

# Mill Creek MetroParks

## White-tailed Deer Management Plan



Last Edited: September 17<sup>th</sup>, 2024

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### **Mission Statement**

The mission of Mill Creek MetroParks is to provide park, recreational, educational, and open space facilities of regional significance. In fulfilling this mission our objectives are:

#### **To be responsive to community needs**

Studies and surveys direct the MetroParks to preserve appropriate natural and cultural areas, make improvements to MetroPark facilities, develop additional recreational opportunities, and continue to strengthen activity and public information programming.

#### **To be environmentally sound**

Stewardship strategies will be dictated by the intrinsic nature of the land.

#### **To be adaptable**

The only certainty in our world is that change is occurring at an increasing rate. To respond, the MetroParks must maintain strong public information and involvement programs and form new kinds of creative liaisons to meet changing needs.

#### **To be economically feasible**

The MetroParks has finite resources that are not guaranteed in perpetuity. It must constantly work to broaden its base, especially through new partnerships. Revenue generating programs and facilities must be a key element in the overall funding picture.



## **Mill Creek MetroParks White-tailed Deer Management Plan: Goals and Objectives:**

The purpose of this management plan is to summarize current conditions concerning white-tailed deer in the MetroParks and provide meaningful science-based recommendations to improve the overall health and vitality of our deer herd, while also mitigating the negative ecological impacts associated with long-term overbrowsing and reducing human-conflict associated with an overabundance of white-tailed deer. This management plan is a fluid-document and will be routinely updated as additional information becomes available or as management objectives change over time.

The following objectives will serve as the guiding principles for white-tailed deer management in Mill Creek MetroParks:

- Maintain healthy white-tailed deer populations in a sustainable fashion within the ecological carrying capacity of the land, allowing for the natural regeneration of native flora.
- Restore and maintain ecological balance through best management practices related to wildlife and habitat management to promote biodiversity to the highest degree ecologically possible for all species of native flora/fauna, highlighting those of increased concern (rare, threatened, or endangered).
- Restore and maintain the ecological integrity of MetroParks properties to ensure high-quality natural areas are available to current and future generations of park visitors.

In accordance with the Mission Statement, Mill Creek MetroParks strives to protect properties throughout Mahoning County, acquiring and preserving those that exhibit excellent natural features and ecological function.

The MetroParks actively manages natural resources using a facility-based approach incorporating environmentally sound best management practices to achieve these goals.

### **White-tailed Deer in the MetroParks**

The white-tailed deer (*Odocoileus virginianus*) is a common sight throughout Ohio and much of the United States. White-tailed deer have proven to be extremely adaptable, as their populations have risen exponentially since the late 20th century despite increased habitat fragmentation caused by human development. Northeast Ohio is no exception, with the overabundance of white-tailed deer becoming a prominent threat to native ecosystems throughout the region over the last several decades. While these effects can be felt across all landscapes, they are often disproportionately concentrated in urban/suburban areas including parks and municipalities.

Negative ecological impacts associated with the overabundance of white-tailed deer within Mill Creek MetroParks can be traced back to the mid-1990s, however the subject was revisited with renewed focus beginning in 2020.

Initial concerns were raised by MetroParks staff who reported visual evidence of high numbers of deer being seen throughout the MetroParks and surrounding areas. These concerns included overall herd health within the MetroParks and a host of ecological concerns that were widespread throughout various facilities. In response to these concerns the MetroParks put into motion a multi-year campaign to:

- Review historical information.
- Gather current population data.
- Assess ecological conditions.
- Provide management recommendations concerning white-tailed deer populations on MetroParks properties based upon methods permitted by the Ohio Department of Natural Resources: Division of Wildlife.

### **Historical Data**

To better understand current conditions and make meaningful recommendations, MetroParks staff first looked to the past to learn about historical information concerning white-tailed deer populations within the MetroParks.

Beginning in 1997, the MetroParks commissioned numerous aerial deer surveys which continued on a regular basis until 2002. Survey efforts focused on Hitchcock/Huntington Woods and Mill Creek Park (south of Shields Road) and included both daytime visual surveys flown by helicopter and nighttime infrared surveys flown by fixed wing aircraft. During this time, population estimates were identified as high as 98.4 deer/mi<sup>2</sup>. (Appendix A)

#### **Survey Results:**

- Facilities: Mill Creek Park (South of Shields Rd.), Huntington Woods, and Hitchcock Woods Surveyed Area: (~1660 Acres or 2.59 Sq Mi)
- Date: February 7, 2000
- Survey Method: Fixed Wing Aircraft (Infrared)
- # of Deer Detected: 255 Deer Detected = 98.4 Deer/mi<sup>2</sup>

#### **No Aerial Survey Data Available from 2002-2022**

The result of the aerials surveys confirmed the anecdotal evidence of frequent deer sightings and severe overbrowsing witnessed by Park District Staff and other natural resources professionals (Ohio Department of Natural Resources, Cleveland Museum of Natural History, etc.). These results revealed population levels that were estimated to be 5x recommended levels in the year 2000.

## **Current Data**

Given the nearly 20-year gap in management activities and any previous data pre-dating the acquisition of many regional facilities, the MetroParks quickly recognized the need for current population estimates. To accomplish this task, multiple survey methods have been utilized, beginning in January of 2021:

### Helicopter Survey

A visual helicopter survey was planned in partnership with USDA Wildlife Services in both 2021 and 2023, however both efforts failed due to the lack of suitable weather conditions (4+ inches of sustained snow cover required).

### Roadway Infrared Survey

In place of the proposed helicopter survey, a roadway infrared survey of Mill Creek Park was substituted in March of 2021 and repeated in March of 2022. After multiple attempts, it was the consensus of both Mill Creek MetroParks and USDA Wildlife Services that this method was not determined to be a viable option moving forward based upon reduced visibility from roadways due to topography, the lack of road access to some portions of the Park, and the inability to utilize this method outside of Mill Creek Park due to accessibility issues. (Appendix A)

### Aerial Infrared Survey

Given the lack of success provided by previous survey methods, the MetroParks felt the most accurate and comprehensive method to gain useful data for all MetroParks properties would be an infrared aerial survey flown by fixed-wing aircraft. The MetroParks commissioned infrared aerial surveys to be conducted in 2022 and 2024 by “Above All Aerial & Specialty Photography” based in Medina, Ohio. During each survey, the Contractor surveyed all MetroParks facilities (excluding the MetroParks Bikeway) including an ~400’ buffer beyond our property boundaries. Surveys were conducted during the months of January and February, targeting the most ideal weather conditions with low temperatures and snow cover being preferable.

