive
Akron, Ohio 44319

Re: Mill Creek MetroParks 2023-2024 Deer Management Request Proposal

Mr. Westerfield,

Please find enclosed, the 2023-2024 deer management permit request for Mill Creek MetroParks (Mahoning County), the following items have been included for your reference:

- Permit Request Form
- Area Mapping
- Ecological Assessments

Initially, all work will be completed in Mill Creek Park located in Boardman Township (between U.S. Route 224 and Midlothian Blvd.) if possible, additional permits may be requested based need, staff availability, and budget. Additional permit requests may also include additional properties such as Huntington Woods and/or Hitchcock Woods based upon the results of the controlled hunting program that will be taking place at these locations (October 1, 2023 – January 27, 2024).

If you have questions or require additional information, please contact me by email at nderico@millcreekmetroparks.org or by phone at 330.702.3000 x 136.

Sincerely,

Nick Derico
Natural Resources Manager

Deer Management Request Proposal for

Mill Creek MetroParks

for the 2023/2024 Removal Season

Instructions

- Type in the appropriate boxes.
- For check boxes, right click and use the "fill" option.
- Complete a chart for each park/unit you plan to remove deer from this year.
- Submit with this request proposal any ecological data that supports the request.
- Submit request to Geoff Westerfield at least 30 days prior to the start date in this request.

Protocol

The dates the park district plans to start deer removal operations on are:

Start date: 10/1/2023 End date: 3/31/2024 .

Once killed, the deer will *(Check which option(s) apply and supply the required information)*:

A. ☒ be sent to Keller Meats for processing which is located a 3739 Avon Lake Rd, Litchfield ,OH 44253 . After the deer are processed, we plan to give the meat to Second Harvest Food Bank of the Mahoning Valley .

B. ☐ not be sent to a processor. Instead, we will do the following with the deer:

We are requesting the following allowance for taking of antlered deer *(select one):*

A. ☒ The standard 20% allowance (no additional data is required).

B. ☐ % antlered deer. Max. request of 35% and you must submit supplemental data sheets with this request to help justify the increased request. Anecdotal information (ex. "we are seeing lots of bucks") will not be satisfactory justification. The % allowance will be determined on a case-by-case basis at the sole discretion of the Division of Wildlife.

Requested Number of Deer & Ecological Assessment

Summary

Park/Unit Name	Requested # for 2023-2024 Season
Mill Creek Park	30
Total	30

The park district has established a protocol for assessing the ecological impact of deer within its park(s). This assessment of the ecological impact has helped determine the need for deer removals. The chart(s) below are a historical account of the ecological impacts of deer for that park as well as the number of deer requested and removed annually.

Park Name/Unit Name: Mill Creek Park

Calendar Year	Ecological Impact Assessment (Mild, Moderate, Severe)		Deer Removal Season	Requested # of Deer for Removal	# Deer Removed
2014	N/A		2014-2015	N/A	N/A
2015	N/A		2015-2016	N/A	N/A
2016	N/A		2016-2017	N/A	N/A
2017	N/A		2017-2018	N/A	N/A
2018	N/A		2018-2019	N/A	N/A
2019	N/A		2019-2020	N/A	N/A
2020	N/A		2020-2021	N/A	N/A
2021	N/A		2021-2022	N/A	N/A
2022	N/A		2022-2023	N/A	N/A
2023	Severe		2023-2024	30	N/A

Park Name/Unit Name:

