



November 6, 2024

Ms. Geneice Gary-Adams, Director/Zoning Official
Township in West Orange
Planning and Development
66 Main Street
West Orange, NJ 07052

**Re: Second Supplemental Report re: Environmental Conditions per Settlement
Agreement:
West Essex Highlands with Attached Documentation as Requested**

Via Electronic Mail
zoningofficial@westorange.org

Dear Ms. Gary-Adams,

After comments received at the hearing of October 30, 2024, DeFeo Associates hereby submits the attached supporting information related to the environmental conditions at the West Essex Highlands (Applicant) site.

In addition, this report contains answers to specific questions raised during that hearing.

I have attached four documents for your use:

1. The original tree study conducted by Amy Greene Environmental dated January 6, 2020.
2. A copy of the Final Report, 2023 Deer Management Program for Essex County, New Jersey at the South Mountain Reservation.
3. A copy of the Autumn, 2024 ANJEC Report. I call your attention to the special section – Protecting NJ’s trees, pages 12 and 13.
4. A copy of the New Jersey Conservation Foundation article on Regenerating native forests to fight climate change.

Additionally, in response to inquiries made during the hearing, the following information is being provided for clarification.

1. Are seedlings available for sale to help accelerate the process of reforestation?
 - a. ANS. New Jersey does sell seedlings to private companies and provides free seedlings to certain groups. No seedlings were available in 2024 due to



production issues. It is possible that seedlings may be available in 2025.

2. What reference is there for the Duke Farms deer management program?
 - a. ANS. The attached article from the New Jersey Conservation Foundation references the Duke Farms Deer Management project. Additional information on this project was obtained from a first - hand interview with Duke Farms staff.

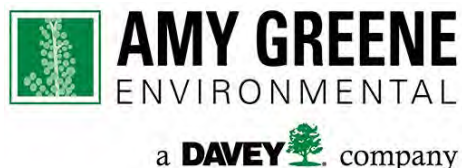
DeFeo Associates reserves the right to modify all findings based on additional information.

Should you have any questions, please contact me at your convenience.

Very truly yours,

Wayne D. DeFeo, LEED AP, BD&C
Principal
DeFeo Associates

Cc Jamilet Baquerizo - jvite@westorange.org



January 6, 2020

DeFeo Associates
15 Washington Valley Road
Warren, NJ 07059

VIA EMAIL (WDeFeo@defeoassociates.com)

Re: West Orange Housing Development/West Essex Highlands
West Orange Township, Essex County, New Jersey
ASGECI Project #4519

Dear Mr. DeFeo:

AMY S. GREENE ENVIRONMENTAL CONSULTANTS, INC. (ASGECI) is pleased to provide this report of findings on the tree survey conducted on December 10, 2019 at the proposed West Orange Housing Development/West Essex Highlands Site (Site). Per the request of West Orange Township, a tree survey was conducted to determine the approximate density of trees within a ~25-acre area where a 496-unit housing development is proposed, in which a portion includes inclusionary housing pursuant to the Mount Laurel doctrine.

Methodology

The tree survey was conducted based on methodology described in Mueller-Dombois and Ellenberg (1974)¹ which presents the following guidelines regarding vegetation sampling for forest tree studies:

1. Where the sampling emphasis is on obtaining an accurate estimate of the number of individuals per unit area within large communities vs. sampling for recurring plant assemblages, the sampling is spread over the area in question in the form of small quadrats vs. a single "minimal sampling area"; however, both methods can be combined and the number of small quadrats can be determined to include the "minimal sampling area" of the community (p. 47 and p. 70);
2. The "minimal sampling area" for temperate zone forests with respect to tree stratum should be between 200m² to 500m² (p. 48);
3. Individual quadrats for forest plots should cover a minimum of 10m x 10m (p.70);
4. For forest volume studies, a standard of five to ten percent sampling intensity is often appropriate (five to ten percent of an area in question is sampled and then extrapolated to the whole, p. 76); and
5. Appropriate sample size can be determined by calculating a "running mean" of the collected data where the average number of trees in all plots sampled (x/n) is plotted

¹ Mueller-Dombois, D and H. Ellenberg. 1974. Aims and methods of vegetation ecology. New York: Ed. J. Wiley & Sons, 547pp.

against the total number of plots sampled (n) and when the resulting curve levels off, the collection of additional data produces insignificant variation and thus no further sampling is necessary (p. 77).

Following the “minimal” sampling area necessary to capture the number of individuals per unit area in temperate forest plots, only five 100m² plots would be necessary to achieve a 500m² minimal sampling area. This would only represent 0.49 percent of the overall Site; therefore, to ensure an adequate sampling area, ASGECI planned to sample five percent of the Site while concurrently estimating the running mean to evaluate that the sampling size had appropriately captured the diversity at the Site. Five percent sampling intensity on 25 acres would result in sampling of 1.25 acres or 5,059m² of the Site. This could be captured in 51, 10m x 10m plots.

To determine the location of the 51 potential sampling plots, a Geographic Information Systems (GIS) professional randomly selected 51, somewhat evenly spaced points on the aerial mapping that spanned the limit of disturbance (LOD). In the field, approximately half of these points (evenly and appropriately spaced to cover the full LOD) were chosen as a subset. After this subset was sampled, the running mean was calculated to determine if further sampling was required or if variation across the Site was appropriately captured.

A shapefile of the points was loaded onto a Trimble GeoHX Geographic Positioning System (GPS) unit so that plots could be located at sub-meter precision. When the location of the random point was identified, the sample plot was arranged so that the established point was placed in the northeast corner of the plot, and from this point meter tape was laid out 10 meters south and 10 meters west to frame the 100m² plot. Within each plot, the diameter at breast height (DBH) was recorded for all trees four inches DBH or greater. Additionally, tree species and condition were noted. The overall number of trees less than four inches DBH were also noted. Basic statistical analyses (evaluation of normal distribution, mean, standard deviation and confidence intervals) were performed.

Results

Twenty-two plots were surveyed throughout the LOD (Figure 1) and tree density appeared consistent across the Site. This was further confirmed upon calculation of the running mean, where it was determined that insignificant variation in plot tree density and DBH occurred after the collection of approximately five plots/500m² (Charts 1 and 2, respectively). Therefore, no additional plots were collected beyond the subset of 22 that were initially selected.

Of the 115 live trees observed that were greater than four-inches DBH, species included red maple (*Acer rubrum*), black birch (*Betula lenta*), pignut hickory (*Carya glabra*), shagbark hickory (*Carya ovata*), mockernut hickory (*Carya tomentosa*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), tulip-tree (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*), white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), and sassafras (*Sassafras albidum*). Seventy-six percent of these trees had a DBH of 12 inches or less (Chart 3) and only eight trees had a DBH greater than 20 inches.

The average number of trees per plot was 5.23 with a 95% confidence interval of 4.37 to 6.08 per plot, indicating this mean strongly represents the average number of trees across the plots. Tree density data followed a normal distribution (Shapiro-Wilk test, $W = 0.95$, $p\text{-value} = 0.33$) and therefore data transformation was not necessary.

West Orange tree replacement guidelines (Township of West Orange Article 1, 25-27.8 g (a) (b)) differentiate requirements for replacement of trees removed that are between four- and six-inches DBH vs. greater than six-inches DBH. Further splitting the data between these categories, the average number of trees per plot between four- and six-inches DBH is 1.3 with a 95% confidence interval of 0.91 to 1.64 and the average number of trees greater than six-inches DBH per plot is 4.0 with a 95% confidence interval of 3.24 to 4.66.

Conclusions and Recommendations

Extrapolating the overall mean trees per plot in the LOD (5.23) to the area of disturbance at the Site would result in approximately 212 trees per acre, and approximately 5,300 trees per the 25-acre LOD. For trees between four- and six-inches DBH, the Site contains approximately 53 per acre and 1,325 in the 25-acre LOD. For trees greater than six-inches DBH, the Site contains approximately 162 trees per acre and 4,050 per the 25-acre LOD.

If you have any questions or require additional information, please feel free to contact me at (908) 788-9676, *extension 32*, or Craig Metzgar of our staff at *extension 24*.

Sincerely,
AMY S. GREENE ENVIRONMENTAL
CONSULTANTS, INC.

A handwritten signature in black ink that reads "Jamie Morgan". The signature is fluid and cursive, with the first name "Jamie" and last name "Morgan" clearly distinguishable.

Jamie Morgan, CPSS/Certified Senior Ecologist
Project Manager

Attachments

Appendix A

Figures



Appendix B

Charts

Chart 1: Running mean - number of trees per plot.

Number of Trees Running Mean

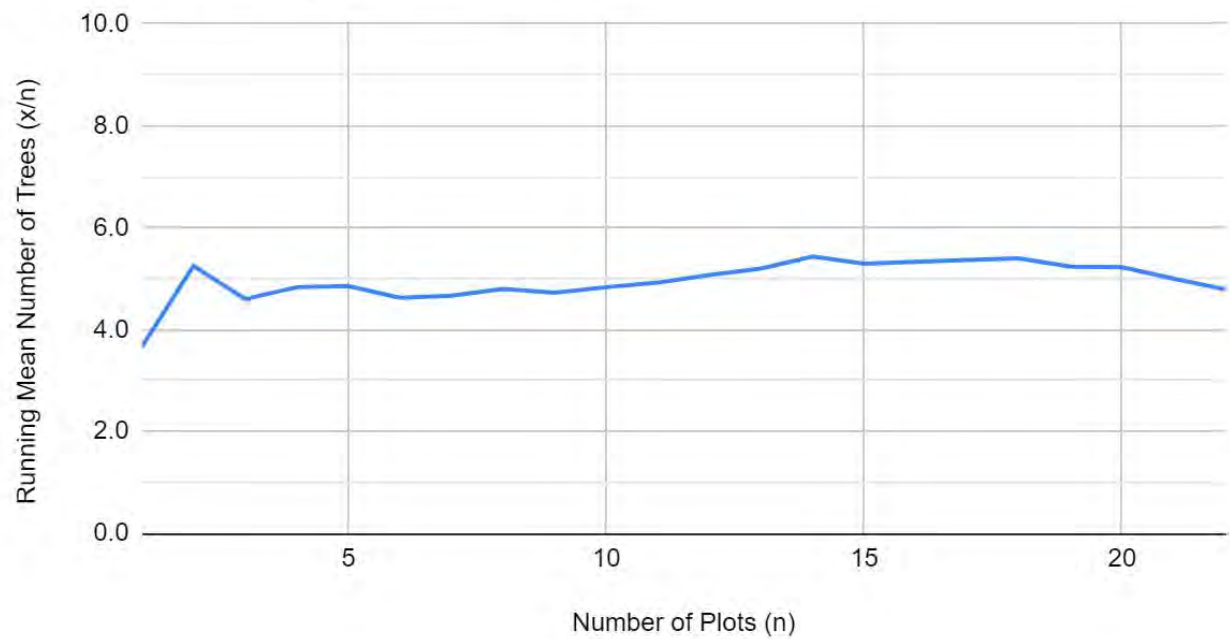


Chart 2: Running mean - tree DBH per plot.