In each case, the survey was flown over two (2) nights, with the “Central Area” being flown on one night and the remaining regional areas being flown on a separate night. The “Central Area” includes Mill Creek Park, Huntington Woods, Hitchcock Woods, Collier Preserve, and the Mill Creek Wildlife Sanctuary. The remaining regional facilities include Sebring Woods, Egypt Swamp Preserve, Hawkins Marsh, Vickers Nature Preserve, Sawmill Creek Preserve, the MetroParks Farm, Cranberry Run Headwaters, McGuffey Wildlife Preserve, Springfield Forest, and Yellow Creek Park.

Survey timing was selected based upon the best available weather conditions, which ideally would include calm winds, low temperatures, and snow cover. Weather conditions were preferable during both survey efforts (please refer to appendix A for additional information).

Following each survey effort, the data was reviewed in video format, with each sequence being analyzed frame by frame. Each frame was thermally tuned by a certified thermographer and each heat signature was evaluated individually on its own merit based upon size, shape, habit, and thermal characteristics.

Considering the excellent weather conditions and the detailed data review process, the surveyor indicated a high level of confidence in the results and provided an 85% or greater confidence interval for both surveys. (Appendix A)

### Trail Camera Surveys

Despite the comprehensive results provided by the infrared aerial survey, the MetroParks felt it was important to continue exploring additional survey methods to gain a better picture of not only population densities but also overall herd health. For this, the MetroParks employed trail camera surveys in July of 2022, beginning at Hitchcock Woods and the Mill Creek Wildlife Sanctuary and expanding to Mill Creek Park in July of 2023. Following guidelines published by Mississippi State University and the National Deer Association, the MetroParks successfully used trail cameras to estimate localized population densities, gather information on herd structure, and visually assess the physical condition of the deer herd.

The results confirmed elevated populations densities within the surveyed areas as documented by other population estimates. Please refer to Appendix A to view the results from the 2022-2024 trail camera survey efforts.

### Thermal Drone Surveys

In a continued effort to explore and utilize all possible survey methods, the MetroParks trialed the use of drones equipped with FLIR thermal technology to survey the deer population at McGuffey Wildlife Preserve and Springfield Forest in the early spring of 2024. These properties were selected due to their smaller size as a cost-effective way to trial the technology.

This survey methods detected a total of 14 deer at McGuffey Wildlife Preserve and 19 deer at Springfield Forest, with these numbers being nearly identical to those produced by the 2024 aerial infrared survey flown by airplane (11 McGuffey, 21 Springfield), the MetroParks is confident in the use of both survey methods moving forward.

As an added benefit, the drone technology utilized had the ability to switch from a thermal camera to a standard camera with 200x zoom, which allowed the pilot to examine each thermal signature and confirm the presence of a deer.

### Survey Accuracy

While there are numerous survey methods that may be employed to estimate wildlife populations, it is important to note that any one survey method is simply a snapshot in time and can only be considered accurate for the time, date, location, and weather conditions under which it was conducted. In the case of white-tailed deer, populations and their use of a

particular property may fluctuate based upon factors such as time of day, time of year, weather conditions, food availability, or human pressure.

The deer density estimates produced by the various survey methods, are generally presented as a deer/mi<sup>2</sup> or deer/km<sup>2</sup> figure. This metric is used by wildlife professionals to express deer population density in relation to the size of the survey area (1 square mile = 640 acres). This metric can vary greatly on small properties or those with irregular boundaries (Cranberry Run, Yellow Creek Park, Sebring Woods, etc.) with even small changes in the number of deer detected during a given survey effort.

Given the factors described above, population density surveys are best used to track trends over time. The focus of the deer management program in Mill Creek MetroParks is to mitigate the ecological damage caused by overbrowsing, not to manage for a specific number of deer.

Current Ecological Conditions:

In June 2023, MetroParks staff initiated an ecological survey protocol aimed at quantifying current conditions related to forest regeneration on MetroParks properties – this assessment was first applied to Mill Creek Park, Huntington Woods, and Hitchcock Woods. Moving forward, microplots will be established and monitored at additional MetroParks facilities as staff availability allows.

Survey protocol included the establishment of permanent microplots (6’ radius plots) to assess the state of forest regeneration within the surveyed areas – in total 110 microplots were established. Within each microplot, all woody stemmed vegetation was identified and sorted into five (5) size classes (germinant, small seedling, seedling, large seedling, and sapling) based upon height with each size class being assigned a weighted score based upon survivability and value in terms of long-term forest regeneration. Microplots which score over 150 points are considered sufficiently stocked for forest regeneration - the scoring breakdown is as follows:

| 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    |

Microplots will be assessed annually on a rotating basis and may also be used to monitor other metrics such as winter browse damage and/or spring ephemeral wildflower abundance.



The results of this study document a severe lack of forest regeneration in terms of native seedlings and saplings, most notably those of high browse preference such as oaks (*Quercus spp.*) - please refer to appendix (B) for the full results of this study in 2023 and 2024.

## **Critical Impacts**

White-tailed deer are considered to be keystone herbivores in their environments meaning their feeding habits can have large scale impacts to the vegetative community and can subsequently impact other species of wildlife including birds, mammals, insects, amphibians, etc. While white-tailed deer are known as generalist herbivores, feeding on a wide range of woody and herbaceous plants they are also known as preferential browsers, meaning they have preferred species that they will gravitate towards when available. Many of these species are natives, such as red oak seedlings or spring wildflowers. When overabundant, the browsing impacts of white-tailed deer can have a disproportionate impact on those preferred species, allowing for the proliferation of less palatable plants (often invasive species) leading to an overall loss in biodiversity and increased habitat degradation overtime (Côté et al, 2004).

To better understand the negative effects an overabundance of deer can have on the environment, the carrying capacity of the land must be determined. Carrying capacity can be defined by multiple metrics:

### Biological Carrying Capacity (BCC):

Biological carrying capacity can be described as the density in which a population (in this case white-tailed deer) can sustain themselves on the landscape over the long-term. This number can vary greatly depending upon the availability of food resources, it is common for biological carrying capacity in urban/suburban areas to be artificially elevated due to increased supplemental food sources (gardens, landscaping, supplemental feed, etc.) and a lack of predation. Despite white-tailed deer populations being able to sustain themselves on the landscape, populations at or below biological carrying capacity often have negative impacts on the surrounding environment and the health of the deer herd based upon the available food resources.

### Ecological Carrying Capacity (ECC):

Ecological carrying capacity is the density in which white-tailed deer populations have no long-lasting negative impacts to their surrounding environment and allow for natural regeneration of flora. When population densities exceed ecological carrying capacity, negative impacts associated with an overabundance of deer become apparent such as overbrowsing, a loss of biodiversity, and stunted forest regeneration. Ecological carrying capacity may vary across the landscape depending upon resource availability, but research indicates between 10-20 deer/mi<sup>2</sup> as the ideal range for ecological carrying capacity. Population levels beyond ECC can cause long

lasting and/or permanent effects to the vegetative community onsite, affecting many other species of wildlife across all trophic levels.