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2015			2015-2016		
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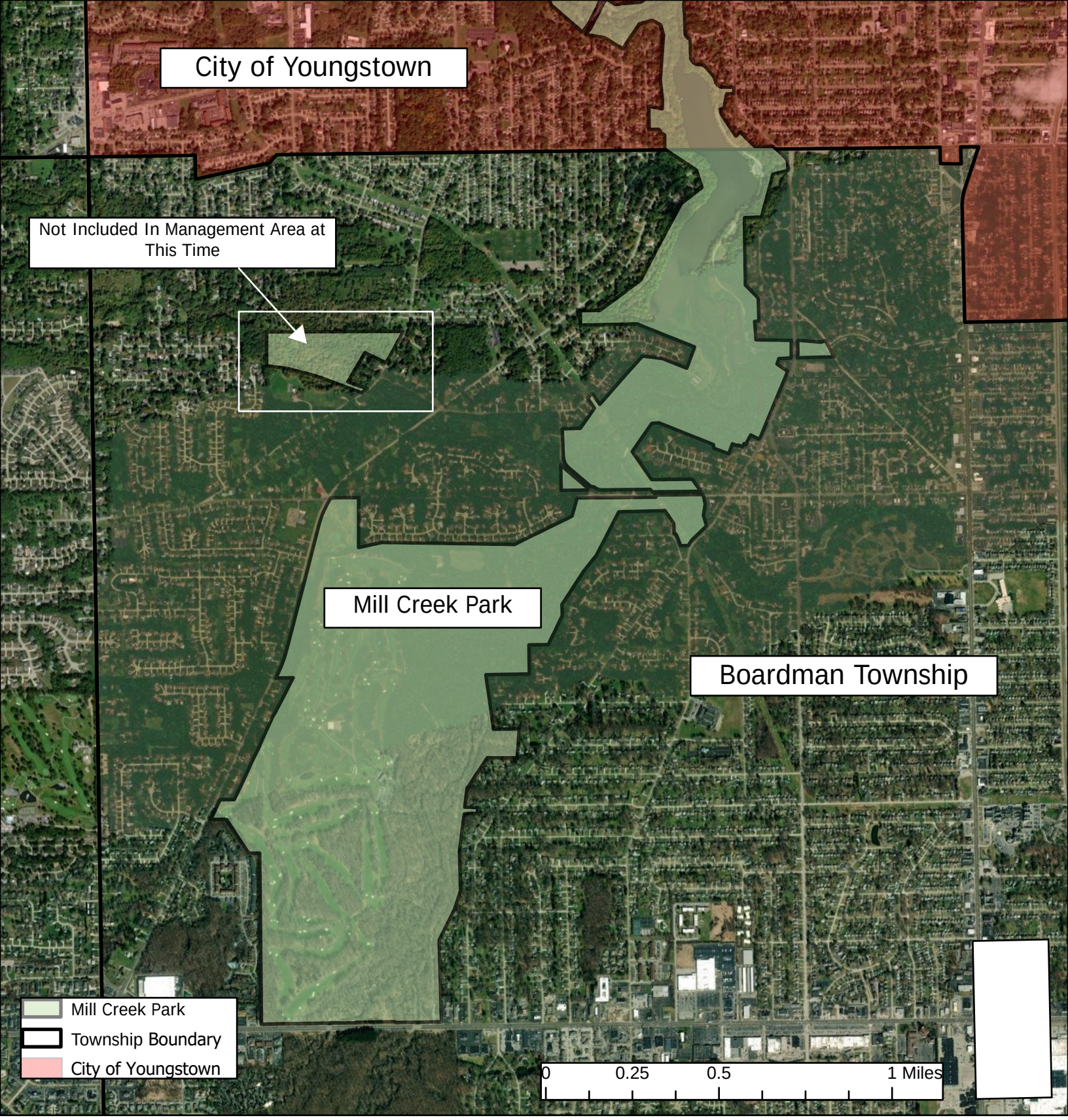
2022			2022-2023		
2023			2023-2024		N/A



Mill Creek MetroParks
White-tailed Deer Targeted Removal Program
2023-2024 Management Year

MILL CREEK METROPARKS

Assessment of Forest Regeneration in Mill Creek Park, Huntington Woods, and Hitchcock Woods

June 2023

Introduction:

By definition, forest regeneration is the process that allows a forest to replace and sustain itself in the long-term through the establishment and survival of seedlings and saplings that replace mature canopy trees as they die, either by natural causes or by large disturbance events such as windstorms, wildfire, or disease.

Healthy forest regeneration is a crucial component to forest management to ensure the long-term sustainability of our forest ecosystems for future generations.

Forest regeneration can be influenced by a number of variables such as habitat disturbance, invasive species introduction, disease, and herbivory by ungulates such as white-tailed deer.

While white-tailed deer are known as generalist herbivores, feeding on a wide range of woody and herbaceous plant growth, they are also preferential in their feeding habits which can negatively influence forest regeneration when populations exceed ecological carrying capacity.

In the case of Mill Creek MetroParks, the ecological effects of white-tailed deer overabundance such as distinct browse lines, stunted forest regeneration, and low species diversity have been anecdotally noted in some areas for over two decades, however, the effects of overbrowning have not previously been quantified.

Objectives:

To evaluate current conditions related to forest regeneration based upon seedling and sapling abundance/height and track changes through time in response to management changes such as deer management, invasive species treatment, and/or habitat manipulation.

Methods:

Plot Description

Survey plots (1-acre in size) were distributed throughout Mill Creek Park, Huntington Woods, and Hitchcock Woods where space allowed. Within each survey plot, five (5) microplots were established (6' radius circle). The placement of microplots was standardized, with one microplot placed at the center of each 1-acre survey plot, additional plots were established at a distance of 60' from the center point in four directions.