DBH Running Mean

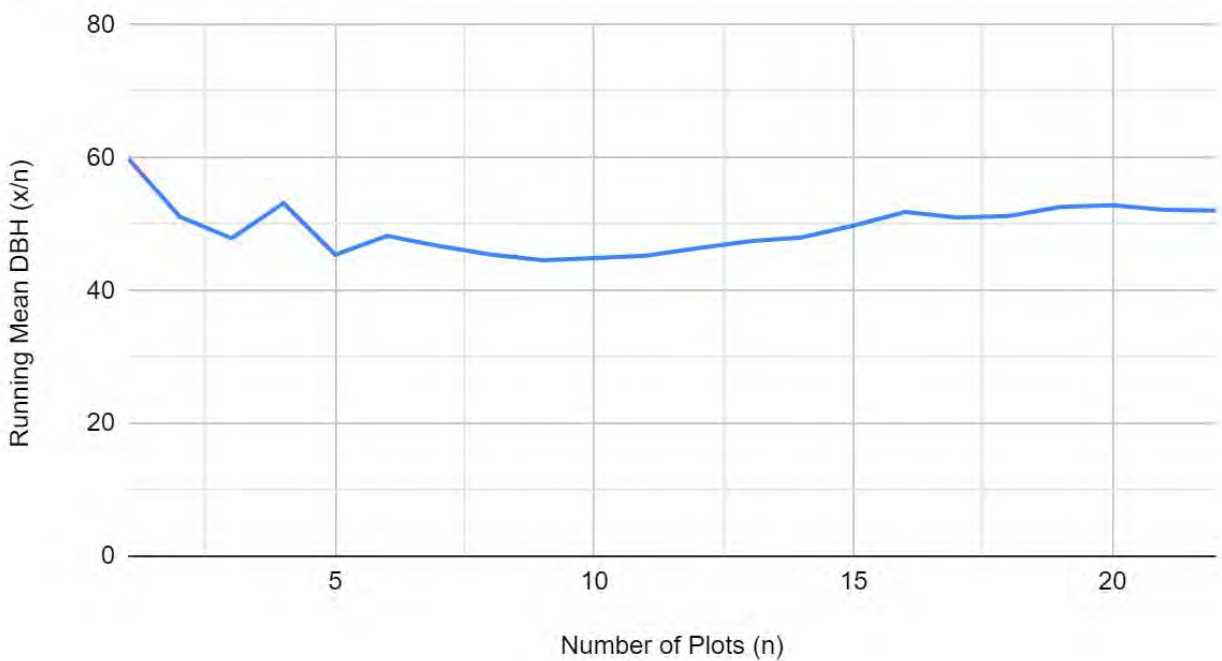
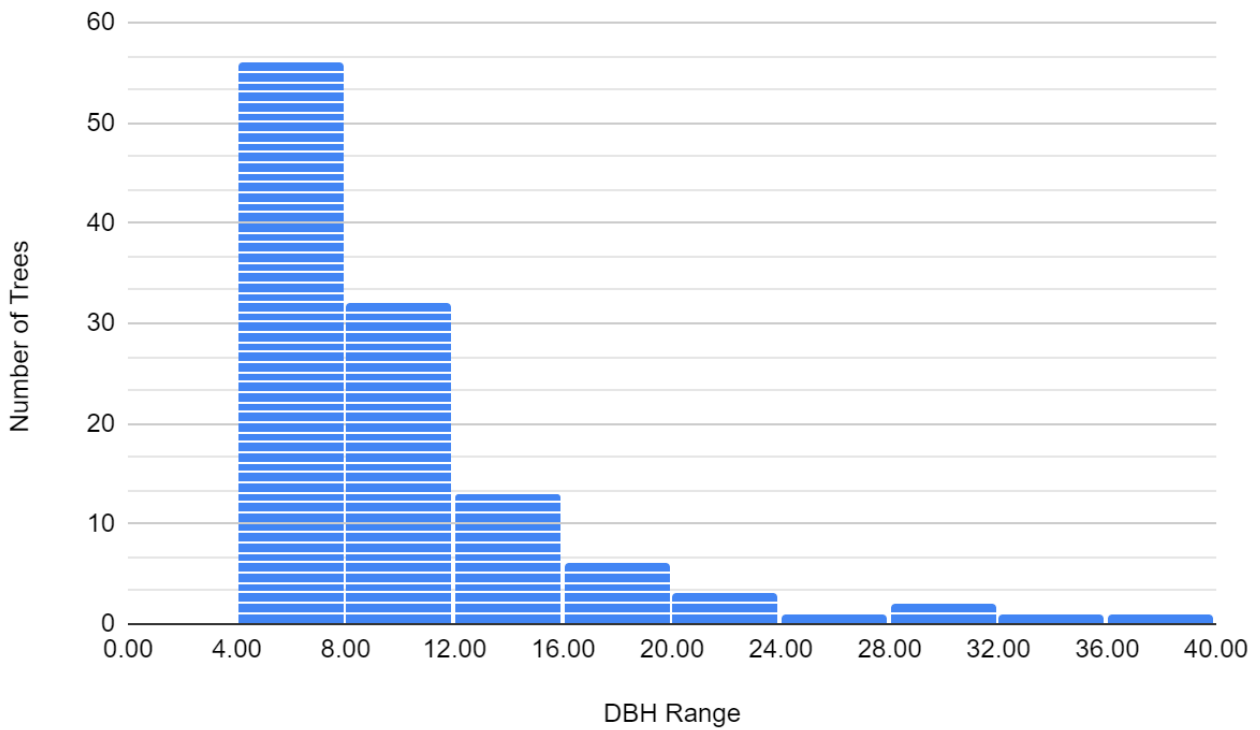


Chart 3: Histogram displaying number of trees in four-inch DBH categories (0"-3.9", 4"-7.9", 8"-11.9", etc.).



FINAL REPORT

2023 DEER MANAGEMENT PROGRAM FOR ESSEX COUNTY, NEW JERSEY SOUTH MOUNTAIN RESERVATION HILLTOP RESERVATION

Prepared for

Joseph N. DiVincenzo, Jr., Essex County Executive,

the Essex County Board of Chosen Freeholders,

and

Daniel K. Salvante, Director,

Essex County Department of Parks, Recreation and Cultural Affairs

by

Daniel J. Bernier

Wildlife Management Consultant

June 20, 2023

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Background

In 1896, a year after the formation of the Essex County Park System, John Durand described the mountain that includes South Mountain Reservation as “a wilderness, as it probably existed at the time of Henrick Hudson, a primitive forest abounding with deer and other wild animals, and traversed by streams alive with trout. Game was plentiful – partridges, quail, woodcock, rabbits, squirrels of every species, raccoons and foxes.”

Today, the County of Essex, like many governmental entities in New Jersey, finds that deer abound in much greater numbers than the other wild animals. In several of its large tracts of parkland and open space, the County sees the problems typically associated with an over-population of white-tailed deer:

- Vegetation in tracts of public open space is being over-browsed, resulting in a loss of vegetative biodiversity;
- Loss of vegetation due to over-browsing is forcing a decline in the number of animal species, particularly songbirds and small mammals, that depend on the herbaceous and shrub layers of the forest and fields for food and cover;
- Over-browsing of native tree seedlings is precluding growth of new trees, altering the age structure of forested areas and stopping the ability of the forest to regenerate as older trees are lost;
- Loss of vegetation is decreasing the ability of forested areas to retain rainwater, increasing the rate and volume of stormwater runoff to streams and rivers, exacerbating erosion and flooding problems;
- Loss of native vegetation is enabling an incursion of invasive exotic plants, which outcompete native species, and provide little or no benefit to native wildlife;
- Trees and shrubs in the surrounding residential areas are being heavily browsed, resulting in huge financial losses for area residents, landscapers and nurseries;
- Deer-related motor vehicle accidents result in personal injury, significant property damage, and mortality or injury of many deer, and could lead to loss of human life;
- The fear of Lyme Disease diminishes enjoyment of the out-of-doors for many people, both in public open space and in their own yards; and
- Destruction of garden plants and the ubiquitous presence of deer droppings hinder the ability of homeowners to enjoy use of their own yards for gardening and recreating.

Officials of the County of Essex, including its Department of Parks, Recreation and Cultural Affairs, have been concerned for almost three decades with the dense population of white-tailed deer in the South Mountain Reservation, and the resultant effect on forest ecology and the surrounding community. Hearings organized by Freeholder Chairman (now County Executive) Joseph DiVincenzo in the mid 1990's brought out residents complaining of the usual problems associated with high deer density in large tracts of public land surrounded by suburbia - residential landscaping damage, deer-related motor vehicle accidents, fear of Lyme Disease, and the inability of homeowners to enjoy use of their own yards.

Parks Department staff were particularly alarmed by the impact of overbrowsing of deer on the South Mountain Reservation, where the understory had been eaten away from most of the 2,047-acre park and the survival of plant and other animal communities was seriously threatened. In more recent years, expressions of concern for the forest ecology have been echoed by the South Mountain Conservancy and New Jersey Audubon.

In March, 2006, the County of Essex received a Landscape and Infrastructure Assessment and Restoration Management Plan for the South Mountain Reservation, prepared by Professional Planning and Engineering Corporation (PPE). Recommendations for management of deer presented in that plan were based on a Deer Management Report issued by The Louis Berger Group, Inc. in November, 2005.

Louis Berger and PPE noted that deer populations had been browsing on the understory of the forest at levels that were changing the vegetative species composition and disrupting the natural landscape. In addition, deer impacts were affecting the visitor's visual experience and the historic and scenic value of many areas in the largest park in the oldest County park system in the United States.

The impact of the high deer population on the forest ecology in South Mountain Reservation was most evident at the herbaceous and shrub layers of the understory. Tree seedlings, forbs, wildflowers, shrubs and even an accumulation of leaf litter had largely disappeared. The future effect on the forest was foretold as the tree canopy was thinning in some areas and not being replaced due to a lack of seedlings and saplings.

About 80% of the 2,047-acre park is forested. More than 75% of that area consists of an evenly aged stand of trees with low species diversity and minimal understory. The early successional habitat found in seedlings and saplings stands has been eliminated by deer overbrowsing, which precludes the possibility of forest regeneration.

In some areas, the lack of an understory has allowed the incursion of huge quantities of invasive plants, which deer won't eat and which provide little or no food or shelter resources to other wildlife. Massive stands of Japanese knotweed are prevalent along many of the roads and at the edges of meadows and activity areas. Japanese stiltgrass covers acres of the forest floor.

A survey of vegetation species found throughout South Mountain Reservation as part of the PPE study identified 98 different tree, shrub and herbaceous species. Eleven of those species are invasive plants not native to North America.

The loss of vegetation due to overbrowsing by deer was leading to an increase in erosion and a decline in stream and lake water quality. Slope areas and hiking trails that were most badly eroded were in areas where the herbaceous layer of the forest had been stripped away. Instead of rainwater seeping into the porous ground of a healthy forest, thereby filtering pollutants and assimilating nutrients, the water was running quickly over the hardened slopes, washing soil with it and causing a decrease in water quality in the park's streams.

As a first step in trying to deal with the burgeoning deer population, the County of Essex looked at the feasibility of instituting a deer management program in the South Mountain Reservation. The County hoped to draw upon the experience of its neighbor, the County of Union, which successfully addressed similar issues in its 2,143-acre Watchung Reservation.

The Watchung Reservation is similar to South Mountain Reservation in terms of size, ecology, and topography. Implementation of a deer management program there in 1995 achieved a reduction of deer density from 180/square mile to 35/square mile in just four years, and now is maintaining the population at about 30/square mile (though still trying to go lower). Impacts on the Watchung Reservation have been greatly reduced and signs of regeneration are found throughout the forest.

Essex County officials felt that lessons learned during and since the reduction phase of the Watchung Reservation program could be applied to efforts in South Mountain Reservation, and could be expected to achieve deer population reduction with greater efficiency of time and manpower. County Executive DiVincenzo recruited Daniel J. Bernier, a wildlife management consultant, in mid-2007 to design, permit, prepare and implement a deer management program for South Mountain Reservation. As Director of the Union County Division of Park Environmental Services, Bernier had administered the Watchung Reservation Deer Management Program since its inception in 1995.

Numerous meetings were held between the wildlife management consultant, Essex County officials and staff, municipal officials, and representatives of several law enforcement agencies. A set of Program Guidelines was developed that almost replicated the plan successfully used to remove deer by selected agents from the Watchung Reservation. All elements of the shooting program were crafted and carefully reviewed to ensure that deer would be removed in a manner that was safe for program participants, park users, and park neighbors, while at the same time being humane in its treatment of the deer.

Essex County set its initial goal at reducing the deer population to the 20 deer per square mile goal density that had typically been recommended for fostering a forest's ability to regenerate. That density equates to a targeted population size of about 64 deer in the park. Based on Forward Looking Infrared censuses of deer conducted between 1999 and 2005, it was estimated that achieving that density would require the removal of at least 250 deer.

After the New Jersey Division of Fish and Wildlife issued a Special Deer Management Permit, shooting activity began in January, 2008. When the program ended in late February, after 8 ½ days of operation, 213 deer had been harvested from the South Mountain Reservation. Similarly, in January and February of 2009, 83 deer were removed over the course of 9 days of hunting.

The Program Expands

In light of the considerable success achieved in reducing the deer density in South Mountain Reservation in just the first 2 years, County Executive DiVincenzo looked toward beginning to tackle the deer problem in other areas of the Essex County Park System. Two park properties where deer impacts were noticeable and complaints from the surrounding communities were high are Eagle Rock Reservation and the Hilltop Property.

Wildlife Management Consultant Bernier developed population density estimates that, in turn, guided the establishment of goals for removing 50 deer from South Mountain Reservation, 75 deer from Eagle Rock Reservation and 50 deer from the Hilltop Property in the 2010 season.

Because of a disparity in the number of deer killed on afternoon shifts versus morning shifts in 2009, it was recommended that hunting at South Mountain Reservation only be conducted in the afternoons in 2010. In 6 half-day shifts, another 44 deer were removed from the park. Remarkably, in 3 ½ full days of hunting, only 19 deer were removed from Eagle Rock Reservation. However, an incredible 97 deer were taken out of the Hilltop Property in that same time period.