#### Cultural Carrying Capacity (CCC):

Cultural or social carry capacity is the density in which white-tailed deer populations are socially tolerated in a community, this figure can vary greatly based upon public opinion and commonly exceeds both biological and ecological carry capacities.

For the purposes of white-tailed deer management in Mill Creek MetroParks, **ecological carrying capacity** will be the primary metric by which populations are evaluated.

#### Disease Concerns:

Chronic Wasting Disease (CWD) is a fatal neurologic disease found in North American members of the cervid family (white-tailed deer, mule deer, moose, reindeer, and elk). First discovered in Colorado (1967), this disease has now spread to thirty (30) U.S. State and four (4) Canadian Provinces including both captive breeding facilities and free-range herds. Unfortunately, Ohio has recently joined this list in 2020 with CWD being discovered in free-ranging populations. The current known distribution within Ohio is contained within Wyandot and Marion County in North Central Ohio.

Chronic wasting disease is categorized as a prion disease, similar to Creutzfeldt-Jakob disease (CJD) in humans or Bovine Spongiform Encephalopathy (BSE or “Mad Cow”) in cattle. This disease has a long incubation period, infected animals could take years to show symptoms, but once developed a host of neurologic symptoms such as drastic weight loss, stumbling, and fatigue become severe, leading to death. Chronic wasting disease is 100% fatal, with no known treatments at this time.

CWD is transferred from animal to animal through close contact and also can be spread through the environment via carcasses, feces, saliva, etc. The risk of transmission is greatly increased in areas with high deer densities and once shed into the environment the CWD causing prions can remain infectious for years.

Despite the best efforts of management agencies, CWD has proven to be extremely difficult to eradicate once established in wild free-ranging herds. At this time, the best land management practice is to help mitigate the spread by maintaining healthy population levels and being cautious about transporting potentially infected animals or infected materials to new areas of the state.

At this time, there is no research to suggest that CWD, is capable of being transferred to humans.

Epizootic Hemorrhagic Disease (EHD) is one of the most common diseases that affect the white-tailed deer in North America, with Ohio often experiencing localized outbreaks throughout the state depending upon weather conditions. EHD is transmitted by a biting midge (a type of fly) that is most prevalent during the mid to late summer, as they thrive in the mudflats created by drought conditions.

As compared to chronic wasting disease, EHD is very fast acting, with infected deer often showing symptoms with 10 days of exposure and expiring within 36 hours of showing symptoms. Symptoms can include lethargy, loss of fear, swelling of the tongue, head and neck, and difficulty breathing – carcasses of affected deer are often found in or near bodies of water. Many factors contribute to how severe an EHD outbreak will be such as weather, location, and an individual's level of susceptibility to the disease. However, it is not uncommon for a large portion of a local population to be affected during an outbreak, especially in the Midwest where deer populations have built little genetic resistance to the disease.

EHD is not spread from animal to animal but having a high population density during a localized outbreak could result in very high mortality rates due to a high number of deer being exposed to infectious midges.

Lyme Disease and other tick-borne diseases have progressively increased in prevalence in recent years. White-tailed deer, a primary host of the black-legged tick (*Ixodes scapularis*), aka "deer tick", have experienced a similar rise in population over a similar timeframe and created a notable correlation.

Lyme disease is the most common vector borne disease in the United States and poses a risk to both humans and pets. This disease affects approximately 30,000 people annually, with data from the Ohio Department of Health showing Mahoning County as having 2.26 cases of Lyme disease per 100,000 per year (2013-2022) – as of August 2023 there have been 5 reported cases in the county.

Lyme disease is caused primarily by the bacterium *Borrelia burgdorferi* and is transferred through the bite of a black-legged tick. Research directly linking deer population levels to human health is admittedly lacking in some regard, however, numerous studies have shown in controlled situations that the reduction of deer densities can have a direct influence on tick populations (Kugeler, et al 2015). Perhaps most notably, research conducted in Connecticut over a thirteen (13) year period that by decreasing deer population densities to 5.1 deer/km<sup>2</sup> yielded a 76% reduction in tick abundance, 70% reduction in the entomological risk index, and 80% reduction in resident-reported cases of Lyme disease in the community from before to after a hunt was initiated (Kilpatrick, et al 2014)

While white-tailed deer are the preferred host of the black-legged tick, other species (mice, chipmunks, birds, other mammals, etc.) can fill this void in areas where deer are less numerous. This coupled with the inevitable immigration/emigration of deer in an open population make it

difficult to assess the effects of a deer reduction program regarding tick populations and human health on the large scale.

### **Property Damage**

In addition to the threat white-tailed deer populations pose to natural ecosystems, they can also cause significant negative impacts to personal property and the community. The most common community impacts are damage to landscaping or gardens and damage or personal injury caused by deer-vehicle collisions.

### Landscape Damage

When overabundant, populations of white-tailed deer can quickly deplete natural food sources which often leads to the browsing of landscape and/or garden plants, even those that are traditionally not favored by deer or considered to be “deer resistant”. Damage caused by the overbrowsing of landscape and garden plants can cause significant financial impacts to landowners to replace damaged plants and/or erect deer enclosure measures.

### Deer Vehicle Collisions

Deer vehicle collisions (DVC) are an ever-present threat to the motorists of Ohio, this threat increases in areas of high deer density and can fluctuate seasonally throughout the year. Crash data from the Ohio State Highway Patrol (2015-2019 ) shows Mahoning County as having a high incidence of deer-vehicle collisions ranking 15th out of 88 counties with a total of 1,696 collisions (~424 per year).

Additionally, records from ODOT show an upward trend in the number of deer picked up by road crews in Mahoning County over the last seven (7) years (2015-2022), peaking at 277 deer in 2022.

Deer vehicle collisions pose both a financial and physical threat to motorists with an average cost of \$4,000 of damaged caused per DVC and the possibility of injury or even death as a result of the collision.

## **We Are Not Alone**

The issue of white-tailed deer overpopulation is a problem that is facing many communities across the nation, with Ohio being no exception. Many peers at other Park Districts throughout the region are actively managing white-tailed deer populations on their properties, in some cases for two decades or more. Perhaps the most notable example being Cleveland MetroParks, which has been involved with intense monitoring and active management of their deer herd since the 1990s.