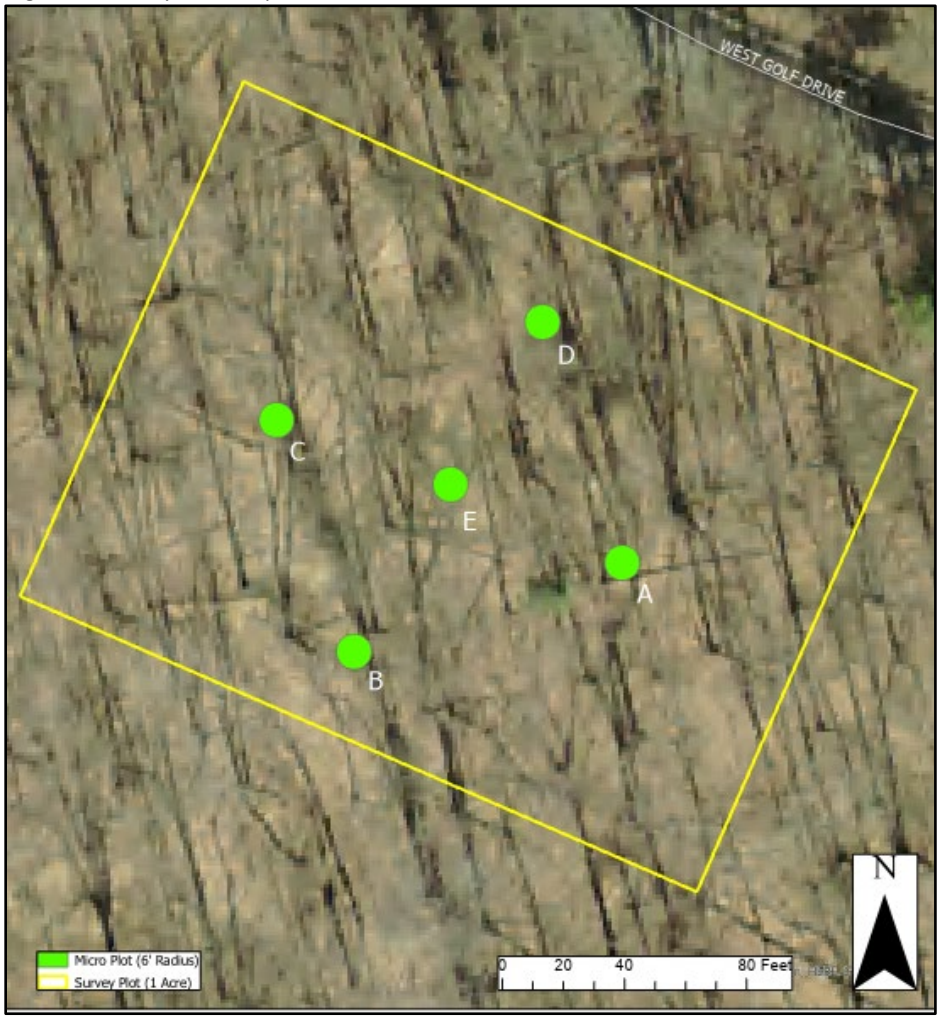
Plot Selection

Survey plots were established in upland hardwood sites with varying degrees of canopy closure (0%-95%). Sites with a lower prevalence of invasive species and desirable light availability were preferred when available to assess forest regeneration under the best possible circumstances given current site conditions. All plot locations were free of human caused disturbance such as logging, prescribed fire, or other active management.

If any of the following conditions are present at the predetermined 60' spacing, the microplot center point will be adjusted to the nearest suitable location:

- Obstructions such as rocks, downed trees, mature trees, roadways, or open water hinder the establishment of the microplot and/or subplot.
- The proposed plot location is located on a slope greater than 70%.
- The proposed plot location is dominated by large invasive shrubs (<75% coverage).

Figure 1. Plot Layout Example



Once microplots are established they are affixed with a permanent stake. These plots will be used to gauge changes in forest regeneration on an annual basis, but may also be used to examine other metrics such as winter browse damage and/or spring ephemeral wildflower abundance.

Data Collection

For the purposes of assessing forest regeneration, all woody vegetation less than 4.5" DBH located within each microplot was identified and categorized based upon size class. Woody vegetation was separated into five (5) size classes: <6", 6-12", 1-3', 3-5', and 5'+ with each size class being assigned a weighted score which reflects the survivability of each size class and it's value in terms of forest regeneration.

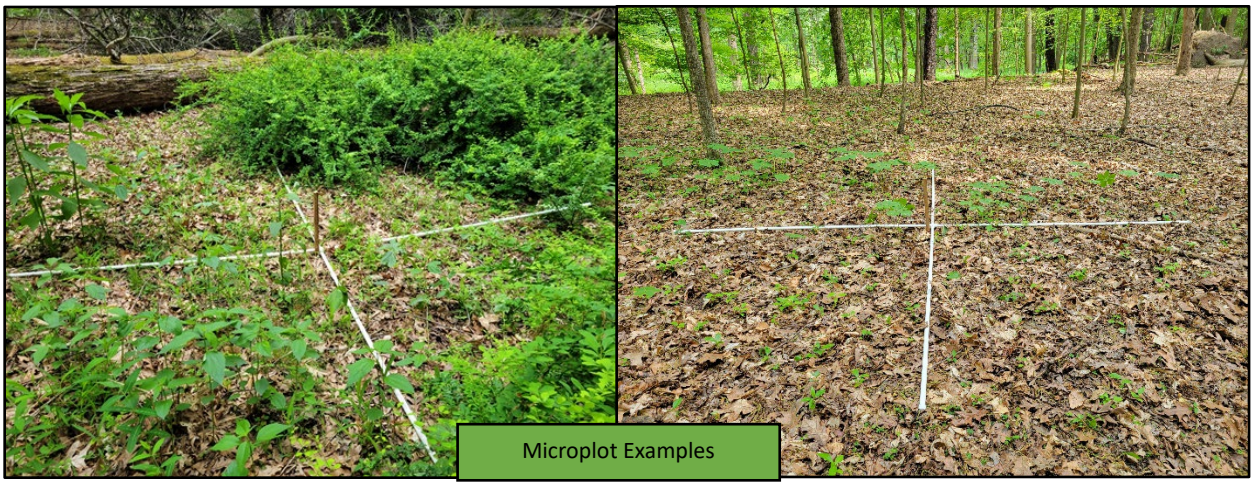
Additionally, percent canopy closure was assessed at the center point of each microplot, and photographs were gathered depicting both current plot conditions and canopy closure.

To provide a control, data was also collected from the deer exclosure located in Hitchcock Woods, which was first constructed in the year 2000 but was not refurbished and fully functional until 2018. The exclosure is 18x18' (324 sq ft) and has ~80% canopy closure directly above but is adjacent to a sizeable light gap to the south.