Since 2010, goals have been set annually based on population density estimates. The length of the hunting program for South Mountain Reservation has varied from as short as 3 half-days to as long as 4.5 full days. Anywhere from 31 deer to 101 deer have been harvested in each of those years. At Hilltop Reservation, the harvest has varied from 39 deer to 120 deer in seasons that ranged from 4 half-days to 7 full days.

At Eagle Rock Reservation, between 19 and 23 deer were removed annually in seasons that lasted from 3 ½ days to 7 half-days. In 2013, no hunting was planned for Eagle Rock, as the deer population estimate at that time was lower than the amount that could be efficiently removed in terms of cost and manpower. Hunting has not returned to Eagle Rock Reservation since then, as the deer population has been too low to warrant the expense of a hunting program.

In 2019, 6 half-days of hunting yielded 101 deer from South Mountain Reservation. Ninety-nine deer were taken out of the Hilltop Reservation in another 6 half-days. In a similar schedule in 2020, 37 deer were removed from South Mountain Reservation and 55 from Hilltop Reservation. Deer management programs were planned for 2021 and 2022, but had to be cancelled before implementation due to the global coronavirus epidemic.

The Approval Process

Authority for the conduct of a deer management program of the type conducted in Essex County's parks since 2008 lies with the New Jersey Division of Fish and Wildlife, upon approval by the New Jersey Fish and Game Council. The Fish and Game Council, in January of 1994, adopted a program entitled the Community-Based Plan for the Management of Suburban Deer Populations. That program set forth optional methodology for deer reduction in areas where traditional hunting is not possible due to concerns for safety or public acceptance.

There was again a large number of antlered deer harvested. Of the 75 total males, 49% (37 deer) were antlered, similar to the 48% in 2020 and 49% in 2019, but greatly more than the 23% in 2018. Another 26 males had shed their antlers, and 12 were button bucks (fawns).

At South Mountain Reservation, 25 of the 93 total deer killed (27%) were male or female fawns, which was a slight decrease from the 30%. And at the Hilltop Property, 9 of the 59 total deer harvested (15%) were in that age category, a huge drop from the 58% in 2020 and even the 37% ratio in 2019.

Program Costs

Direct costs to the County of Essex for the operation of the Essex County Deer Management Program in 2023 were as follows:

Personnel overtime	
Park Maintenance	\$ 40,121.42
Sheriff's Department	22,324.08
Contracted services	
Wildlife Management Consultant	11,000.00
Butchering fees	14,345.00
Expendable materials & durable equipment	
Bait (whole corn)	2,000.00
Food	6,520.00
Ammunition	1,300.00
Baiting & processing equipment	3,199.72
Newspaper advertisements	865.87
Postcard printing & mailing	7,909.11
TOTAL program costs	109,585.20

As shown, the total direct program costs amounted to \$109,585.20. With 152 deer having been removed, this expense equates to a cost of \$720.96 per deer. Over the 14 seasons of hunting conducted since 2008, costs have ranged from a low of \$412 per deer (2008) to a high of \$1,044.58 (2020), with an average of \$642.26 per deer. Generally the cost per deer is proportionate to the total number of deer culled, as the fixed costs get spread out over more or less total deer harvested (see Appendix G).

The County of Essex again implemented all reasonable measures to ensure that this effort would be conducted in a manner that would be as safe and humane as possible, and that the general public would be well informed and inconvenienced as little as possible. Some of those measures could be scaled back in subsequent years, thereby resulting in a lower cost per deer.

Post-hunt, the County of Essex County contracted with Raritan Valley Community College to conduct an infrared census of deer in South Mountain Reservation from a drone. They also engaged Ecological Solutions, LLC, at a cost of \$5,815 to conduct a forest health study. Both surveys are essential to assessing the current deer density, its impact on the forest ecology, and the level of success achieved in forest regeneration.

Analysis

The 2023 season was the 14th year of the Essex County Deer Management Program. The average harvest across that span is 137 deer. The 152 total of deer harvested this year was the mean for those years, and only 15 deer (11%) higher than the average.

In 2019, 200 deer were harvested. That was the second highest total of all seasons to date. In 2020, the total dropped to 92, which was not unexpected considering that the population had been greatly impacted the prior year. Hunting did not occur in 2021 and 2022, enabling the population to grow with little restriction. So, it is understandable that the harvest jumped to 152 in 2023.

Subsequent Census Data

Spotlight counts are conducted each year in April in South Mountain, Eagle Rock and Hilltop Reservations to determine post-hunt deer population estimates. In 2023, the County of Essex also contracted with Raritan Valley Community College to conduct a deer population survey of South Mountain Reservation using drone-mounted infrared photography.

The Deer Population Estimator found in Appendix H has been used in the past to predict the overwintering population of deer in each park by starting with the spotlight count or drone survey results and applying formulas which account for estimated new births and non-hunt mortality. The estimated overwintering population then suggests the number of hunters to be recruited and the number of days to conduct hunting in order to reduce the deer density to population levels that minimize deer impacts.

Based on 2023 harvest results, the Estimator assumes that 53% of the deer population in South Mountain and 48% in Hilltop are female. It also assumes that 68% of the females are pregnant, and that the pregnant females will deliver an average of 1.69 offspring each. The number of deer will be reduced by 15% to account for loss to natural or accidental mortality.

Recommendations

The results of the 2023 deer management program show that the populations of deer in South Mountain Reservation and Hilltop Reservation are greatly reduced since deer management activities were first undertaken in 2008. However, those populations, especially in the Hilltop Reservation, are still considerably higher than they should be.

Forest ecologists recommend a deer density no greater than 20 deer per square mile in a healthy forest ecosystem. In a forest that is damaged by overbrowsing by deer, as is certainly the case at South Mountain and Hilltop Reservations, the density should be reduced to 10 deer per square mile or lower in order for forest regeneration to succeed.

For South Mountain Reservation, the Deer Population Estimator calculates an overwintering population for 2023-24 of 134 deer (42 per square mile), which is 70 deer more than the recommended population of 64 deer (20/square mile x 3.2 square miles) for this park, if this park had a healthy ecosystem. At the 10 deer/square mile density recommended for an impaired ecosystem, there is an excess of 102 deer.

Essex County has invested considerable resources to establish 41 fenced enclosures throughout South Mountain Reservation, in which native plantings have been installed to jumpstart the forest's recovery from the impacts of deer. In theory, as the deer population is incrementally decreased in size by the deer management program, the native plantings will have an increasing chance of repopulating themselves as they spread their seed beyond the fenced enclosures.

Therefore, reduction of the deer population in South Mountain Reservation should be continued. It is recommended that hunting occur at 14 baited sites, over the course of 5 days, with a goal of removing 102 deer. Based on past experience, hunting should be limited to afternoon shifts only.

The drone-mounted infrared survey of South Mountain Reservation showed higher densities of deer in some sections of the park versus other. That data should be correlated with the actual yields from the various baited sites when selecting bait sites for 2024.

The estimated 2023-24 overwintering population of deer for the Hilltop Property will be 84 deer (190/sq. mi.), or 80 deer more than the 4 deer recommended for this 0.44 square mile area. Therefore, the effort at the Hilltop Property should be continued in earnest. The extremely high density in and around the Hilltop Property needs to be cut drastically for the safety and welfare of park neighbors and the motoring public. Hunting should occur on 7 afternoons, at 8 baited sites, with a goal of removing 80 deer.

The schedule for hunting in 2024¹ should follow the same basic schedule as in 2023, hunting South Mountain Reservation on Tuesdays and Hilltop Reservation on Thursdays. However, at South Mountain there would be 5 afternoons of hunting, starting January 16, with 2 possible rain dates. There should be 7 afternoons of hunting at Hilltop Reservation, starting January 11, with 1 possible rain date. The rain dates would not extend beyond February 29. There will be no

conflicts with holidays.

The 2023-24 overwintering population at Eagle Rock will be 44 deer, which is 37 more than the recommended population of 7 deer for this 0.68 square mile park. However, the spotlight counts since 2018 saw such small numbers of deer that the validity of these numbers is questionable. I am hesitant to recommend a commitment of money and manpower to securing the park and hunting until we have better population data. Though an infrared drone survey scheduled in 2023 had to be cancelled due to an early leaf-out, it is hoped that one can be accomplished in 2024.

Infrared drone surveys should be conducted as soon as possible after the 2024 deer removal concludes. They are more reliable than spotlight counts, and important to determining the success of each harvest and in guiding continued deer removal efforts.

Acknowledgments

Essex County Executive Joseph DiVincenzo is to be commended for continuing the Essex County Deer Management Program in two of Essex County's most significant park properties. He recognizes the perilous future of the ecology of these irreplaceable park resources and is fighting to correct it in the most efficient and effective method possible, despite the objections of some County residents. The Essex County Board of County Commissioners showed that they share the County Executive's concern by voting to allow this program to continue.

The success of the Essex County Deer Management Program is due to the hard work, commitment and cooperation of hundreds of people. Thanks are extended to the staff of the Essex County Department of Parks, Recreation and Cultural Affairs, and in particular its Director, Daniel Salvante, and Tara Casella, Environmental Center Director; the Essex County Sheriff's Department, and in particular Sheriff Armando Fontoura and Sergeant Matthew Krug; and the numerous other Essex County and municipal agencies and offices that contributed to this effort.

The County of Essex extends its thanks to Jodi Powers, Senior Biologist with the New Jersey Division of Fish and Wildlife, for her assistance in the conduct of this program.

The residents of Essex County again owe a great deal of thanks to the hunters who took time away from their families, jobs, and their own personal pursuits to serve voluntarily in a program that is saving the ecology of parks in the Essex County Park System for the enjoyment and benefit of future generations of County residents and visitors.



Joseph N. DiVincenzo, Jr.
County Executive

COUNTY OF ESSEX
DEPARTMENT OF PARKS, RECREATION AND CULTURAL AFFAIRS
115 CLIFTON AVENUE
NEWARK, NEW JERSEY 07104
Phone: 973-268-3500
Fax: 973-481-5302
www.essexcountynj.org

Appendix A



Daniel K. Salvante
Director

2023 DEER MANAGEMENT PROGRAM FOR ESSEX COUNTY, NEW JERSEY

Adopted – August 3, 2022

PROGRAM GUIDELINES

INTRODUCTION

- The South Mountain Reservation encompasses 2047 acres (3.2 square miles) in the Townships of Maplewood, Millburn and West Orange.
- The Hilltop Reservation spans over 200 acres (0.33 square mile) in the Borough of North Caldwell and the Townships of Cedar Grove and Verona.
- Forest ecologists recommend that white-tailed deer populations in Northeast hardwood forests should not exceed a 10 deer per square mile in order to support biodiversity and ecosystem structure and function.
- Browse damage, damage to residential landscaping and the numbers of deer-related motor vehicle accidents indicate that white-tailed deer populations in South Mountain Reservation and the Hilltop Reservation far exceed the recommended density.
- Out of concern for the long-term health of the environment in its largest park properties, the County of Essex began in 2008 to reduce the density of deer.
- Achieving the goal density would curtail over-browsing of native vegetation and allow forest regeneration, minimize browsing of residential landscaping surrounding the County properties, and minimize the incidence of deer-related motor vehicle accidents.
- The County of Essex undertook programs in 2008 through 2020, with the assistance of community-minded licensed hunters with a proficiency in marksmanship, to reduce the population of deer in the South Mountain Reservation, Eagle Rock Reservation and the Hilltop Reservation. A total of 1,774 deer were removed as a result of those efforts.
- In 2023, the County of Essex will continue to reduce the number of deer in the South Mountain Reservation and the Hilltop Reservation.

GENERAL DESCRIPTION OF PROGRAM

- The County of Essex will continue to reduce the size of the South Mountain Reservation deer herd over the course of six (6) half days (afternoons) in January and February, 2023.
- The County of Essex will continue the removal of deer from the Hilltop Reservation over the course of six (6) half days (afternoons) in January, February and March, 2023.
- Such removal will again be accomplished through the efforts of selected agents, shooting over baited sites.
- 14 agents will be selected from among experienced, licensed hunters who can demonstrate a proficiency in marksmanship and some of whom participated in the previous deer management programs conducted in Essex County in 2008 through 2020.
- Agents will take part in this program on a voluntary basis.
- This program is designed to address a problem of population control; it is not intended to provide sport or recreational opportunities.

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ESSEX COUNTY IS AN EQUAL OPPORTUNITY EMPLOYER

PERMITS

- The County of Essex, through its Department of Parks, Recreation and Cultural Affairs, will submit an application for a Special Deer Management Permit to the New Jersey Division of Fish and Wildlife (NJDFW).
- If a permit is granted, the County of Essex will administer and conduct all deer management activities in South Mountain Reservation and the Hilltop Reservation.
- As agents of the County, participants will not be required to purchase hunting season or zone permits.
- Agents selected for this program will be required to purchase a 2023 hunting license prior to participation.
- Specific details of the deer control program may be adjusted as field conditions necessitate while conforming to statutory law and NJDFW policy and maintaining the highest standards of safety.