Other regional county park districts with deer management activities include:

- Trumbull MetroParks
- Ashtabula County MetroParks
- Columbiana County Park District
- Friendship Park, Jefferson County
- Erie MetroParks
- Lake MetroParks
- Summit MetroParks
- Stark Parks
- Cleveland MetroParks
- Geauga Park District:
- Portage County Parks
- Medina County Parks
- Toledo MetroParks

In addition to other park districts, numerous other organizations throughout the region also actively manage deer populations on their properties such as:

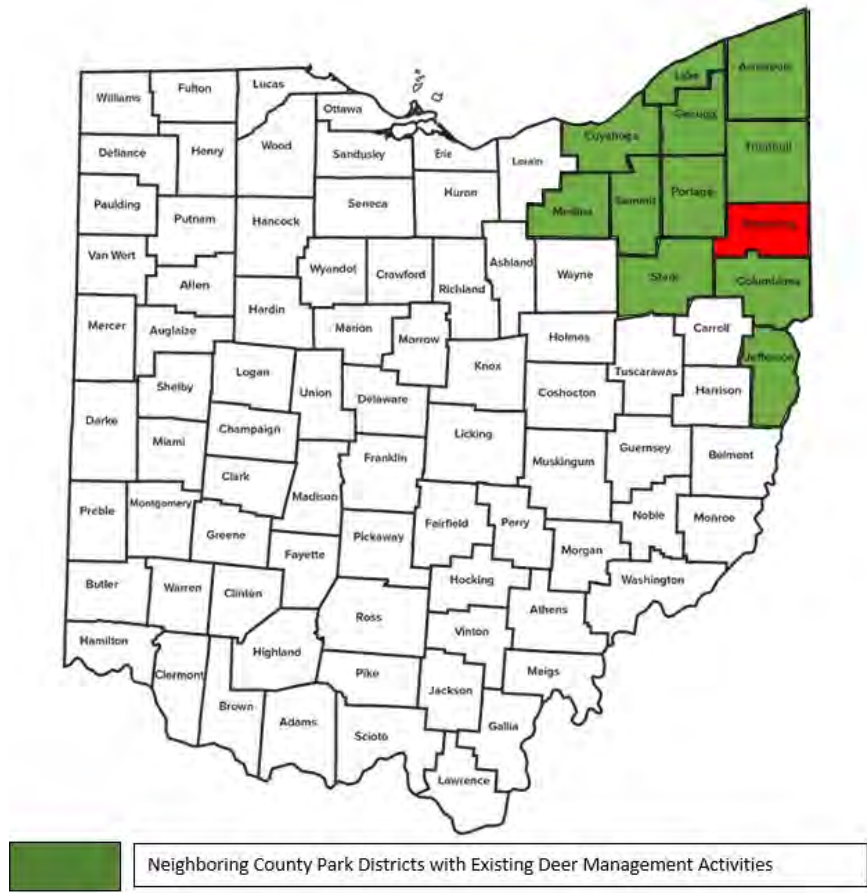
- Holden Arboretum
- The Nature Conservancy
- Cleveland Museum of Natural History
- Cuyahoga Valley National Park
- Western Reserve Land Conservancy

In addition, a long list of municipalities throughout the region are also actively managing deer within their municipalities such as (but not limited to):

- Mentor
- Avon Lake
- Pepper Pike
- Solon
- Parma Heights
- Lorain

- Lyndhurst
- Westlake
- Highland Heights
- Richmond Heights
- South Euclid
- Peninsula
- Beachwood
- Bay Village
- Shaker Heights

Many of these same organizations are members of the Lake Erie Allegheny Partnership for Biodiversity (LEAP), which is a regional alliance dedicated to the conservation of our natural resources that recognizes the need for sustainable management of white-tailed deer populations and supports active management.



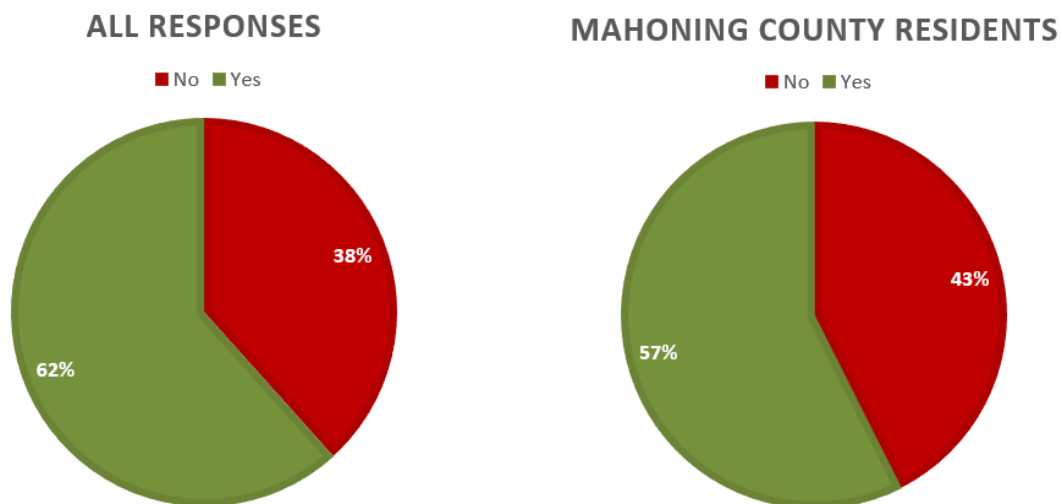
## Public Input:

Following the presentation of “White-tailed Deer in the MetroParks – Part I” on February 13<sup>th</sup>, 2023, the MetroParks conducted an online survey (February 14, 2023 – March 1, 2023) to evaluate the experiences and opinions of the public regarding white-tailed deer populations on MetroParks properties. The result of that survey effort yielded the following results:

- 407 verified responses (all emails were verified by a 3<sup>rd</sup> party service provider)
- 74% of all survey respondents were Mahoning County residents
- 78% of all survey respondents stated Mill Creek Park or Fellows Riverside Gardens as their most visited property, 80% of county residents indicated the same.
- 57% of all survey respondents stated that based upon their experiences in the park that they feel there is an overpopulation of white-tailed deer, 53% of county residents indicated the same.
- 62% of all survey respondents stated that they believe steps should be taken to address the white-tailed deer population in the MetroParks, 57% of county residents indicated the same.

The MetroParks reviewed the survey responses in great detail and will use public input to help shape management recommendations moving forward. Public input is an important component; however, it is important to note that scientific research is the primary tool used by land managers to guide wildlife management under the North American Model of Wildlife Conservation. These two components must be balanced to successfully reach management goals.

Do you think something needs to be done to address the deer population within the MetroParks?



## **Independent Survey Efforts**

Following both the, February 13<sup>th</sup> and March 13<sup>th</sup>, 2023 presentations to the Board of Park Commissioners, The Vindicator conducted an online survey of their own to help gauge the public's position on the subject of White-tailed Deer in the MetroParks.

The first survey effort asked the question "Does Mill Creek MetroParks have a Deer Problem?". In total, 54% of survey respondents said "yes" that they believe the MetroParks has a deer problem.

The second survey asked the question "Do you support the MetroParks' Plan to Reduce Deer Numbers?". In total, 61% of survey respondents indicated "yes", that they support the MetroParks' proposed management plan.