Figure 3. MCMP Forest Regeneration Scoring Chart

Size Class	Score
0-6"	0
6-12"	1
1-3'	2
3-5' Native Sub-Canopy or Shrub Species	7.5
3-5' Native Canopy Species	15
5'+ Native Sub-Canopy or Shrub Species (<4.5" DBH	15
5'+ Native Canopy Species (<4.5" DBH)	30

- Invasive species are noted but not assigned a positive score.
- Trees showing outward signs of disease or severe damage are scored at half value.
- Ash spp. will not be assigned a positive score due to their lack of long-term viability, caused by the emerald ash borer.
- Each microplot is assessed individually, a score of 150 points or greater signifies that plot as sufficiently stocked for forest regeneration.



Microplot Examples

Results:

22 survey plots (110 microplots) were established throughout Mill Creek Park, Huntington Woods, and Hitchcock Woods the results are as follows:

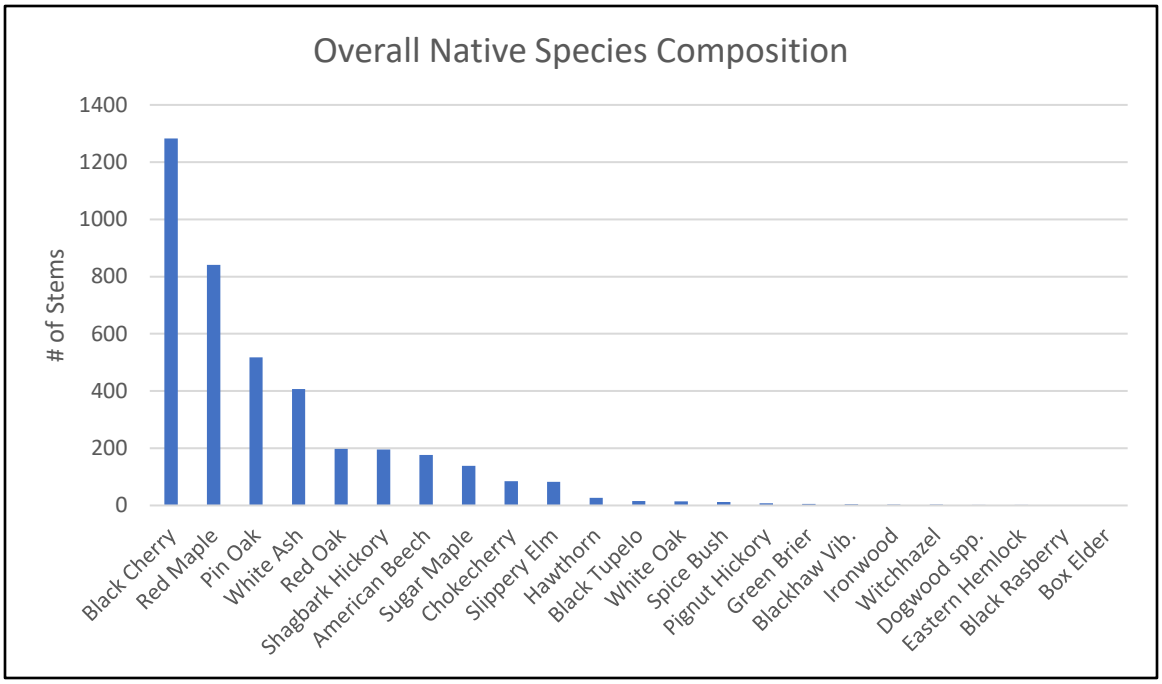
Species Composition and Diversity

In total, 4,446 woody stems were surveyed of those, a total of 22 native species and 8 invasive species were documented – native species accounted for 90% of the total stems surveyed (plots with <75% invasive shrub cover were excluded).

Of the 22 native species identified black cherry (*Prunus serotina*) and red maple (*Acer rubrum*) occurred with the most frequency and in combination account for 53% of all native woody stems. This is not surprising as these species typically have dense seeding rates, fast growth, and are tolerant to a wide range of soil conditions, often times making them the first canopy species to repopulate disturbed areas.

Other prominent species include pin oak (*Quercus palustris*), white ash (*Fraxinus americana*), red oak (*Quercus rubra*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*) , sugar maple (Acer saccharum), and slippery elm (*Ulmus rubra*). Other species such as box elder (*Acer negundo*), eastern hemlock (*Tsuga canadensis*), and dogwood (*Cornus spp.)* occurred very infrequently in only 1 or 2 microplots. Of the 22 native species documented, only 11 (50%) were present in the 3-5’ and 5’ size class.