PROGRAM LENGTH

- The shooting program will occur on Tuesdays in South Mountain Reservation and Thursdays in Hilltop Reservation during the 8-week period starting January 10, 2023 and ending March 2, 2023.
- The program will occur on twelve (12) days only. The schedule includes two (2) rain dates for hunting in South Mountain Reservation and two (2) rain dates for hunting in Hilltop Reservation, to replace days of hunting that might need to be cancelled due to inclement weather.
- There is no limit on the number of deer to be removed.
- The number of agents to be utilized and the number of days of operation are based on a goal to remove 50 deer from South Mountain Reservation and 50 deer from the Hilltop Reservation.
- South Mountain Reservation and the Hilltop Reservation are closed to traditional hunting at all times.

HOURS OF PROGRAM OPERATION

- Agents may be in the field between 12:00 noon and approximately 8:00 pm for each afternoon shift.
- Shooting will occur only during daylight, the hours of which will vary as sunset changes daily.
- Each shift begins with the deployment of agents into the field and ends after all deer taken on that shift have been processed for transport to a butcher.

SELECTION AND QUALIFICATION OF AGENTS

- Applicants must meet the following qualifications:
 - be at least 21 years old;
 - be able to speak and understand the English language;
 - possess a valid New Jersey Firearm Hunting License or All-Around Sportsman License;
 - possess a valid New Jersey Firearm Purchaser Identification Card;
 - have not been convicted of any firearms violation, in any state, in the last 10 years, or of any fish and game code violation in the last 5 years;
 - have at least 5 years successful experience in hunting white-tailed deer with a shotgun;
 - be able to demonstrate an expertise in marksmanship; and
 - be available and willing to contribute voluntary service to the program for a minimum of seven (7) shifts.
- Agent Applications must be returned in person or by mail to the Essex County Dept. of Parks, Recreation and Cultural Affairs, 115 Clifton Ave., Newark, NJ, 07104, by Friday, September 30, 2022 no later than 4:30 PM.
- Applications may be sent via FAX or e-mail, to addresses stated on the application, before the deadline, but the original must follow by mail.
- The 14 agents will be selected in the following manner:
 - Applicants will be divided into two categories – 1.) those who participated as an agent in the Essex County Deer Management Program between 2008 and 2020, and 2.) all new applicants.
 - Applicants in the first category will be evaluated with respect to their hunting proficiency, availability, and adherence to program ethics and objectives.
 - Based on the evaluation and the number of applicants, up to 12 agents will be selected from among the applicants in the first category.
 - The remainder of the available agent positions will be filled with hunters chosen by lottery from the category of new applicants. Essex County residents or those who are employed within Essex County will be given preference in the lottery process.

- All agents will be informed whether or not they have been selected, via telephone call, letter or e-mail.
- All selected agents will be required to pass a marksmanship proficiency test and attend an orientation program on or about October 29, 2022.
- If information about one or more agents is requested by the general public through an Open Public Records Act request, the agents' names, addresses, and other personal identifiers will be redacted by the County of Essex from all requested documentation. The County of Essex has a responsibility and an obligation to safeguard from public access a citizen's personal information with which it has been entrusted when disclosure thereof would violate the citizen's reasonable expectation of privacy.

SCHEDULING OF AGENTS

- Applicants are required to indicate their availability for program activities on the Agent Application.
- A schedule, assigning hunters to a specific park or parks and to particular days and shifts, will be set and distributed to all agents, based on the availability of agents as indicated on their applications.
- The program is scheduled to occur on Tuesdays between January 10 and February 14 at South Mountain Reservation and on Thursdays between January 12 and February 16 at the Hilltop Reservation.
- In the event of inclement weather, as judged by the Director of the Department of Parks, Recreation and Cultural Affairs, program activities may be postponed to February 21 or February 28 for South Mountain Reservation and February 23 or March 2 for Hilltop Reservation.

PUBLIC NOTIFICATION

- The County of Essex will again utilize press releases, signage and mailings to inform the general public of the details of this program.
- All informational signage and documents will clearly state the schedule by which the Deer Management Program will operate for each property.

PROGRAM OPERATION

- Baiting stations will be set up in a multitude of locations throughout South Mountain Reservation and the Hilltop Reservation.
- Baiting stations will be carefully selected to provide the marksman with a clear and open view of the deer.
- Agents must utilize 12 gauge shotguns with telescopic sights, shooting only slugs.
- All shooting will occur from portable tree stands, shooting near or over bait, with hunters positioned on platforms at least 20 feet above the ground. Agents must provide their own stands. The use of ladder stands is not permissible.
- In order to achieve a reduction in population size as quickly as possible, a bias for the taking of deer will be adhered to again, in the following order – injured or sick deer, does, fawns, antlerless bucks, antlered bucks.
- The antlers of any antlered buck harvested will be cut off and retained by the County or destroyed.
- At any one time, up to 14 agents may be deployed into the South Mountain Reservation and 8 in the Hilltop Reservation.
- Agents will not be restricted as to the number of deer each individual can harvest.
- Some park roads and the access drives to some park areas will be closed during program activities.

DISPOSITION OF DEER

- Harvested deer will be transported to a County-operated, NJDFW-supervised check station at a location within a County park where agents will clean the deer and complete reports about the age, sex, and weight of the deer, the disposition of all shots fired, and the number of volunteer man-hours expended.
- All deer will be transported by the County to a NJDOH-approved butcher for processing.
- Any agent who completes at least seven (7) shifts of voluntary service to this program will receive 40 pounds of dressed venison at the conclusion of the program.
- The remainder of the venison will be distributed to the needy and the homeless through the Community Food Bank of New Jersey.

Joseph N. DiVincenzo, Jr., *Essex County Executive*
and the Board of County Commissioners

County of Essex
Office of the Essex County Executive
Hall of Records, Room 405
465 Martin Luther King Jr., Boulevard
Newark, NJ 07102

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ATTENTION

The 2023 Essex County Deer Management Program

will be conducted in

South Mountain Reservation

on Jan. 10, 17, 24, 31; Feb. 7, 14

*If a session is cancelled because of inclement weather,
it will be made up on Feb. 21 or 28*

and Hilltop Reservation

on Jan. 12, 19, 26; Feb. 2, 9, 16

*If a session is cancelled because of inclement weather,
it will be made up on Feb. 23 or March 2*

EXPERIENCED MARKSMEN WILL BE ON SITE

*For Safety Reasons, the Reservations
will be **CLOSED** to the Public*

For Information, Call 973-621-4400



Putting Essex County First



Joseph N. DiVincenzo, Jr., Essex County Executive
and the Board of County Commissioners



2023 Essex County Deer Management Program

For **Safety Reasons**,

South Mountain Reservation will be **closed** on **Jan. 10, 17, 24, 31; Feb. 7, 14**
*(*In the event of inclement weather, make-up days are Feb. 21 & 28)*

Hilltop Reservation will be **closed** on **Jan. 12, 19, 26; Feb. 2, 9, 16**
*(*In the event of inclement weather, make-up days are Feb. 23 & March 2)*

For Information, Call 973-621-4400

<u>January/February 2023</u>						
SUN	MON	TUE	WED	THU	FRI	SAT
8	9	<u>10</u> <u>SMR</u>	11	<u>12</u> <u>HR</u>	13	14
15	16	<u>17</u> <u>SMR</u>	18	<u>19</u> <u>HR</u>	20	21
22	23	<u>24</u> <u>SMR</u>	25	<u>26</u> <u>HR</u>	27	28
29	30	<u>31</u> <u>SMR</u>	1	<u>2</u> <u>HR</u>	3	4

<u>February/March 2023</u>						
SUN	MON	TUE	WED	THU	FRI	SAT
5	6	<u>7</u> <u>SMR</u>	8	<u>9</u> <u>HR</u>	10	11
12	13	<u>14</u> <u>SMR</u>	15	<u>16</u> <u>HR</u>	17	18
19	20	<u>21</u> <u>SMR*</u>	22	<u>23</u> <u>HR*</u>	24	25
26	27	<u>28</u> <u>SMR*</u>	1	<u>2</u> <u>HR*</u>	3	4

SMR – South Mountain Reservation; HR – Hilltop Reservation; * – Make up days if needed

Appendix G

ESSEX COUNTY DEER MANAGEMENT PROGRAM Multi-Year Summary

	Harvest	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total to date
South Mountain Reservation	Shifts:	8.5 days	9 days	6 p.m.'s	3 p.m.'s	4.5 days	3 p.m.'s	3 p.m.'s	3 p.m.'s	5 p.m.'s	2 p.m.'s	5 p.m.'s	6 p.m.'s	6 p.m.'s	0	0	6 p.m.'s	
	Deer:	213	83	44	48	50	43	52	31	75	48	87	101	37	0	0	93	1005
	Fetuses:	147	55	15	26	29	19	22	13	33	34	43	41	18	0	0	49	544
	Total:	360	138	59	74	79	62	74	44	108	82	130	142	55	0	0	142	1549
Eagle Rock Reservation	Shifts:			3.5 days	7 p.m.'s	7 p.m.'s												
	Deer:			19	19	23												61
	Fetuses:			23	13	18												54
	Total:			42	32	41												115
Hilltop Reservation	Shifts:			3.5 days	7 days	7 days	2.5 days	4 p.m.'s	4 p.m.'s	5 p.m.'s	4 p.m.'s	6 p.m.'s	6 p.m.'s	6 p.m.'s	0	0	6 p.m.'s	
	Deer:			97	120	102	61	56	39	79	41	52	99	55	0	0	59	860
	Fetuses:			54	113	52	29	25	20	53	22	30	59	37	0	0	39	533
	Total:			151	233	154	90	81	59	132	63	82	158	92	0	0	98	1393
All properties combined	Deer:	213	83	160	187	175	104	108	70	154	89	139	200	92	0	0	152	1926
	Fetuses:	147	55	92	152	99	48	47	33	86	56	73	100	55	0	0	88	1131
	Total:	360	138	252	339	274	152	155	103	240	145	212	300	147	0	0	240	3057

Post-hunt density	SM	240 #		27	43	38	18	41	24	11	37	47	29	?	21 >	30 >	18	
	ER			42	105	24	15	19	29	20	18	18	29	?	27 >	47	41	
	HT			227	246	145	91	238	231	100	97	204	114	?	76 >	145	145	
		# Estimate based on harvest results					? No count due to COVID					> 2021 drone survey results						

Cost per deer culled	\$	412.00	985.57	617.12	595.02	744.13	593.51	461.75	736.10	486.90	500.89	571.65	521.44	1,044.58	-	-	720.96	642.26
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Venison donated to Community FoodBank	lbs.	8,000	3,000	5,717	4,824	4,572	2,291	2,577	1,668	3,803	1,968	3,439	5,216	2,700	0	0	4,405	54,180
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Number of deer carcasses picked up from County roadways		363	284	233	n/a	185	222	251	272	242	259	249	198	228	231			3,217
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2024 Essex County Deer Management Program Deer Population Estimator

Appendix H

Park	Park size (sq. mi.)	% of view-able area	Pop. Goal at 20/sq. mi.	Pop. Goal at 10/sq. mi.	2022 Spotlight/drone count			Overwinter pop.		2023 Harvest			
					# of deer seen	Est. total deer	Est. density per sq. mi.	Est. total deer	Est. density per sq. mi.	Harvest goal	# of shifts	# of sites	Result
South Mountain	3.2	35%	64	32	81	96	30	118	37	50	6	13	93
Hilltop	0.44	40%	9	4	32	64	145	92	209	50	6	8	59
Eagle Rock	0.68	30%	14	7	8	32	47	43	63	0	0	0	0

Park	Park size (sq. mi.)	Survey area (sq mi)	Pop. Goal at 20/sq. mi.	Pop. Goal at 10/sq. mi.	2023 Spotlight/drone count			Overwinter pop.		Recommended 2024 Harvest			
					# of deer seen	Est. total deer	Est. density per sq. mi.	Est. total deer	Est. density per sq. mi.	Harvest goal @ 20/sq. mi.	Harvest goal @ 10/sq. mi.	# of shifts	# of sites
South Mountain	3.2	5.74	64	32	98	98	18	134	42	70	102	5	14
Hilltop	0.44	1.65	9	4	32	64	145	84	190	75	80	7	8
Eagle Rock	0.68	1.52	14	7	7	28	41	44	65	30	37	4	6

To calculate overwintering population for 2023-2024:			
		Est. total deer - from 2023 spotlight or drone survey	
x	53% @ SM	# of females in population	(48% @ HT) (50% @ ER)
x	68%	# of females pregnant	
x	1.69	births per pregnant deer	
=		# of new births	
+		Est. total deer - from 2023 spotlight or drone survey	
=		Sub-total	
x	85%	Loss to mortality	
=		Estimated 2023-24 overwintering population	

To determine # of hunting days:	
Start with harvest goals @ 10/sq. mi.	
Multiply x # of hours expended last season (increase to account for smaller population)	
Divide by number of hunters/bait sites	
Divide by average afternoon shift (7 hours)	
Result is number of days to hunt.	