## **MCMP Natural Resources Citizen Advisory Committee**

Created in 2020, the Natural Resources Citizen Advisory Committee is comprised of 9 members of the public and the MCMP Natural Resources Manager and serves as an advisory committee to the Board of Park Commissioners and provides recommendations on natural resources related projects. This committee met on February 14<sup>th</sup>, 2023 and March 17<sup>th</sup>, 2023 to review and discuss the subject of White-tailed Deer in the MetroParks. After reviewing Part I and Part II of the presentation series, the group voted on March 17<sup>th</sup>, 2023 to pass a motion supporting the MetroParks' plan to reduce and manage white-tailed deer populations – the motion passed 6 to 1, with the MCMP Natural Resources Manager abstaining from the vote.

## **Past Efforts**

Once again, before moving forward, the MetroParks looked to the past and examined previous management activities and assessed their successes and failures.

In response to population estimates and ecological impacts at the time, the MetroParks instituted an archery-only controlled hunting program in Hitchcock and Huntington Woods, and eventually including Mill Creek Park south of Shields Road. The controlled hunt ran for a total of three (3) seasons (1998-2001) utilizing licensed hunters to remove deer from these priority locations.

No active management of white-tailed deer populations on MetroParks properties took place from 2001- 2023.



## **Management Authority**

In the State of Ohio, the Ohio Department of Natural Resources: Division of Wildlife (ODOW) is tasked with managing the State's deer herd. Management by the Division of Wildlife is done in accordance with current scientific research and best management practices to ensure the health and longevity of the resource.

To effectively manage Ohio's herd, the Ohio Division of Wildlife regulates the white-tailed deer as a big game species, allowing for regulated harvest each season by licensed hunters. Annual harvest rates in Ohio have averaged 193,062 in recent years (2019-2021), with Mahoning County accounting for 2,007 harvests annually (on average) over the same time frame. It is estimated that approximately 230,596 hunters participated in the 2021-2022 deer season. With these hunters purchasing approximately 404,800 deer permits across the state (~36.2% hunter success rate). During the same license year Mahoning County accounted for 2,178 hunting licenses and 2,688 deer permits sold.

\*Success rate defined as percentage of licensed hunters who harvested a deer in the 2021-2022 deer season. Some successful hunters may harvest multiple deer per season.

As the keystone herbivore in Ohio, the regulated harvest of our deer herd is essential to maintain the balanced and diverse native ecosystems of our state. It is common for white-tailed deer numbers to exceed ecological carrying capacity in urban or suburban areas where traditional hunting practices do not typically take place. To allow for the sustainable management of deer in these areas, the Ohio Division of Wildlife may issue deer damage permits on a case-by-case basis that go beyond the scope of typical seasons and/or harvest limits to meet management objectives.

## **Our Plan**

Based upon current survey data regarding overall deer densities and ecosystem health, the MetroParks is recommending the continuation of a facility-based management program to reduce and manage white-tailed deer populations on MetroParks properties. This program employs a combination of the proven options currently authorized by the Ohio Division of Wildlife. These recommendations are based upon current scientific research and best management practices.

### **Ohio Division of Wildlife – Approved Management Methods**

#### **Controlled Hunting Program:**

The use of regulated hunting has proven to be a safe, effective, and ethical tool to manage wildlife populations for long term-sustainability at the national, state and local level.

Controlled hunting programs have been successfully implemented by other park districts and municipalities across the state to successfully manage white-tailed deer populations in urban, suburban, and rural environments.

### Targeted Removal Program:

A targeted removal program is a safe, effective, and ethical method of management and is primarily utilized in urban/suburban areas. A targeted removal program operates outside of normal hunting regulations as defined by the Ohio Division of Wildlife (ODOW), therefore, requires the issuance of “deer damage permits”. These damage permits are issued on a case-by-case basis at the discretion of ODOW in circumstances where the need for deer management exceeds the ability of typical hunting activities to be effective or are simply not feasible.

### Do Nothing or Let Nature Take its Course:

To simply do nothing would only exacerbate the problem that has been compounding for over two decades. “Letting Nature Take its Course” would result in the further decimation of our natural ecosystems and the continued decline in the health of our deer herd, potentially resulting in disease outbreak and/or starvation. This approach does not allow for the responsible and sustainable management of our natural resources.

### Ohio Division of Wildlife – Non-Approved Management Methods

#### Trap and Relocate:

Relocation is not considered a viable option for deer management for numerous reasons. These reasons include the lack of viable release sites, potential disease transmission, high associated costs, and a high degree of mortality with relocated individuals due to the stress of transfer. Research has indicated highly variable mortality rates as high as 20% (Haulton et al 2001). Long-term survivability of white-tailed deer that have been relocated has been documented as low as 30% after one year (Beringer et al 2002).

Relocation is **not** currently permitted by ODOW for use in deer management programs.

#### Surgical Contraception:

Surgical contraception has been employed by other organizations as part of their deer management. Perhaps the most notable example is Cornell University where an extensive surgical contraceptive program was implemented on the main university campus. Despite a dedicated effort this program proved extremely costly (~\$1000/deer despite utilizing in-house veterinary services) and did not prove effective in achieving management goals on campus.

Cornell University did see a decline in overall pregnancies on campus, however, they concluded that surgical contraception did **not** have a measurable impact on deer populations over the long-term despite having sterilized nearly 90% of female deer on campus. They attributed the ineffectiveness to population immigration and emigration associated with an open population (Boulanger et al 2014 ).

Surgical contraceptive does not directly address the current population levels, rather it may only stabilize current populations and show a reduction in future fawn recruitment. This method has proven to be to extremely costly and ultimately ineffective at managing population levels of wild free-ranging white-tailed deer.

Surgical contraception is permitted **only** for research purposes and is **not** currently permitted by the Ohio Division of Wildlife to be used in deer management programs. Any research proposal presented to the Ohio Division of Wildlife must be conducted by a legitimate research entity, have clearly defined goals, and must identify **novel** research topics.

The MetroParks will continue to evaluate the feasibility of surgical fertility control for use in deer management programs as science and technology progresses.

#### Chemical Contraception:

Multiple chemical contraception compounds have been researched and trialed by numerous organizations for use in white-tailed deer such as GonaCon™ or PZP. In the early 2000s, Cleveland MetroParks (under research permits) expended nearly \$500,000 over 5 years researching immunocontraception as a non-lethal alternative to reduce deer numbers. Their results did show a reduction in overall pregnancies but was proven **not viable** in an open population due to immigration/emigration of deer into and out of the study area (Cleveland MetroParks).

As with surgical contraceptive, this method does not directly address the current population levels, rather it may only stabilize current populations and show a reduction in future fawn recruitment. This method has proven to be to extremely costly and ultimately ineffective at managing population levels of wild free-ranging white-tailed deer.

Chemical contraception is permitted **only** for research purposes and is **not** currently permitted by the Ohio Division of Wildlife to be used in deer management programs. Any research proposal presented to the Ohio Division of Wildlife must be conducted by a legitimate research entity, have clearly defined goals, and must identify **novel** research topics.