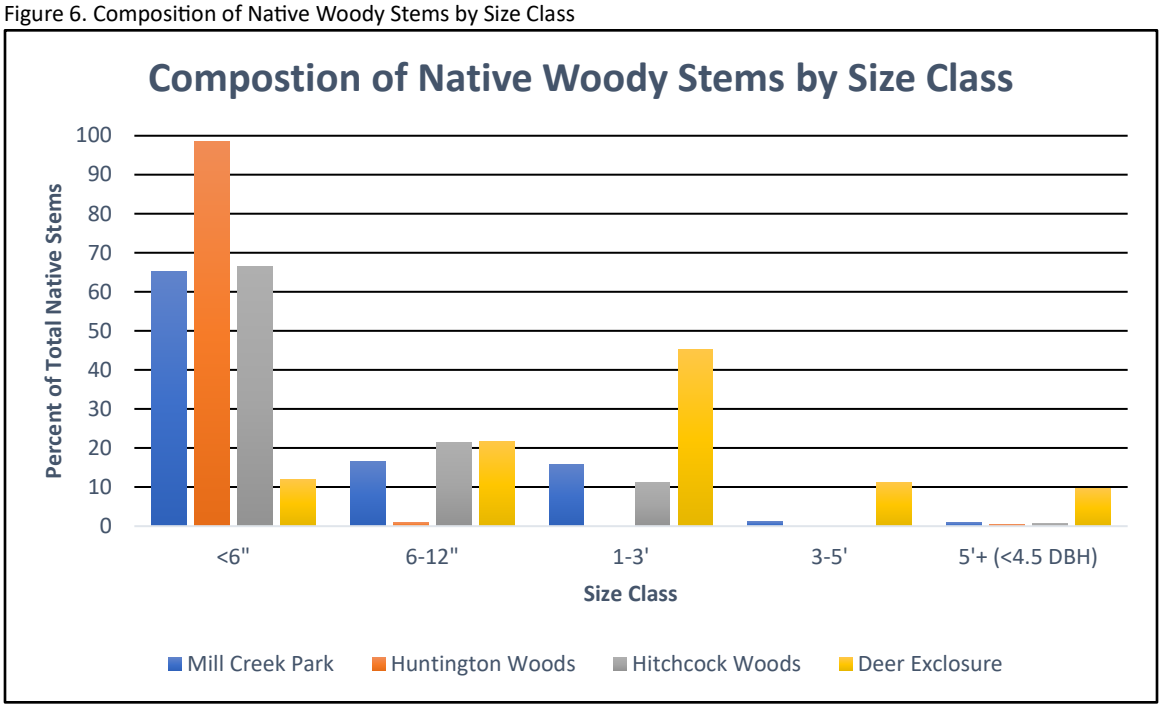
Figure 5. Overall Native Species Composition



Native Woody Stems by Size Class

As stated above, woody stems were separated into five (5) size classes the following data depicts the size class breakdown of woody stems found in all three (3) survey areas and the Huntington Woods deer exclosure.

Figure 6. Composition of Native Woody Stems by Size Class



The results show that overwhelmingly the <6” size class as the most abundant in areas unprotected from deer browsing, overall 75% of all native woody stems surveyed were less than 6” in height. In general, the larger size classes (3-5’ and 5’+) were absent from the unprotected survey areas and accounted for only 1.4% of the total stems surveyed.

On the contrary, in the Hitchcock Woods deer exclosure all size classes were well represented with 45% of stems being found in the 1-3’ size class.

Size Class: <6” (Germinant)

Woody stems less than 6” are considered “germinants” and were by far the most common size class documented– this size class represented 75% of all native woody stems surveyed with black cherry and red maple occurring most frequently. This size class is comprised of newly germinated trees – this is considered a very vulnerable size class with survivability being influenced by many variables such as sunlight availability, soil condition, weather, and herbivory.

Size Class: 6-12” (Small Seedling)

Woody stems from 6-12” are considered “small seedlings” and are typically 0-1 years old, however, this can vary widely based upon species and growing conditions. This size class accounted for 13% of all native woody stems surveyed – white ash and pin oak were the most common species in this size class. Small seedlings are still vulnerable to changes in growing condition and herbivory; however, this size class does have a higher rate of survival as compared to germinants.

Size Class: 1-3’ (Seedling)

Woody stems from 1-3’ are considered “seedlings” and are typically 1-2 years old depending upon species and growing condition. This size class accounted for 10% of all native woody stems surveyed – white ash and shagbark hickory were the most common species in this size class. This size class is less susceptible to environmental conditions such as changes in weather; however, we found this size class to be the most impacted by herbivory. Species (native and invasive) in this size class such as white ash, American beech, hawthorn, spicebush, multiflora rose, common privet, and glossy buckthorn all show signs heavy browse pressure from white-tailed deer.

Size Class: 3-5’ (Large Seedling)

Woody stems from 3-5’ are considered “large seedlings” and are typically 2-3 years old depending upon species and growing conditions. This size class accounted for only 0.5% of all native woody stems surveyed – chokecherry, American beech, and white ash were the only native species represented in this size class. Seedlings are robust by this stage and can tolerate a number of environmental pressures, however, heavy browsing can still negatively impact this size class.

The stark drop in both seedling abundance and species diversity in the 3-5’ size class can likely be attributed to heavy browse pressure at the lower size classes where preferred browse species are selected against – species such as chokecherry and American beech are low browse preference species, with chokecherry foliage being toxic to white-tailed deer.

Size Class: 5'+ <4.5" DBH (Sapling)

Woody stems taller than 5' in height but less than 4.5" DBH (diameter at breast height) are considered "saplings" and are typically a minimum of 3-5 years in age depending upon species and growing conditions. This size class represented 0.8% of all native woody stems surveyed – chokecherry and American beech were the most common species found in this size class. This size class is very robust and is generally unaffected by environmental pressures or herbivory – the greatest risk to saplings would be pests, disease, or heavy site disturbance.