All percentages/#'s taken from 2023 season



ANJEC REPORT

Local Environment Matters

AUTUMN 2024

Inside:

- Special section - Protecting NJ's trees in a changing climate
- For the sake of fireflies (and other night fliers)
- Fall EC checklist



Director's Report

10 years of Keep It Green

"There are some who can live without wild things, and some who cannot. These essays are the delights and dilemmas of one who cannot. Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now, we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild and free."

– A Sand County Almanac

Perhaps it is because we live in the most densely populated state in our nation that New Jerseyans have always overwhelmingly supported the preservation of open spaces. The COVID pandemic underscored the vital connection we have with the outdoors and how a regular dose of nature's wild things is essential to our mental, emotional, spiritual and physical health.

At ANJEC, we are thrilled to celebrate two remarkable benchmarks in NJ's commitment to long-term, sustainable funding to protect and preserve farmland, historic places and open space, and to create equitable access to those spaces.

First, the State budget for fiscal year 2025 (July 1, 2024, to June 30, 2025) restored \$60 million in annual funding to environmental programming, specifically \$48 million for farmland, historic and open space preservation, and \$12 million to fund cleanup of hazardous, contaminated sites in communities. Funding for these programs had been reduced on January 1, 2024, when Governor Murphy and the NJ Legislature eliminated the 2.5 percent Corporate Business Tax (CBT) surcharge for New Jersey businesses at the very highest earning level.

ANJEC and leaders from our partner organizations began speaking with legislators last fall about the environmental program cuts that would result from this funding cut.

Governor Murphy and legislators heard us.

As of July 1, the new State budget includes a new 2.5 percent fee on ultra wealthy businesses, those who earn more than \$10 million in annual taxable income. This new fee, dubbed the Corporate Transit Fee (CTF), is a new category of the CBT. Therefore, the environmental programming that has been funded by the CBT is restored. This new funding is retroactive to January 1, 2024, which means no environmental program funding has been lost.

This new funding commitment runs through December 31, 2028, although it will need to be reauthorized annually through the State budget process. ANJEC will continue to be your advocate in Trenton for this funding because it directly supports municipal action to clean up land, create healthier communities and protect and preserve open spaces.

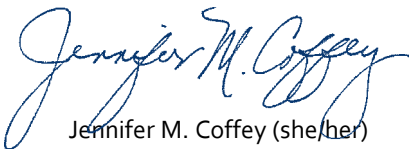
Ten years and counting

Secondly, this November we will celebrate the tenth anniversary of the choice by New Jersey voters to amend our State Constitution to create sustainable funding to preserve open space in the Garden State. Back in November 2014, 66 percent of voters said "yes" on their ballots to create an amendment to the State Constitution that now dedicates 65 percent of the CBT

to open space, farmland and historic preservation.

This funding cannot be used to support other State priorities or fill budget gaps without bringing another constitutional amendment before the voters in an election. ANJEC applauds New Jerseyans for prioritizing their values in our State budget.

ANJEC is a founding member of the New Jersey Keep It Green Coalition (NJKIG), a coalition of more than 150 member organizations who are leading the crusade for funding preservation and stewardship in our State. ANJEC staff have served in several leadership positions with NJKIG, and with your support we'll continue our involvement to benefit municipalities across our great State!



Jennifer M. Coffey (she/her)
Executive Director



ANJECREPORT
Local Environment Matters

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564 MUNICIPALITIES ONE ENVIRONMENT

Executive Director Jennifer M. Coffey
Editor Julie Lange Groth

The mission of ANJEC is to promote local action to protect and restore New Jersey's natural resources and to ensure healthy communities for today and the future. ANJEC advances its mission by engaging in equitable and inclusive practices through leadership, partnerships, education, advocacy for strong public policy, and in support of environmental commissions, public officials, and communities throughout New Jersey.

The *REPORT* welcomes articles and photographs but is not responsible for loss or damage. Opinions expressed by guest authors do not necessarily reflect ANJEC policy. Articles may be reprinted with permission and credit. Please address correspondence to ANJEC *REPORT*, PO Box 157, Mendham, NJ 07945; tel: 973-539-7547. E-mail: info@ANJEC.org. Website: www.anjec.org.

On the cover: *Holiday Lake in Manalapan.*
Photo by Andrew F. Kazmierski

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Bringing back the night

By N. Dini Checko, ANJEC Project Director

Imagine navigating the night just from the light of the stars. For millennia this was possible, but in the recent 25 years, there's been a dramatic increase in artificial outdoor lighting so that 80 percent of people in the US can no longer see the Milky Way.

Princeton University's Office of Sustainability produced a powerful documentary about the importance of dark skies. *Dark Sacred Night* was directed by Jared Flesher and stars Princeton University astrophysicist Gaspar Bakos. Professor Bakos asserts there are simple solutions to bringing back dark skies for human and wildlife health: make outdoor lights dimmer; shield lights so they only shine downward; and use warm-colored lightbulbs.

Professor Bakos defines light pollution as an "inappropriate and excess amount of outdoor lighting." In humans, light pollution has been linked to increases in breast cancer, diabetes and depression. Many species, such as migrating birds, hatching turtles and fireflies have also been affected with alarming rates of decline. For fireflies, these magical beloved bioluminescent beetles, artificial light decreases their ability to observe mating signals, which could impact reproduction and therefore population.

Dark Skies International works to restore darkness to the global population living under a light-polluted nighttime sky. The nonprofit's website *Dark Sky NJ* states: "While its impacts are still being studied and vary widely across species, scientists do know light pollution is affecting how plants grow and reproduce. It disrupts their seasonal rhythms, their ability to sense and react to natural light, and their fragile relationship with pollinators. The more

strained that relationship becomes, the more our food supply may be put in jeopardy. And just one broken link could create unfathomable physiological consequences up and down the food chain."

LEDs can worsen light pollution

The recent increase in light pollution is connected to the inappropriate use of outdoor LED lighting. LED light bulbs have important advantages -- they last longer, use less energy and are brighter than incandescent/CFL lights-but that means we should be using less lighting with proper design that focuses light only where it's needed. Light pollution costs approximately \$3 billion annually in wasted energy.

What can be done about excess outdoor artificial light?

Design

- Illuminate only what you need to see.
- Use energy-efficient bulbs and only as bright as you need.
- Shield light bulbs and direct them downward.
- Use automatic timers or motion sensors to turn on lights only when needed.
- Choose warm light. Just like for humans, blue light can be dangerous for wildlife.

Education

- Raise awareness about the problems with excess artificial light.
- Celebrate the beauty of the night sky. Show the documentary *Dark Sacred Night* and encourage residents to view meteors such as the Perseid Shower.
- Pass a proclamation. The Town of Clinton's proclamation designated April

2-8, 2024, as International Dark Sky Week. Reach out to info@anjec.org for sample proclamation language.

- Use apps such as BirdCast to help birds as they migrate through the night. Birds get disoriented by artificial light and, sadly, many die. An estimated 365 to 988 million birds die in collisions with buildings annually, including several species of high conservation concern. Use BirdCast to monitor nocturnal migration activity and, when you know birds are passing through your town, encourage "lights out."

Legislation

1. Pass an ordinance with strong outdoor lighting standards, such as Hopewell Township's (<https://ecode360.com/36110083>). The Town of Clinton, under the leadership of Councilman John Kashwick, is working to pass an ordinance that could serve as a good model.

"Excessive artificial light at night disrupts wildlife, impacts human health by disturbing sleep and circadian rhythms, and deprives our children from seeing the night sky," Kashwick explains. "In response to resident complaints about light pollution, I plan to introduce an ordinance in the Town

of Clinton later this year to mitigate its effects and reduce light trespass."

2. Support the passage of State bill A2196/S1610, which requires that outdoor lighting fixtures installed or replaced by, or on behalf of the State, or at projects receiving State funds, to meet certain criteria.

Simple, commonsense solutions can help bring back our dark skies. Each night, the universe offers us a spectacle of infinite beauty. By reducing light pollution, we preserve its beauty, wonder and peace.

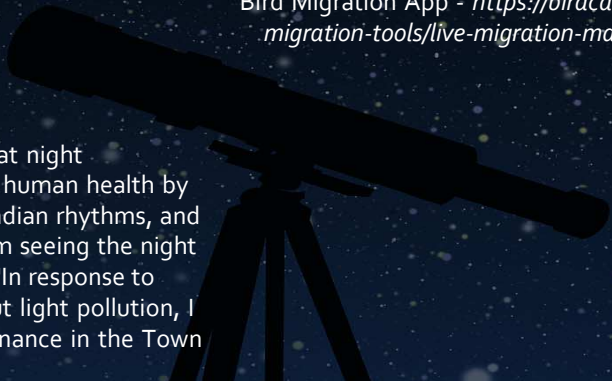
Sources:

Dark Scared Night documentary -

www.youtube.com/watch?v=FWoWZX75Nmo

Dark Sky NJ - www.astra-nj.com/darksky-new-jersey

Bird Migration App - <https://birdcast.info/migration-tools/live-migration-maps/> 



Protecting the night sky starts with YOU!

- 1 Light only what you need



- 2 Use energy efficient bulbs and only as bright as you need



- 3 Shield lights and direct them down



- 4 Only use light when you need it



- 5 Choose warm white light bulbs



- 6 Join Darksky.org





By **Rayna Laiosa**, Chair, Hawthorne Environmental Commission/Green Team;
Greg Poff, Township Manager, Randolph Township;
Michele Gaynor, ANJEC Resource Center;
and **Julie Lange Groth**, ANJEC Report Editor

Hawthorne applauds environmental leadership



Upcycle Fashion displayed at Hawthorne's 32nd Cel-Earth-Bratton event held in April. From left, Natali Saleh; Rayna Laiosa, EC/Green Team Chair; Saja Alhoms; Mayor John V Lane, Borough of Hawthorne; Mary Mahon, Hawthorne EC Vice Chair; and Teacher Theresa DiGeronimo

Photo by Rayna Laiosa

"Think Globally, Act Locally" was the theme of a June presentation by Hawthorne students to the town's Environmental Commission (EC) showcasing their environmental projects. Certain local businesses and residents also received special recognition for their leadership and commitment to protecting and preserving the community's natural resources.

The EC reviewed highlights of their 32nd Cel-Earth-Bratton event held in April, where first prize winner Maggie Giacchetti, a third grader from Jefferson Elementary School, presented her project "Explore Hawthorne Places." Hawthorne High School STEM students Ryan Corella, Joshua Duran, Nathan Gaehring, Jacob Hernandez and Medrit Velu also presented their project "DownSpout Dynamo," in which the

students sought to test the viability of "gutter power" as a sustainable energy source by placing a hydroelectric converter inside a rain downspout to transfer water-powered energy to a storage battery. The team was coached by math teacher Michele Phibbs and library media specialist Theresa DiGeronimo and was mentored by volunteers from New Era Engineering, Rayna Laiosa from the Hawthorne EC and STEAM Tank subject matter experts. The students earned second place in the statewide NJ School Board Association's STEAM Tank Challenge, earning their school \$1,500.

Students Saja Alhoms, Blake Preiskines, Natali Saleh, Rowyn Simmermon and Emma Damstra presented their "Upcycle Fashion Dress," created with old SAT

practice booklets, a discarded book, leftover promotional flyers and an old mannequin.

Lastly, Brianna Counsellor, David Salazar, Logan Sakir and Benedetto Russo were recognized for winning first place and a scholarship for their Species on the Edge 2.0 high school learning challenge entry about the black skimmer, a distinctive coastal waterbird.

Colour & Whim Studio received the 2024 Green Businesses of Hawthorne award. The firm utilizes low VOC paint, teaches students how to make crafts out of recycled materials and recycles paper, cans and plastics. Citizens John Minicozzi, Paul Whelan and Rita Pinelli were recognized for their partnership with the EC.

– Rayna Laiosa

Guidebook lays foundation for environmental protection

The Randolph Township Environmental Guidebook (RTEG) is a living document, subject to annual review, that contains information about contributors to climate change and environmental degradation. It also details projects and strategies that can be implemented locally to create positive and measurable change.