The MetroParks will continue to evaluate the feasibility of immunocontraception for use in deer management programs as science and technology progresses.

## Other Alternative Considered

Chemical Repellent, Physical Deterrent, Noise Makers, and Exclosure Fencing:

Chemical repellents have mixed reviews, but may prove useful in controlled landscaping situations, however, repellents must be reapplied frequently depending upon weather conditions.

Physical repellents such as motion activated sprinklers, may also prove useful in controlled landscaping situations where a water source is available. Other physical deterrents such as predator decoys or scarecrows provide only temporary results, as deer will become habituated to their presence over time.

Noise makers may also provide limited success in the short term however, the use of these devices must be timed during peak movements hours (dawn, dusk, and through the night). Over time, deer will become habituated to the use of these devices, especially in urban/suburban areas where human activity and loud noises are normal occurrences.

Exclosure fencing is very effective in both controlled landscape situations and natural areas when installed correctly, however, fencing large areas is extremely cost prohibitive and would detract from natural settings. Exclosure fencing is best utilized around browse sensitive landscape plants, small scale planting plots, or small naturalized areas for research and education.

The MetroParks has and will continue to utilize the various non-lethal deterrents described above singly or in combination when conditions are appropriate.

### **Recommended Management Options:**

#### Controlled Hunting Program:

The implementation of a controlled hunting program, where deemed safe and ecologically feasible on MetroParks properties, in partnership with the Ohio Division of Wildlife will continue as the preferred management technique of the MetroParks at this time.

Properties included in the controlled hunting program include:

- Collier Preserve
- MetroParks Farm (Archery Only)
- Sawmill Creek Preserve
- Mill Creek Wildlife Sanctuary
- Springfield Forest
- Hawkins Marsh
- Vickers Nature Preserve
- Huntington Woods (Archery Only)
- Hitchcock Woods (Archery Only)

These properties have been deemed safe for controlled hunting opportunities due to their overall size and/or their rural location within the county. In addition, these properties have all been identified as having white-tailed deer populations exceeding ecological carrying capacity, as evidenced by vegetative assessments conducted by MetroParks staff.

#### Structure and Logistics:

- All controlled hunting opportunities will be by permit only.
- Permits will be issued through a lottery drawing conducted by the Ohio Division of Wildlife (ODOW).
- All applicants must meet the minimum participation standards set forth by the ODOW, including a valid hunting license and either-sex and/or antlerless deer permit(s).
- Permitted hunters will be assigned a hunt unit, hunters may not actively pursue game outside of their assigned hunt unit.
- Hunt units will be established on a facility-by-facility basis based upon existing site conditions.
- Controlled hunting opportunities will be archery only, unless otherwise noted – where deemed safe, select regional facilities located in rural areas of the county will have separate firearm hunting opportunities.
- Archery permit periods for selected hunters will be 1-week in length, with eight (8) separate permit windows beginning on September 29<sup>th</sup>, 2024 and continuing into late November. Hitchcock Woods and Huntington Woods will have a total of sixteen (16) permit windows (archery only) which will extend through January.
- Firearm permit periods will be 2-days in length, with five (5) separate permit windows being allotted for firearms hunts which will take place on consecutive weekends throughout the month of December.
- All facilities will remain open to the public during archery season and applicable facilities will be closed to the public during firearms hunts.
- **Hunters are not permitted to harvest any deer exhibiting a unique color phase (albino, piebald, melanistic, etc.).**

A list of MetroParks controlled hunting rules and regulations will be provided to each hunter. These rules, in addition to the MCMP park-wide rules and regulations and ODOW statewide hunting regulations will be enforceable by MCMP Police and/or the County Wildlife Officer. Please see appendix (E) for the full list of MCMP Controlled Hunting Rules and Regulations.

## Pros and Cons of a Controlled Hunting Program:

### Pros

- Proven as a safe, effective, and ethical means of population management, as demonstrated at the state and local level by ODNR and a long list of other park districts, non-profit organizations, and municipalities in Northeast Ohio.
- Minimizes impacts to the public use of facilities – hunt units are designed to minimize potential conflicts.
- Requires minimal financial input from the MetroParks.

### Cons

- Success relies on the effort put forth by each individual hunter, varying from person to person. Multiple hunters utilizing the same hunt unit throughout the season based upon rotating permit periods will help alleviate this concern.
- Accuracy of harvest reporting will also rely upon the participation of each hunter, which may vary. Having two (2) separate methods of reporting (one to MCMP and one to ODOH) will help highlight any inaccuracies.

### Controlled Hunting Harvest Estimates

As previously stated, the success of the controlled hunting program is largely dependent upon the individual hunter with overall success rates of other ODNR controlled hunting opportunities and results of the 2023-2024 MetroParks controlled hunting program being approximately 20%. Success rate in this scenario is defined as a permit holder (or partner) who utilizes their permit and successfully harvests a deer as part of the controlled hunt.

Additionally, we can use the number of deer harvested per permit issued in the 2023-2024 management season to estimate harvest rates moving forward.

The following table represents the number of permits that will be issued and an estimated number of deer which will be harvested from each respective property – final harvest numbers may vary based upon numerous factors.

| Facility                     | Huntable Acreage | # of Archery Permits per Window | Total # of Archery Permit Holders (Annually) | # of Firearm Permits per Window | Total # of Firearm Permit Holders (Annually) | Total # Combined Permit Holders (Annually) | 2023-2024 Deer Harvested per Permit Issued | Harvest Estimate (~20% Success Rate*) |
|------------------------------|------------------|---------------------------------|--|---------------------------------|--|--|--|---------------------------------------|
| MetroParks Farm              | 50               | 1                               | 8  | 0                               | 0  | 8  | 0.85                                       | 2-7                                   |
| Sawmill Creek                | 128              | 3                               | 24   | 2                               | 10   | 34   | 0.38                                       | 7-14                                  |
| Vickers Nature Preserve      | 225              | 3                               | 24   | 3                               | 15   | 39   | 0.33                                       | 8-16                                  |
| Hawkins Marsh                | 128              | 2                               | 16   | 2                               | 10   | 26   | 0.23                                       | 5-13                                  |
| Collier Preserve             | 162              | 2                               | 16   | 2                               | 10   | 26   | 0.33                                       | 5-13                                  |
| MC Wildlife Sanctuary (East) | 208              | 2                               | 16   | 2                               | 10   | 26   | 0.51                                       | 5-13                                  |
| MC Wildlife Sanctuary (West) | 220              | 2                               | 16   | 2                               | 10   | 26   | 0.51                                       | 5-13                                  |
| Springfield Forest           | 82               | 2                               | 16   | 1                               | 5  | 21   | 0.29                                       | 4-8                                   |
| Hitchcock Woods              | 489              | 5                               | 80   | 0                               | 0  | 80   | 0.35                                       | 16-32                                 |
| Huntington Woods             | 223              | 2                               | 32   | 0                               | 0  | 32   | 1.28                                       | 6-41                                  |
| <b>Totals</b>                | <b>1,915</b>     | <b>25</b>                       | <b>256</b>                                   | <b>15</b>                       | <b>75</b>                                    | <b>318</b>                                 | <b>0.51</b>                                | <b>64 -162</b>                        |

\*Harvest estimate is based upon success rates of hunters participating in other ODNR controlled hunting opportunities and the results of the 2023-2024 controlled hunting program. These figures may fluctuate based upon partner participation.