Plot Scoring

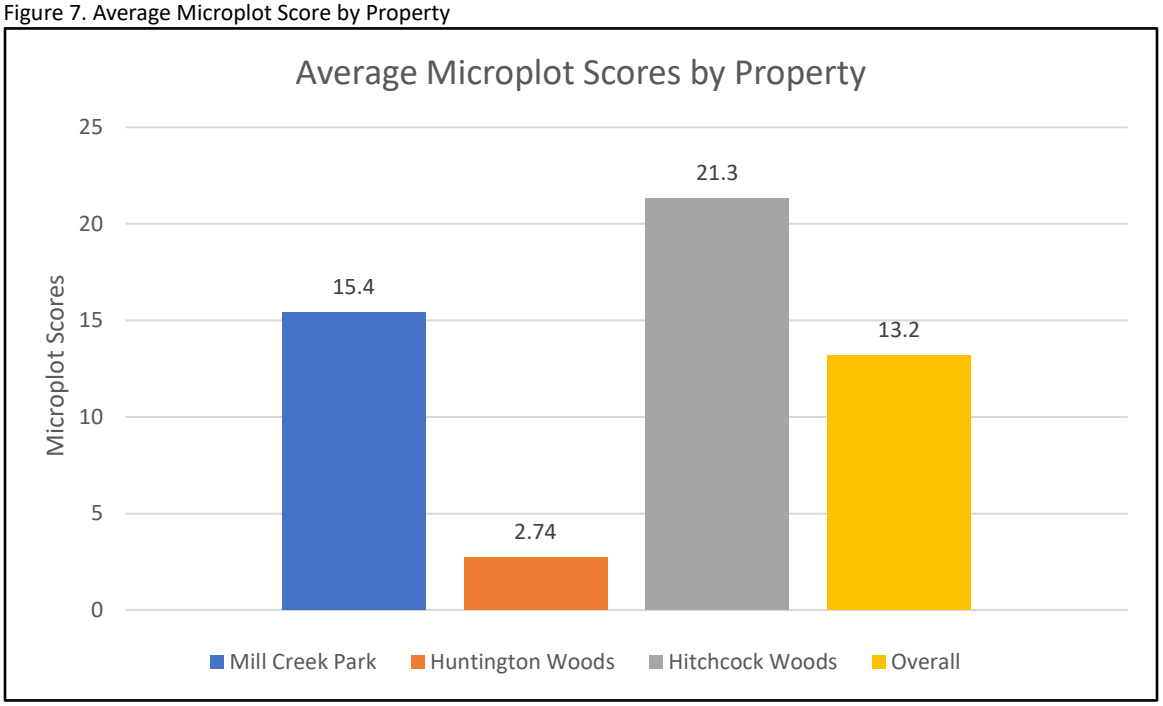
Using the scoring system described above, all microplots were assigned a score which reflects the stage of forest regeneration for each plot based upon native species abundance and height. Overall, the average microplot score for all surveyed areas was 13.2, with zero (0) of the 110 surveyed plots surpassing a forest regeneration score of 150 points.

Again, white ash was not assigned a positive score due to their lack of long-term viability. It is important to note that white ash is heavily susceptible to the emerald ash borer (EAB), a non-native boring insect that is responsible for the destruction of millions of ash trees across much of the eastern United States. It is estimated that only 1% of ash trees on the landscape have a higher-than-average resistance to this pest, with that being said ash regeneration is still taking place on the landscape, typically in the smaller size classes. Impacts from EAB will likely continue once saplings reach a suitable size rendering them largely incapable of reaching full maturity and becoming the dominant canopy species they once were.

Also, woody stems showing severe damage or outward sign of disease were scored at half-value this primarily impacted American beech which oftentimes showed both heavy browse pressure and advanced signs of beech leaf disease (BLD).

As a control, the Hitchcock Woods deer exclosure was scored using the same metrics in total the 324 sq ft area produced a forest regeneration score of 571 – scaled down to match the size of the microplots (113.1 sq ft) the deer exclosure scores 199.65 (15x better than the overall average microplot score).