Designed to be used at different scales, from municipal leadership to volunteer groups, the RTEG is overseen by the Environmental and Landmark Committee and was developed in consultation with Pinto Consulting, LLC, and funded by the NJ Highlands Council. The comprehensive resource contains detailed recommendations for 49 projects across 11 action categories, from air quality to open space to water.

- Key visions and goals include:
- Enhancing sustainability and resilience – adopting sustainable practices to prepare for environmental challenges.
 - Fostering collaborative partnerships – collaborating with local departments,

schools, and organizations to promote sustainability.

- Protecting sensitive areas – conserving natural habitats to maintain biodiversity;
- Advancing clean energy use – transitioning to cleaner energy sources to reduce our carbon footprint;
- Green infrastructure for stormwater management – utilizing innovative solutions to manage stormwater and reduce impact.
- Community engagement and education – creating informed citizens committed to environmental health;
- Improving air and water quality – implementing initiatives to benefit environmental and public health;
- Boosting recycling and waste reduction – enhancing waste management to decrease environmental impact.

The Environmental and Landmark Committee and the Township are proud to share the RTEG with the community as a collaboration between residents and the municipal government, which is essential for reaching shared goals of sustainability, environmental stewardship and resiliency.

Find the RTEG at <https://tinyurl.com/52375ysy>

– Greg Poff

Hoboken is disposing of disposables

Hoboken has joined the small but growing ranks of NJ municipalities that have enacted Skip the Stuff ordinances restricting restaurants from automatically handing out plastic cutlery and single-use condiments with takeout and delivery orders. The City Council unanimously approved the measure in June as part of an effort to reduce single-use plastic waste. The law stipulates that restaurants may only include items like plastic utensils and condiment packets in deliveries if customers specifically request them.

In March Red Bank and Garwood passed similar ordinances, but the real pioneers of stuff-skipping laws took action years ago. Red Bank included limits on disposable

utensils in the municipality's plastic bag ban instituted in 2019. And in 2018, Stone Harbor and Avalon passed laws prohibiting disposable plastic cutlery. Camden County began its ban on plastic utensils, stirrers, polystyrene food containers and single-serve disposable plastic water bottles at county facilities and county-sponsored events in 2020. — Julie Lange Groth

Parsippany screens *American River* film

The Parsippany Environmental Advisory Committee together with the Parsippany Green Team and Wildlife Preserves, a nonprofit land conservation corporation, hosted a free screening of the award-winning film *American River*, which documents the history of the Passaic River.

The May screening brought 80 people together on a Saturday at the town library to learn about the sordid history of this infamous river. The Passaic, which starts from a pond in Mendham, travels through

eight counties before ending up in Newark Bay. Parsippany sits in the Passaic River Basin and has the Whippany River and Rockaway River running through the Township.

The documentary, produced by Scott Morris, chronicles the adventures of Mary Bruno and her guide Carl Alderson on the Passaic River. Bruno, author of the book, *An American River: From Paradise to Superfund*, is also a journalist and biologist. The pair set out by kayak on a four-day, 80-mile journey starting along a quiet, tree-lined stream in Morris County and carrying them along many diverse habitats to the industrial, contaminated waters in Newark Bay.

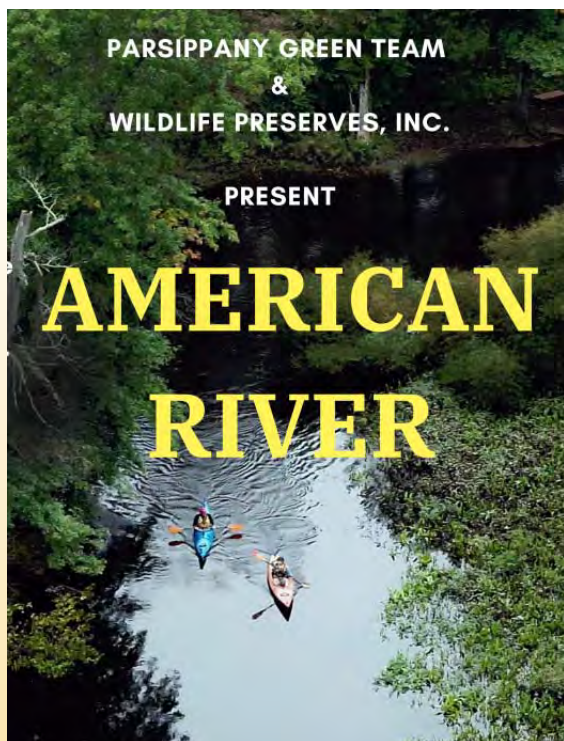
In the film Bruno talks about her childhood growing up near the polluted section of the River in North Arlington as she sets out to discover what has become of the River since her youth.

Pastor John Algera, who runs a company called Urban Wilderness Renewal that conducts paddling expeditions on the Passaic River, spoke at the screening, about his experiences taking kayakers out on the River.

Consensus about the film was very positive, with residents walking away with an appreciation and understanding of this exploited water body. They were also left with hope knowing that the federal Environmental Protection Agency has recently approved a final cleanup of the lower 8.3 miles of the River.

For more information on the *American River* documentary, visit www.americanriver.film/.

— Michele Gaynor



Poster for *American River* film

2024 ANJEC Lechner Scholarship winner

By **Georgia Madiba**, ANJEC Membership Manager

The 2024 recipient of ANJEC's Lechner Scholarship is Nicholas Guerriero of Surf City, located on Long Beach Island. Nicholas completed high school at the Marine Academy of Technology and Environmental Science (MATES), a specialized school focused on marine and environmental science. Guerriero is a junior at Stockton University pursuing a degree in environmental science with a concentration in soil science and hydrology. His commitment to preserving and improving New Jersey's natural resources, particularly the coastal waters, is demonstrated by his work beyond the university.

Guerriero's hands-on experience with shellfish began at MATES while volunteering on research projects with ReClam the Bay, a nonprofit cultivating and nurturing baby clams and oysters in the Barnegat Bay Watershed's ecosystem in southern New Jersey. He currently works at the Barnegat Oyster Collective, a farm-to-table shellfish aquaculture organization comprised of independent oyster farms in the Garden State. Guerriero manages the nursery and caters the raw bar at special events while informing partygoers on the sustainable practices employed at the Collective. He has also served as the Kayak Eco-Tours program manager and sole guide for Bayview Harbor Marina, where he has educated and guided groups around salt marsh areas, emphasizing the importance of ecosystem preservation and conservation.

ANJEC is impressed by Guerriero's ability to juggle his work (both volunteer and paid) along with his college studies. After university, he is considering a job as a New Jersey conservation officer, or pursuing his passion: shellfish.

ANJEC awards this scholarship biannually to rising college juniors and seniors in memory of conservationist Hermia Lechner to honor her commitment to the preservation of open space and natural resources in New Jersey. 🌊



A third generation fisherman and clammer, Nicholas is in his element in the coastal waters of New Jersey.

Enviros laud new rules proposal



On Aug. 6 ANJEC joined the NJ Sierra Club, the New Jersey League of Conservation Voters, The Watershed Institute, local first responders, and more in Asbury Park in support of the long-awaited NJ PACT REAL rule package being proposed in the New Jersey Register. The proposed land use rules will modernize regulations by requiring that all new development and redevelopment improve resilience to climate change.

This crucial step will help NJ protect against rising sea levels, intense storms and flooding. With projections showing up to 5.1 feet of sea-level rise by 2100, these rules are vital for safeguarding homes, communities and coastal habitats.

"Using scientific data to inform land use

regulations and change the way and places we build to reflect the climate change impacts that are happening will make us more resilient," said ANJEC Executive Director Jennifer Coffey at the event. "We need to become both stronger and smarter than future storms. We need the NJ Department of Environmental Protection (DEP) to adopt these rules quickly."

The 90-day public comment period for the NJPACT REAL rules is currently open, and three public hearings are scheduled through September. The DEP has one year from the date of proposal publication to adopt the rules.

Big thanks to the DEP and Governor Murphy for advancing this important initiative. 

From left: Chris Sotiro, Policy and Program Coordinator, NJ Future; Anjuli Ramos, Sierra Club Executive Director; Jennifer Coffey, ANJEC Executive Director; Ed Potonak, NJLCV Executive Director and Franklin Township (Somerset) Deputy Mayor; Lucia Osbourne, Delaware Bayshore Program Director, American Littoral Society; Bill Kibler, emergency responder and Raritan Headwaters Director of Policy; Miracle Brown, PPA intern; Richard Lawton, NJ Sustainable Business Council; Elliott Ruga, Policy and Communications Director, NJ Highlands Coalition; Executive Director Jim Waltman, Watershed Institute Credit Taylor McFarland Photography





Protecting NJ's trees in a changing climate

Trees under threat... what we can do about it

By **Matthew G. Olson**, Assistant Professor,
Environmental Science Program – Forestry School
of Natural Sciences & Mathematics, Stockton
University

Few organisms inspire us quite like trees. Whether it's a massive white pine emerging above the main canopy of a mature forest or a contorted Japanese maple basking in the full sunlight of a landscaped park, trees never cease to draw our attention and amazement. Beyond their awe-inspiring size and magnificence, these mammoths of the plant world also provide numerous beneficial services to ecosystems and society.

Now more than ever people are recognizing the many benefits of trees and forests, including their role in helping us adapt to human-caused climate change. These climate adaptation benefits range from tree shade lowering home energy usage and costs to the role of forests in mitigating climate change more directly via greenhouse gas capture and storage. Maintaining native tree cover can also aid other species in coping with extreme weather and a warming climate. Simply put... trees work for all.

Humans have long benefited from the ecological services provided by trees. For most of our shared history with trees, we have derived these

*Matthew Olson in the Pisgah National Forest
in North Carolina*

benefits without having to concern ourselves with protecting and regenerating trees. However, our population growth and appetite for natural resources have forced us to develop and adopt sustainable land management practices (e.g., forestry). As human-driven global changes continue to unfold, trees are increasingly dependent on humans for survival and persistence. Some of the more insidious factors limiting trees include high deer densities and chronic over-browsing, expanding invasive species populations, altered disturbance regimes, and anthropogenic climate change and extreme weather. Nowhere are these threats more pronounced than in our urban, suburban, and exurban landscapes.

Mid-Atlantic region acutely vulnerable

Recent ecological investigations have signaled a reduced capacity of eastern US forests to sustain the recruitment and eventual overstory ascension of native tree species. In particular, the Mid-Atlantic region was highlighted as acutely vulnerable to tree and forest regeneration failure. Chronic over-browsing from deer and detrimental interactions with invasive species are widely cited as primary culprits. Furthermore, a let-be strategy of benign neglect and passive management has greatly exacerbated this issue. The loss of tree and forest cover are the logical consequences of insufficient canopy tree replacement.

Here's the good news – a range of tools in the applied ecology toolbox can help trees overcome these limiting factors, including the need for periodic monitoring and evaluation to ensure interventions are effective and timely. Here are a few

approaches to consider when trying to help our trees regenerate and persist near forest edges and within forest fragments.

Protection from deer -- Juvenile trees may need to be protected until their terminal shoots grow above the reach of deer (up to two meters). Chemical deterrents can limit deer impact, but deer repellents require re-application to maintain their effectiveness, sometimes as frequent as every four weeks. Physical barriers like fences and individual tree protectors (tubes and cages) can offer a longer window of protection, but the cost may be prohibitive, especially installing a high fence to enclose a large area. Individual tree protectors are often deployed to protect planted nursery-grown seedlings, affording an opportunity to establish desirable species and provenances (i.e., specific genetic sources procured within a species' range).



*A planted willow oak
emerging out of a 5-ft tree
tube in a natural canopy
opening in a Stockton
University forest*

One cost-effective approach recommended for sustaining desirable species, such as the oaks, is combining (a.k.a., supplemental planting) with tree protectors. These plantings could be concentrated in parts of a stand with the greatest potential for regeneration success such as within or on the edge of natural canopy gaps. However, natural gaps may need a site preparation "cleaning" to remove undesirable vegetation and, if small, may need to be expanded to enhance planted tree recruitment. More recently, enrichment planting has also been touted as a climate adaptation practice for introducing species adapted to projected future climate.

Controlling invasive plant species – Invasive plant species can outcompete juvenile native trees, but they can be controlled by a variety of methods. Although herbicides are generally regarded as the most effective,

methods can be combined to reduce invasive plant abundance more sustainably. For example, either a mechanical treatment (e.g., forestry mower) or a prescribed burn followed up with a spot application of herbicide to treat low growing sprouts can be effective in controlling undesirable woody plants.

For millennia, our ancestors have intentionally shaped landscapes to support their life ways and traditions. Now society must recognize and embrace deliberate human interventions to help sustain ecological systems and their healthy functioning as "natural." This includes actions to facilitate tree regeneration and recruitment in the patchy forests of our more built landscapes.