The number of permits issued for each respective property may vary annually to meet management objectives. If annual harvests via controlled hunting fail to meet the short and/or long-term management objectives for a given property, additional management techniques such as targeted removal may be employed to supplement efforts.

Targeted Removal Program:

Structure and Logistics:

At this time, it is recommended that a targeted removal program be continued by the MetroParks in partnership with United States Department of Agriculture (USDA): APHIS Wildlife Services, under the jurisdiction of the Ohio Division of Wildlife (ODOW). Under this structure, the MetroParks has demonstrated that this method is both safe and effective by working with USDA and utilize federally employed professional marksmen to reach harvest quotas in accordance with deer damage permits issued by the ODOW in areas where controlled hunting is not feasible or where controlled hunting alone fails to meet management objectives.

USDA, APHIS WS is be responsible for site selection (in conjunction with MCMP Police), site preparation, harvesting, field processing, data collection, and transportation of harvested deer to a butchering facility to be processed for donation. All meat from harvested deer will be donated to the community though local food banks and/or other outreach programs. On average a single deer can provide over 30 meals (~1.2 pound servings) of high quality protein to those in need.

**\*Any deer exhibiting a unique color phase (albino, piebald, melanistic, etc.) will not be intentionally harvested as part of any targeted removal program implemented on MCMP property.**

Properties recommended for the implementation of a targeted removal program include:

- Mill Creek Park (North of 224)
- Huntington Woods
- Hitchcock Woods

The properties recommended for a targeted removal program have all been identified as having white-tailed deer populations exceeding ecological carrying capacity, as evidenced by vegetative assessments conducted by MetroParks staff.

Controlled hunting was deemed to either not be a viable management technique or was considered best used in combination with targeted removal in these areas to achieve management objectives due to safety concerns, high public usage of the facility, the total available acreage, and/or the lack of hunter accessibility to a given property.

At the time of this writing, local ordinances in both the City of Youngstown and the City of Struthers prohibit hunting and the use of firearms within city limits. The MetroParks hopes to work with these municipalities to stress the importance of deer management in these areas for the health and longevity of our natural areas, leading to effective management taking place in future years.

Moving forward in 2024, targeted removal efforts are **not** being recommended in the portion of Mill Creek Park which resides in the City of Youngstown (north of Midlothian Blvd.) or Yellow Creek Park despite these properties demonstrating the need for active management.

Pros and Cons of a Targeted Removal Program:

Pros

- Very effective means of herd reduction. Targeted removal programs can operate outside of normal hunting regulations, therefore, can quickly outpace a controlled hunting program depending upon the number of permits granted and can more effectively reach short-term management goals.
- Use of highly trained federal marksmen to safely manage deer numbers.
- Is considered an ethical means of management by the American Veterinary Medical Association (AVMA).
- Ability to collect scientific data. Data collected from each deer would allow the MetroParks to effectively track herd health over time include age demographics, weight, sex ratios, disease transmission, etc.
- Meat donation. All harvested deer will be processed and donated to a local food bank or other community outreach program providing to those in need.



## Cons

- High associated costs. This method will require a significant financial input by the MetroParks to implement an effective targeted removal program in partnership with USDA Wildlife Services. These costs would include administration fees (site preparation, harvesting, transport, data collection, etc.) and the butchering fees which is estimated to be ~\$117.00 per deer in 2024.
- Would require facility closure, may impact public use. All work would be done after normal park hours, however, public use in some areas may be negatively impacted in the short-term.

## Targeted Removal Harvest Estimates

The number of deer removed via the targeted removal program is strictly governed by the Ohio Division of Wildlife through the issuance of deer damage permits.

In the 2023-2024 management season, the MetroParks initially requested 30 deer damage permits to be used within Mill Creek Park south of Midlothian Boulevard, which were granted by the Division of Wildlife. These initial 30 permits were filled in short-order during the first night of operations, after which the MetroParks requested an additional 20 permits. The Division of Wildlife granted a total of 14 additional permits, with the stipulation that seven (7) of the harvested deer must be antlered males – eight (8) of the 14 additional permits were filled on the second night of operations (7 antlerless, 1 antlered). To conserve financial resources, the MetroParks chose to not attempt a 3<sup>rd</sup> night of operations to fill the remaining six (6) antlered permits (see appendix F for additional information).

The MetroParks anticipates requesting additional deer damage permits to be utilized in Mill Creek Park (south of Midlothian Blvd.) and potentially Huntington Woods/Hitchcock Woods during the 2024-2025 management year – the final number of permits requested may vary based upon need, time restraints, and available budget. Mill Creek Park will remain the primary focus for targeted removal efforts during the 2024-2025 management year, additional efforts at Huntington Woods and Hitchcock Woods may take place after the controlled hunting program has concluded for the year, based upon need and available budget.

The MetroParks will work closely with the Division of Wildlife to establish management objectives for the upcoming year to meet short and long-term management goals.

The tables below detail the **estimated** harvest quotas required for Mill Creek Park, Huntington Woods, and Hitchcock Woods to reach maintenance levels within the first six (6) years of the program. These numbers are intended for initial planning purposes and are subject to change as additional data is acquired.

| Facility:<br>Mill Creek<br>Park (South) | 2023-2024<br>Reduction        | 2024-2025<br>Reduction        | 2025-2026<br>Reduction        | 2026-2027<br>Reduction        | 2027-2028<br>Reduction      | 2028-2029<br>Maintenance    | 2029-2030<br>Maintenance    |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Estimate<br>Pop.*                       | 239<br>(191 mi <sup>2</sup> ) | 261<br>(209 mi <sup>2</sup> ) | 209<br>(167 mi <sup>2</sup> ) | 141<br>(113 mi <sup>2</sup> ) | 79<br>(63 mi <sup>2</sup> ) | 47<br>(38 mi <sup>2</sup> ) | 30<br>(24 mi <sup>2</sup> ) |
| # of Deer<br>Damage<br>Permits          | 38                            | 100                           | 100                           | 75                            | 40                          | 20                          | 10                          |
| Recruitment<br>Rate*                    | 1.3                           | 1.3                           | 1.3                           | 1.2                           | 1.2                         | 1.1                         | 1.1                         |