Figure 7. Average Microplot Score by Property

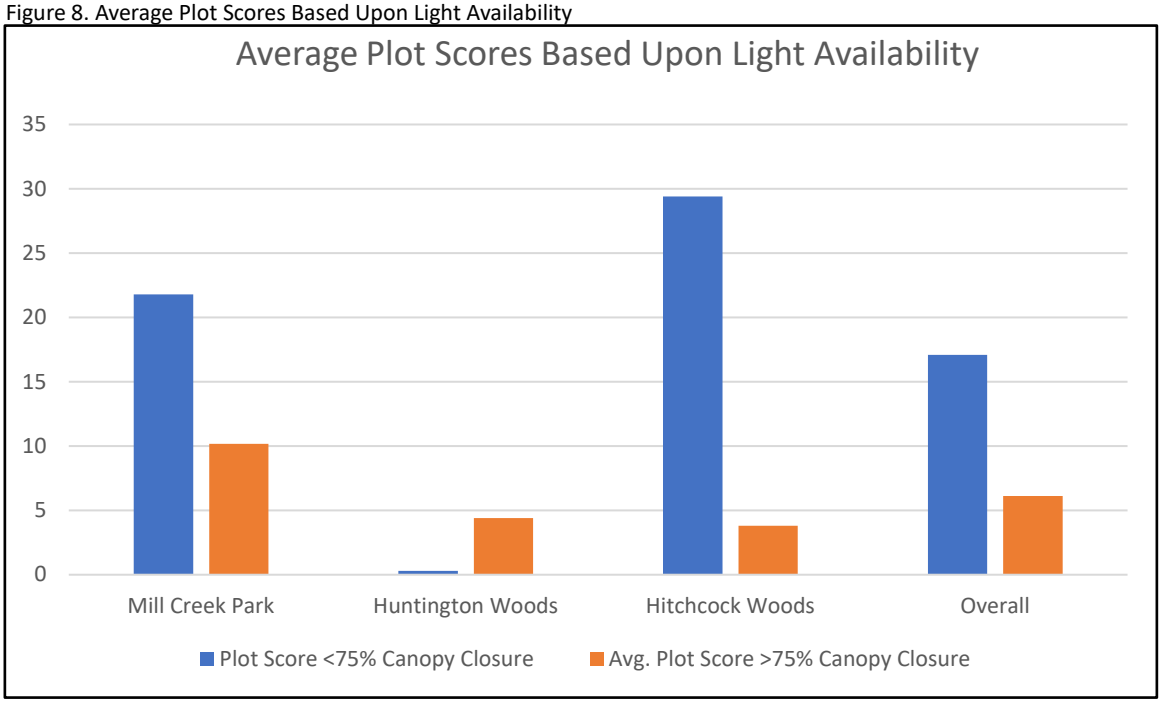


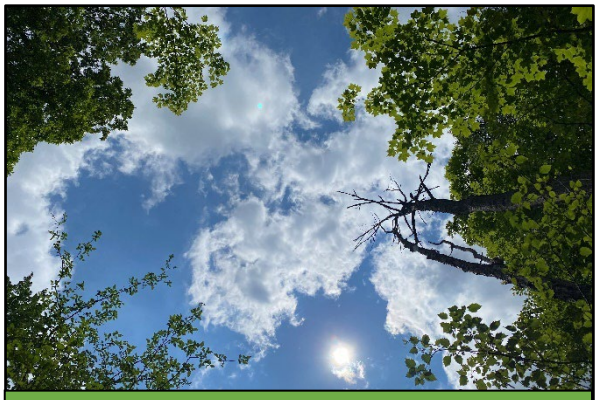
Canopy Closure

Receiving adequate amounts of sunlight is a necessary component for all plant growth. In forested settings, canopy closure affects the amount of light that reaches the forest floor, therefore, can impact a forest's ability to regenerate by affecting both growth rates and species composition. During this study, microplots displayed a wide range of % canopy closure (0-95%) with 48% of microplots with above average light availability (<75% canopy closure) due to prior disturbance from EAB and/or storm damage.

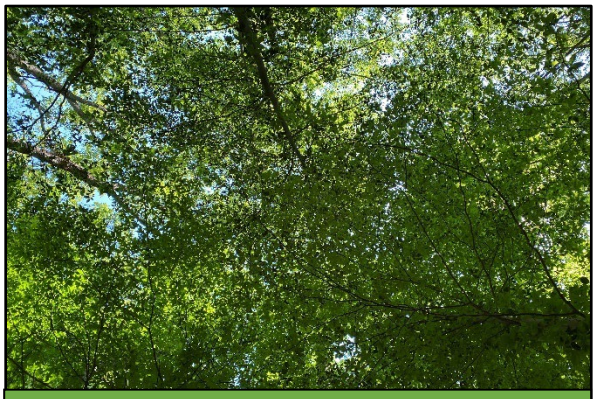
As expected, light availability had a large influence on plot scoring – microplots with less than 75% canopy closure scored 2.79x higher than microplots with greater than 75% canopy closure. Huntington Woods proved to be an exception to this rule, where available light gaps were dominated by ferns and sedges.

Figure 8. Average Plot Scores Based Upon Light Availability





Example of Microplot with <75% Canopy Closure



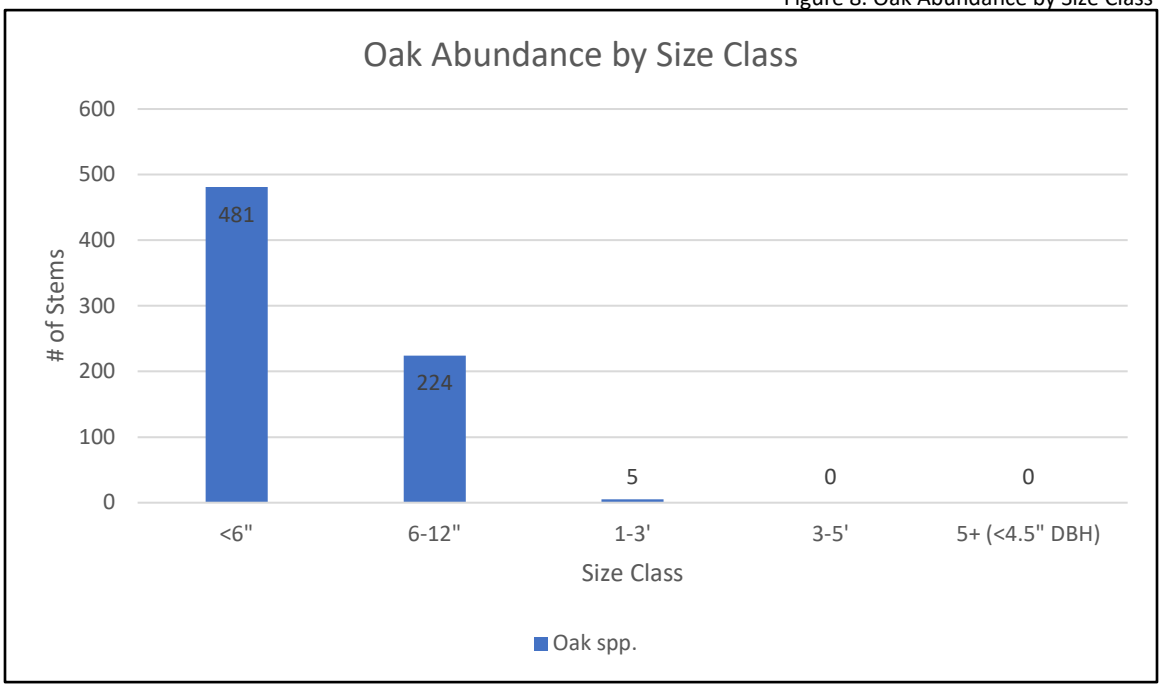
Example of Microplot with >75% Canopy Closure