For more information on forest regeneration challenges and management, check out this online article from Penn State Extension: <https://tinyurl.com/3pjr2fcd>. 

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Tree ordinances protect water, climate and more

By **Michael L. Pisauro, Jr., Esq.**, Policy Director,
The Watershed Institute

Time and time again, we cut down our trees and are surprised when things change. Areas that never were flooded or wet are "surprisingly" wet and flooded repeatedly. We remove trees from along our streams and are surprised when the banks start to erode and the water becomes cloudy and warm. Our once cool homes that benefited from the shade are now warmer and our air conditioners must work harder to keep us cool. Our electricity bills increase as a result. Birds no longer grace our yards and neighborhoods. All of

this because we cut down "just" a tree. Trees are more than the lumber they may provide. Recognizing the benefits that trees add to the environment and all of us, the NJ Department of Environmental Protection (DEP) added tree protection to its new Municipal Separate Stormwater Sewer Permit (MS4). This permit requirement is not a new idea, and many municipalities have tree protection ordinances in place already. The MS4 permit merely reinforces the many benefits of trees to water quality and quantity.



Trees help prevent flooding (September 2, 2021: flooding in New Brunswick after Hurricane Ida).

Photo by Sarah J Lee

The roots of the trees hold onto soil thus reducing soil erosion. Trees absorb water and help it penetrate the ground through the roots. The branches and leaves of trees intercept rainfall, slowing its descent and reducing its force, thus reducing erosion. Because trees can mitigate the amount of runoff from a property, they help ensure less and cleaner water enter our waterways, reducing water quality issues and flooding. There are useful calculators that help quantify these benefits, like the Arbor Day Foundation's National Tree Benefit Calculator (<https://www.arborday.org/calculator/>). The reason to reduce flooding is obvious – flooding impacts all of us, costing lives, damage to property, longer commutes, lost income due to business closure, etc.

How about water quality? NJ's waters need help. According to the most recent assessment of New Jersey's water bodies, only 20 percent of the monitored waters are healthy enough for aquatic life, only 28 percent meet the standards for water supply and only 25 percent meet the standards for primary contact recreation. The federal *Clean Water Act* required NJ to restore its waters to achieve standards by 1983, and the State also set a goal of improving and restoring water quality in its *Water Pollution Control Act*.

Tree ordinances help protect water quality

A significant cause of our water pollution is how we manage our land. Development

Cherry Hill enacts tough but fair tree ordinance

By **Hana Katz**, ANJEC Policy and Project Manager

In June 2022, the Cherry Hill Council voted unanimously to adopt a new tree ordinance.

It has been crafted to reflect the Township's dedication to maintaining its tree canopy and exceeding the requirements of the DEP's tree ordinance. So, what makes this ordinance work for this growing city? I interviewed Cherry Hill's Municipal Attorney and Director of Law Cosmas Diamantis to find out. Here's what I got from our insightful conversation.

Besides thoughtful policy planning, a good tree ordinance can be created and implemented based on the pillars of community, education and enforcement. American Forests, a nonprofit dedicated to protecting and restoring healthy forest ecosystems, gave Cherry Hill a Tree Equity Score of 87/100 prior to the implementation of the tree ordinance, and 91/100

afterwards, which is based on ideal canopy and tree amount.

Cherry Hill's tree ordinance requires a permit for every tree removal, which is granted after municipal inspection. This process ensures that any removal on private or public property is justifiable, balancing development needs with environmental stewardship.

The Township's departments and Mayor David Fleisher work together proactively to uphold this ordinance, with administration, communications, public works, engineering and zoning all collaborating. The municipality educates the public and businesses, including approximately 150 tree companies, about the ordinance, ensuring they understand the regulations and consequences of noncompliance. They do this through multiple communication channels, updating the website regularly,

causes increased volumes of water and pollutants to flow from our properties into our waterways. This is true even if the development fully meets the stormwater management requirements. Therefore, taking simple measures to reduce, clean and slow runoff is important. Trees help meet these goals.

To help municipalities comply with MS4 requirements, the DEP has created a model ordinance that features several components:

- protection of trees 6" inches in diameter at breast height (DBH) or 2.5 inches DBH for street trees;
- a formula for required replacement of trees;
- the ability to pay into a tree fund if it is not appropriate to replant on site. That

- money is then used by the municipality for new trees;
- enforcement and penalties.

Consider the model ordinance a starting point

The DEP's ordinance is a bare bones model that is ripe for enhancements. Some possible areas for enhancement include:

- Consider protecting trees that are smaller than 6 inches – or 2.5 inches for street trees.
- The ratio for replacement trees could be improved. The model ordinance only requires replacement of a tree of 6 inches to 12.99 inches DBH with one 1.5-inch tree. It will take many years, if not decades, for the benefits of a 10-inch tree

posting updates on social media, and publishing weekly newsletters and quarterly community magazines. This proactive approach has led to a decrease in violations as citizens and local removal contractors become more aware of the rules.

The ordinance is also focused on ecological benefits, distinguishing between deciduous and evergreen trees, and encouraging the planting of species that provide optimal environmental benefits for the target area.

Enforcement is key

The Township has strengthened enforcement to prevent unauthorized tree cutting by private companies. The enforcement team, comprised of a full-time inspector, zoning enforcement officers and additional support staff, works diligently to monitor and investigate violations. Violations carry significant penalties, including fines ranging from \$100 to \$1,250, plus restitution payments to the Cherry Hill Tree Fund. The tree ordinance requires tree removal applicants to pay a \$300 contribution to



to be replenished by one 1.5- inch DBH tree. If the goal is to reduce erosion and improve water quality, shouldn't the ordinance require more trees to be planted?

- Maybe the ordinance should require larger trees to be planted as replacements. This would increase the benefits provided by the replacement tree.

The model ordinance also provides multiple exceptions. For example, it stipulates that up to four trees per acre could be removed over a five-year period without replacement. This runs counter to the entire reason for the model ordinance.

These and other enhancements should be considered. Educating the community is just as important as the enhancements.

Municipalities, watershed organizations and other environmental advocates need to make sure people understand the reasons we are protecting trees. The better people understand the issues, the more likely they will be to become part of the solution.

To quote the Once-ler in *The Lorax* by Dr. Seuss: "UNLESS someone like you cares a whole awful lot, nothing is going to get better." 🌱

the Cherry Hill Tree Fund for each healthy or poor condition tree removed that can't be replaced. That means if a commercial applicant wants to remove 20 healthy trees and replant 10 on site, they must contribute \$3,000 to the fund.

The ordinance also applies to homeowners who remove more than three healthy trees. If someone removes a tree without a tree removal permit, they must either submit a tree replacement plan to the DPW or pay \$300 per tree. This fund is then dedicated to tree

planting and maintenance projects with the goal of enhancing the township's tree canopy.

Because multiple stakeholder meetings were held to gather residents' input on the ordinance, and because residents are well informed on the rules, there is little to no resistance to upholding it. The public frequently participates in enforcement as well, reporting unauthorized tree removal to the town.

Most importantly, the township officials are willing to update their policies and learn ways to make environmental sustainability more effective. The Township's strategic and collaborative approach serves as a model for balancing development with environmental conservation, demonstrating that growth and sustainability can go hand in hand when all parties work together toward a common goal.

Cherry Hill's tree ordinance may be found at <https://tinyurl.com/bazvbw2d>. 🌱



Music under the stars in leafy Cherry Hill
Courtesy of Cherry Hill website

How tree species are affected by climate change

By Frank Gallagher, Ph.D.*



In December 16, 1773, the Boston Tea Party became the recognized event in the revolt against British taxation and catalyst for the American Revolution. Lesser known, but of equal if not greater significance, was the seizure of the colonies' largest trees by King George I. With most of the forests of the British Isles harvested many times over by the 17th Century, England was forced to look elsewhere for timber. In particular, the majestic white pine trees, used in many aspects of construction, were marked by surveyors with three hatchet slashes known as the King's Broad Arrow, claiming them as property of the Royal Navy. The White Pine Riot was an armed conflict that occurred when a warrant was being served to a colonist using marked trees just prior to the Boston Tea Party. The outline of the white pine became a symbol of the American Revolution and adorned many revolutionary war flags, including those flown at the battle of Bunker Hill. While our reliance on trees has always been strong, both economically and socially, their future during this era of climate change is uncertain.

The warming climate is undoubtedly facilitating a shift in the range of many tree species to more northern latitudes and higher elevations. The USDA Forest Service has predicted a northern march of the northeastern forest communities, such as those dominated by loblolly pine and some oaks and hickories, by up to four degrees by the end of the century, while the more northern assemblages of black spruce, balsam fir, northern white cedar and red spruce will significantly decrease their

range. Such generalizations provide a solid contextual understanding at a large scale, but decision making that considers conditions at the site and species level becomes more nuanced.

The gray birch (*Betula populifolia*), for example, is an early colonizer of disturbed sites with a broad tolerance in both hydrologic and edaphic conditions. We have studied this species in an abandoned railyard within Jersey City since the early 1990's and have looked at its distribution, production, and growth in relationship to the area's metal-contaminated soils. An amazingly resilient species, the gray birch dominated much of the site for the past thirty years. Tolerant of high soil metals, it was found to colonize the site earlier than expected and appears to be resilient despite disturbances such as Superstorm Sandy. In fact, while the forest canopy of the site lost density because of the physical stress of the storm, it recovered quickly. Ten years later, the forest covers a larger area with greater canopy density than it did before the storm.

Red pine (*Pinus resinosa*), on the other hand, is a northeastern species that naturally occurs just north of New Jersey into Canada and throughout the Great Lakes Region. Prized as a fast-growing tree used for timber production, the Civilian Conservation Corps (CCC) planted it in many areas along or close to the Appalachian Mountain range. Remnants of Roosevelt's New Deal, many red pine stands in New Jersey were planted by the CCC to help put people to work and "improve" timber production during the Great Depression.

We studied the growth rates of one stand in Stokes State Forest, within the New Jersey School of Conservation. Interestingly, while these trees exhibited normal growth trajectories for approximately 50 years, growth rates began to decrease around 1980, which was especially evident during the past decade, the hottest on record. While these data are early and the study is incomplete, the trend appears solid and easily interpreted. Despite its significant historic legacy in New Jersey, planting or replanting red pine is not advisable.

While forests are resilient and there will always be some type of forest here in NJ, their distribution and composition are changing. This change is extremely rapid on a natural time scale. As we look to enhance NJ's Forest resource, two general recommendations appear obvious:

- Since climatic conditions are unpredictable, species with a broad niche will adapt more easily.
- Species that are currently at the northern end of their distribution range should be preferred over species that are at the southern end of their range.

Applying such general rules to the already complex set of criteria for siting a tree can be confusing, however. For example, while the spotted lanternfly (*Lycorma delicatula*) prefers the Tree of Heaven, it will attack many species, including black walnut, butternut, river birch, willow, sumac and silver and red maple. It does not appear to like oak. A swamp white oak (*Quercus bicolor*), with its broad range and general tolerance to the spotted lanternfly, would be a better choice for a lowland situation or floodplain than the

traditional red maple in infected areas. Similarly, both green and white ash (*Fraxinus pennsylvanica* and *F. americana*) have been severely impacted by the emerald ash borer. Morphologically similar species with broad ranges might include locust (*Valerianella locusta* (L.) Lat.) and the Kentucky coffeetree (*Gymnocladus Dioicus*).

It's time to experiment, selecting trees for the future with an open mind. The tree that failed, failed for a reason. Move on; try something different.

**Frank Gallagher Ph.D. is an Associate Professor of Professional Practice at Rutgers, the State University of NJ. He serves as the Director of the Environmental Planning Program within the Department of Landscape Architecture and the Director of Research for the New Jersey School of Conservation.*



Red pine stand planted by the Civilian Conservation Corps in Stokes State Forest



Joyce Kilmer's famous poem "Trees" is said to have been inspired by a white oak tree on the Douglass Campus of Rutgers University that was ceremoniously cut down in 1963. At an estimated age of 175 years, it stood 68 feet tall with a trunk 54 inches thick.



Kilmer's poem "Trees" was believed to have been written at his family home in Mahwah.