| Huntington<br>Woods            | 2023-2024<br>Reduction        | 2024-2025<br>Reduction        | 2025-2026<br>Reduction        | 2026-2027<br>Reduction      | 2027-2028<br>Reduction      | 2028-2029<br>Maintenance    | 2029-2030<br>Maintenance    |
|--------------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Estimate<br>Pop.*              | 159<br>(265/mi <sup>2</sup> ) | 153<br>(255/mi <sup>2</sup> ) | 101<br>(168/mi <sup>2</sup> ) | 55<br>(92/mi <sup>2</sup> ) | 30<br>(50/mi <sup>2</sup> ) | 22<br>(37/mi <sup>2</sup> ) | 19<br>(32/mi <sup>2</sup> ) |
| # of Deer<br>Damage<br>Permits | 0                             | 35                            | 20                            | 20                          | 5                           | 0                           | 0                           |
| Hunter<br>Harvests             | 41                            | 40                            | 35                            | 10                          | 5                           | 5                           | 5                           |
| Recruitment<br>Rate*           | 1.3                           | 1.3                           | 1.2                           | 1.2                         | 1.1                         | 1.1                         | 1.1                         |

| Hitchcock<br>Woods             | 2023-2024<br>Reduction        | 2024-2025<br>Reduction        | 2025-2026<br>Reduction        | 2026-2027<br>Reduction        | 2027-2028<br>Reduction        | 2028-2029<br>Reduction      | 2029-2033<br>Maintenance    |
|--------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| Estimate<br>Pop.*              | 281<br>(261/mi <sup>2</sup> ) | 332<br>(308/mi <sup>2</sup> ) | 293<br>(272/mi <sup>2</sup> ) | 242<br>(224/mi <sup>2</sup> ) | 162<br>(150/mi <sup>2</sup> ) | 80<br>(74/mi <sup>2</sup> ) | 33<br>(30/mi <sup>2</sup> ) |
| # of Deer<br>Damage<br>Permits | 0                             | 75                            | 75                            | 75                            | 50                            | 35                          | 0                           |
| Hunter<br>Harvests             | 26                            | 32                            | 32                            | 32                            | 32                            | 15                          | 10                          |
| Recruitment<br>Rate*           | 1.3                           | 1.3                           | 1.3                           | 1.2                           | 1.1                           | 1.1                         | 1.1                         |

\*Recruitment rate reflects the rate of change within a population and takes into account birth rates, death rates, immigration, and emigration. The actual recruitment rate on MetroParks properties is unknown at this time and will become clearer as time progresses and additional

data is collected. The recruitment rate used in the abovementioned examples is based upon other similar urban/suburban white-tailed deer populations.

\*Population levels and harvest quotas in this instance were **estimated** by considering all information currently available to the MetroParks including current data, historical data, known trends in population dynamics, estimated harvest success rates, and expert consultation. As with recruitment rate, these figures will become clearer and more refined with time as the program progresses and additional data becomes available.

### **Management Goals**

Both the Ohio Division of Wildlife and Mill Creek MetroParks do not support, nor does the implementation of this management plan suggest, that white-tailed deer will be eliminated from MetroParks properties. Rather, the population will be reduced to a level within ecological carrying capacity to mitigate the negative ecological impacts caused by overbrowsing and enhance the overall biodiversity of all native species of plants and wildlife.

The management of white-tailed deer populations within Mill Creek MetroParks will be a long-term endeavor, the success of this management plan will be achieved through the gradual but consistent harvest of white-tailed deer on an annual basis, which over time will lead to sustainable population levels.

Management goals have been established to guide management activities and provide a timeline towards success.

#### Management Goals:

- Restore ecological balance by reducing population densities of white-tailed deer on MetroParks properties to within recommended carrying capacity using best management practices. (5-10 years)
- Enhance and restore areas previously damaged by overbrowsing and other negative impacts associated with an overabundance of white-tailed deer through sound habitat management. (5-10 years)
- Maintain white-tailed deer populations on MetroParks property in a sustainable fashion, within ecological carrying capacity in perpetuity using best management practices. (10+ years)
- Maintain a balanced and diverse ecosystem, focused on the biodiversity of native plants and wildlife. (10+ years)

## Determining Success:

In order to achieve the desired management goals, the long-term and consistent implementation of this management plan is key to achieve and maintain ecological balance. Success will not be determined purely on number of deer removed or population densities of future surveys, but rather success shall be measured by the health and vitality of our forest resources, including the deer herd.

The following metrics have been established to monitor ecological progress and signify when maintenance levels have been achieved:

### Ecological Metrics Evaluated Through Continued Assessment of Forest Regeneration Microplots

- 75% of Forest Regeneration Microplots Scoring 150 Points or More.
- 40% of All Surveyed Oak Stems Greater than 12" in Height with at Least 10% Reaching the 5'+ Size Class.
- Increase in Native Species Diversity with at least 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.
- Less than 30% Percent Browse Rate on Native Woody Stems 1-5' in Height

It is important to note that the abovementioned ecological goals may vary for each individual property to match existing conditions and land uses. To achieve these goals, additional management practices may be necessary beyond just lowering deer densities such practices may include:

- Native Species Planting of Trees, Shrubs, and Herbaceous Plants
- Invasive Species Treatment/Removal
- Tree Pest/Disease Management Where Feasible
- Habitat Management Where Appropriate and Feasible
- Deer Exclusion via Fencing and/or Tree Tubes/Caging Where Appropriate and Feasible

Please see appendix (B) for a more details concerning ecological assessments.

In addition to ecological metrics, the MetroParks will continue to evaluate current population levels of white-tailed deer utilizing the following techniques:

#### Continued Survey Methods:

- Repeated aerial infrared surveys
- Annual trail camera monitoring

#### Additional Survey Methods to be Considered:

- Helicopter surveys as weather permits (non-infrared)
- Thermal drone surveys

An annual evaluation of management activities will be conducted and presented to the MetroParks Board of Park Commissioners. Annual adjustments will be made based upon the successes and failures of the previous season to refine the overall program and continue moving towards the established management goals.

**Education and Communication:**

Education and communication will remain key components in both the short and long-term to the success of the Mill Creek MetroParks: White-tailed Deer Management Plan.

Educational components will include:

- A dedicated webpage to deer management within the MetroParks, with all relevant information being available to the public.
- Educational programming surrounding the ecology of the white-tailed deer and the impact they have on their local ecosystems.
- Annual report of management activities being presented to the Board of Park Commissioners and being made available on the website.

**Supporting Documentation:**

1. Appendix A: Current Data – Survey Results
2. Appendix B: Ecological Survey Results
3. Appendix C: Deer Damage Photographic Log
4. Appendix D: Description of Properties
5. Appendix E: Controlled Hunt Program Structure
6. Appendix F: Targeted Removal Program Annual Summary
7. Appendix G: Browse Preference of Regional Plant Species

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