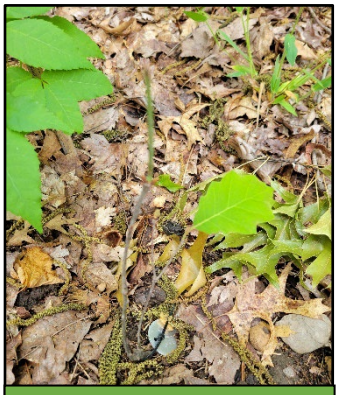
Oak Regeneration:

Across their range, oaks (*Quercus spp*.) exist as common canopy trees, however, they are largely absent in the understory seedling and sapling layers. This has led to increased concern in recent decades regarding the overall lack of oak regeneration in Eastern hardwood forests – likely caused by intensive browsing by white-tailed deer (oaks are a highly preferred browse species), increased competition with other plants, land use changes, and fire suppression. Oaks provide mast crops in the form of acorns which are an essential part of the forest ecosystem providing valuable fall and winter forage for wildlife. If the current trajectory is not corrected, we may face losing this valuable forest resource in the coming decades as mature trees die with nothing in the understory to replace them.

This same principles apply here as the northern red oak (*Quercus rubra*), pin oak (*Quercus palustris*), white oak (*Quercus alba*), and swamp white oak (*Quercus bicolor*) are all species commonly found on MetroParks properties as mature canopy species and many were also found in the smaller (<6” and 6-12”) size classes, however, oaks of all species were completely absent from 3-5’ and 5+ size classes, with only five (5) being found in the 1-3’ size class.

Figure 8. Oak Abundance by Size Class





Unprotected Red Oak Seedling

Protected Red Oak Seedling

Discussion, Management Objectives, and Recommendations:

Discussion

The results of this study reinforce the anecdotal evidence regarding a lack of forest regeneration that has been observed by MetroParks staff beginning in the 1990's by documenting the severe lack of native seedlings and/or saplings in the understory, most notably those in the larger size classes.

White-tailed deer herbivory appears to be the primary driver of forest regeneration in Mill Creek Park, Huntington Woods, and Hitchcock Woods. This is evidenced by the intensive browse pressure and overall lack of preferred browse species evidenced by this study and other anecdotal references. Other factors such as light availability, lack of disturbance, exotic pests, disease, and competition from invasive species are also contributing factors that are impacting forest health.

Management Objectives

The following set of objectives have been established regarding forest regeneration within Mill Creek MetroParks:

- 75% of Microplots Scoring 150 Points or More.
- 25% of All Surveyed Oak Stems Measuring Greater than 12" in Height with at Least 10% Reaching the 5'+ Size Class.
- Increase in Native Species Diversity with 75% of Surveyed Species Present as Germinants (<6") Also Being Present in the Large Seedling (3-5') or Sapling (5'+) Size Class.
- Maintain 80% or Greater Coverage of Native Species in Surveyed Areas.

Recommendations:

To achieve the abovementioned objectives, it is recommended that the MetroParks consider implementing the following management techniques until goals are met:

- White-tailed Deer Population Reduction and Management
- Native Species Planting
- Invasive Species Management
- Habitat Manipulation Where Appropriate
- Deer Exclusion via Fencing and/or Tree Tubes/Caging Where Appropriate

Hitchcock Woods Deer Exclosure

Collier Preserve Tree Planting

References:

Carter, David & Barrett, Scott & Barkman, Rebecca & Madigan, Olivia & Olinger, Zachary. (2022). Tree Seedling and Understory Plant Presence in Deer Exclosures on the Matthews State Forest.

Mcwilliams, W.H., Stout, S.L., Bowersox, T.W., & McCormick, L. (1995). Adequacy of Advance Tree-Seedling Regeneration in Pennsylvania's Forests. Northern Journal of Applied Forestry, 12, 187-191.

Shirer, R., & Zimmerman, C. (2010). Forest Regeneration in New York State. https://forestadaptation.org/sites/default/files/NYS_Regen_091410_0.pdf

The National Parks Service: Forest Regeneration 2022 https://www.nps.gov/articles/000/forest-regeneration-2022.htm