Photo by Alex Michelini , Creative Commons



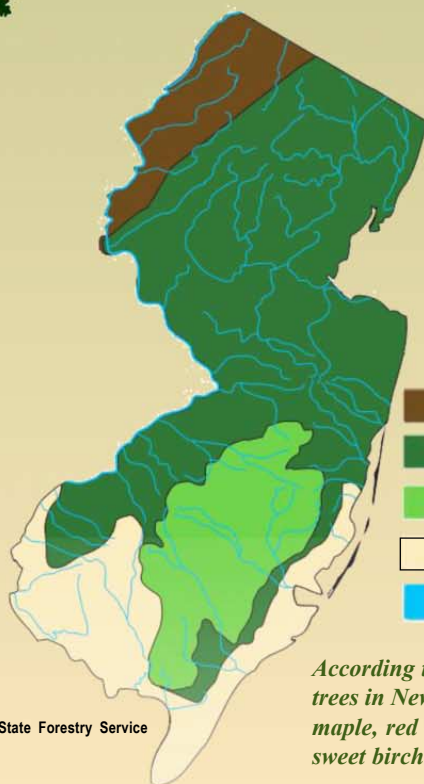
The red oak is



Duke Farms is home to four of the ten oldest trees in New Jersey and ten state-listed Champion Trees, including the largest specimens of Amur cork tree, dwarf southern catalpa and common persimmon as well as the second largest northern red oak.



NJ's state tree.



NJ State Forestry Service

New Jersey Forest Types

- Northern Hardwood
- Oak Hickory
- Pitch-shortleaf Pine
- Oak-Pine
- Mixed Lowland Forest
riparian forests along major rivers

According to NJ.gov, the most common trees in New Jersey are the sugar maple, red maple, beech, yellow birch, sweet birch and red oak.

Growing stronger:

The advantages of the NJ Urban and Community Forestry Program

By **Randi K. Rothmel**, ANJEC Project Director

Urban forestry involves the planting, maintenance, care and protection of tree populations in an urban setting. Urban forests make up a significant amount of America's tree canopy and these trees provide essential benefits for humans and habitat for urban wildlife. Trees located in home landscapes, schoolyards, parks and greenbelts, cemeteries, and along streams, streets and utility rights-of-way are all part of the urban community forest. It is an ecological network combining natural and built environments.



Cherry trees in Branch Brook Park, Newark Photo by E Koppel

How do urban and community forestry programs help?

Urban and community forestry programs ensure more livable communities through the care and management of trees. Neglected urban trees, especially along streets, can decline in health and become a liability with reduced life spans. But with proper care, trees live longer, look better and increase in value as they age.

The New Jersey Urban and Community Forestry Program (NJUCF) provides creative

solutions to help local governments create and maintain programs for managing and preserving their tree resources. This statewide program is authorized by the *NJ Shade Tree and Community Forestry Assistance Act (NJSA 13:1L-17.1 et seq.)*.

How can local governments participate in the program?

Municipalities and county governments can become accredited with the NJUCF program by satisfying these requirements:

- Prepare a Stewardship Plan for Urban Trees and Forests, approved by the State Forester.
- Have two representatives (one municipal employee and one volunteer) complete the NJUCF core training.

- Complete an annual accomplishment report. To maintain NJUCF accreditation a local government must:
- Update their plan every five years.
- Maintain core training of at least two active representatives.
- Earn eight or more continuing educational units by at least two individuals.
- Submit an annual accomplishment report.

Benefits of accreditation

The NJUCF program provides grants for the development and implementation of a municipal Urban and Community Forest Management Plan. Accreditation in the program also provides a basis for local governments to reduce or eliminate liability associated with local tree care programs and shade tree commissions. A healthy, safe and resilient urban and community forest can provide environmental, economic and social benefits now and for generations to come.

NJ Forest Stewardship Task Force

The NJ Forest Stewardship Task Force was formed in 2022 to identify actions that the State Legislature should consider to better protect and manage NJ public forestlands. Some of the recommendations in their 2023 report (<https://shorturl.at/LaBjd>) include:

- Conduct statewide planning and mapping of forested public lands.
- Commence a rulemaking process for development of forest management plans and provide interim guidelines for forest management plans.
- Identify areas where active management is needed to promote future carbon sequestration, maintain biodiversity and address threats to ecological health.
- Identify areas where afforestation and reforestation should occur.
- Amplify efforts to address invasive species.
- Measure and reduce deer densities.
- Continue to use fire as an important management tool.
- Protect and manage public forestland to maintain and enhance carbon sequestration and storage to advance climate goals. 

More information about the NJUCF program can be found at <https://tinyurl.com/584x6ayy>. 

Fall is a time for thinking forward

By Julie Lange Groth, ANJEC Report Editor

When autumn leaves begin to fall, many Environmental Commissions (ECs) hold fall stream cleanups or host fall festivals. In addition to finishing up 2024 projects, ECs should also be planning for 2025. As the year draws to a close, it's a good time to reflect on what's working well and should be continued, how your commission can be

more effective and whether you need to recruit new commission members for appointment in the coming year.

Setting goals for 2025

As you contemplate new projects you'd like to tackle in the New Year, first take *continued, on next page*

stock of 2024 objectives that still need to be accomplished. Where does your town stand on required compliance with the new Inland Flood Hazard Rules and Municipal Separate Storm Sewer (MS4) permits?

While you're discussing stormwater issues and shrinking resources with local officials anyway, why not advocate for adoption of a stormwater utility in your town? It provides a funding stream that places a proportionate responsibility for stormwater management costs on those who generate the most runoff.

Also think about potential new ordinances that could benefit your community and how to grease the skids among officials and residents through communication efforts. Examples include ordinances to protect trees, restrict use of gas-powered leaf blowers, outlaw invasive species and encourage green building.

Is your town ready to tackle food waste composting? Are there preserved open spaces or trails that need attention, or newly available properties that could be acquired as open space, especially in environmentally overburdened, underserved communities? Now is the time to plan for such projects.

Follow the money

Think about what support and resources you'll need to accomplish 2025 goals. If your town operates on a calendar-year basis (rather than a fiscal year), municipal officials will be putting the annual budget together in the fall, so you'll need to submit your EC budget. In addition to any projects your commission will need funding for, be sure your budget includes ANJEC membership dues and fees for your members to attend the annual ANJEC Environmental Congress. And start looking for grants to support your plans, including ANJEC's Open Space Stewardship grants (see page 25).

Prepare your annual report

Autumn is also a good time to start writing your annual report highlighting all

your accomplishments for 2024. Because your audience for this report is municipal officials as well as the community at large, emphasize how your efforts helped the town conserve resources, protect public health and improve quality of life. Also consider how you'll publicize your annual report. Besides presenting it at a Council meeting, many ECs post it on the municipal website and social media. Be sure to also share it with local news media.

The Morris Township Environmental Commission's 2023 Annual Report is a good example of a well-organized document with charts that put their efforts in context and colorful pictures that add liveliness. It's posted on the town website at <https://tinyurl.com/m5edb5tw>.

The Princeton EC's 2023 Annual Report is organized around the Commission's goals. It not only memorializes the EC's recommendations on development proposals but also discloses member attendance at EC meetings. In addition, the Report lists goals for the upcoming year. <https://tinyurl.com/2r7dehts>

The Kingwood Township EC's Annual Report is formatted like a newsletter and emphasizes how the EC collaborated with other municipal departments and organizations to accomplish its goals. It also provides information and resources for residents on important rural issues like well testing and septic system pumping. <https://tinyurl.com/4f2sshfj>

ANJEC can help

To make autumn the climax of a great year and the beginning of a promising 2025, contact the ANJEC Resource Center at info@anjec.org for information and toolkits to help you get a head start in the New Year! 🌊

ANJEC awards 2024 open space grants

By Elizabeth Ritter, ANJEC Deputy Director

We are pleased to announce the winners of the ANJEC Open Space Stewardship Grant program, now in its eleventh year. One-year grants were awarded to 16 New Jersey municipal Environmental Commissions (ECs) for the 2024 grant cycle.

Spotlight on ECs

The primary objective of the grant program is to increase community awareness and appreciation of local open space, ultimately increasing public support and funding for open space stewardship. Another objective is to highlight the ECs who accomplish untold amounts of important work in their towns, but often operate under the radar.

ANJEC's Open Space Stewardship 2024 Grant Program is underwritten by the Candace McKee Ashmun Grant Fund, established in 2020 with funds raised in memory of ANJEC's first executive director and from generous donors like you.

The winning projects for 2024 were varied, including: trail maintenance, pollinator gardens, invasive species education and removal, educational signage, rain gardens and a new innovative sports tournament to



Francesca Mundrick, Pitman Environmental Commission, pictured with Joseph Postorino and Ken Goldstein from the LSRPAF in front of the Hitting 4 Habitat project funded through the 2024 grant round Credit ANJEC

benefit habitat! The following communities were selected for 2024 grants: Chatham Township, Closter, East Greenwich, Emerson, Hackensack, Haworth, Jersey City, Lambertville, Lawrence Twp., Long Branch City, Madison, Norwood, Pennington Borough, Raritan Twp., Pitman, and Somerville. Watch for more information about these projects on our social media platforms in the months to come!

continued on next page



Veolia representative Sonja Clark pictured with representatives from Hackensack, Haworth, Closter, Emerson, and Norwood Environmental Commissions at Haworth Water Treatment Plant Credit Veolia

ANJEC's 2024 grant program was supported by Veolia Water Services and the NJ Licensed Site Remediation Professional Foundation. We are excited about these partnerships that allow us to expand funding to more municipalities as they continue their work to protect local natural resources.

No cash match is required for the grants. Projects require an in-kind labor contribution from the commission or other volunteers totaling at least 80 hours. Projects often bring in many times that amount in support from community groups and individuals, who

help with physical labor or donate professional skills. The funded projects are often part of larger initiatives that may include funding from additional sources.

ANJEC remains committed to these worthwhile projects and all the enthusiasm and community goodwill they generate. 

Using the ERI to improve land use decisions

By Ed DiFiglia and Jennifer Feltis Cortese*



One of the most important roles that Environmental Commissions (ECs) play in their municipalities is the review of site plan applications under consideration by local land use boards. This core function provides an important opportunity for protecting the environmental resources within a town.

Parts of this review may examine similar issues in every town:

- Are stormwater best practices being used?
- Does the application comply with local impervious cover limits?
- Is the site accessible to multiple forms of transportation besides cars?
- Is the proposed development solar-ready?

But those questions, while important, only scratch the surface. To take your site plan review to the next level, it's time to turn to your Environmental Resource Inventory (ERI).

What is an ERI?

The ERI, sometimes referred to as a Natural Resource Inventory (NRI), is a document that details a municipality's natural resources, including locations of water bodies, steep slopes, wildlife habitats and other critical environmental information. It's this type of information that can lead to a new level of inquiry for the EC's review of development applications. Here are a few examples:

- Using the ERI's maps and data as a baseline, an EC can ask about the impact of a development on a specific wildlife habitat that will be impacted and suggest mitigation techniques.
- The EC can ask about the impact of a development on steep slopes that might be near the area of disturbance in an application and ask for stronger erosion controls to be included in the plan.
- An ERI can help the EC determine if a site is encroaching on a groundwater recharge area and can suggest adjusting the layout to minimize impact.

There are several steps your EC can take to start incorporating your ERI into your site plan review process. Of course, your municipality first needs to have an adopted ERI. If you do not already have one, you can contact ANJEC and get resources and information on how to create one for your municipality.

After the ERI has been adopted, the team who reviews site plans should create a template for the process that includes sections addressing each of the resources identified in the ERI: soil, steep slopes, wetlands, streams, wildlife habitats, recharge areas, etc.

Then, when an application comes in for review, this template will allow the review team to make sure that each of the natural resources identified in the ERI has been addressed in the site plan and make suggestions to ensure that those resources are protected.

You can find a sample EC site plan review checklist in ANJEC's "Site Plan/ Subdivision Review" resource paper at <https://tinyurl.com/yc67vjmh>.

The ERI as a go-to reference

Your EC can establish joint meetings or special meetings to regularly review various sections of the ERI so that those responsible for land use decisions are familiar with the town's unique environmental characteristics and can more efficiently consult the ERI when conducting reviews of site plan applications.

While these professionals will routinely look for compliance by the applicant with all regulations from the NJ Department of Environmental Protection (DEP) and local ordinances, they might not be aware of the location of certain endangered species habitats or recharge areas. By working with these professionals, you can ensure that the resources identified in the ERI are included in their reviews as well.

Ultimately the goal is to set expectations for the protection of critical environmental resources so that applicants themselves review the ERI and incorporate mitigation efforts into their land use applications from the start.

More information

For in-depth information about the ERI and site plan review, be sure to attend ANJEC's annual course, Fundamentals for Effective Environmental Commissions, offered each spring. Watch our website (anjec.org) for details to come. An ANJEC resource paper, "The Environmental Resource Inventory," is also available at <https://anjec.org/wp-content/uploads/2019/07/ERI-2013.pdf>. 

*Ed DiFiglia is the Township of Ocean Environmental Commission Chair and Planning Board Vice Chair. Jennifer Feltis Cortese works in the Director's Office for the Division of Water Quality at the DEP. Both are ANJEC trustees.



Reviewing site plans is part of the curriculum at ANJEC's Fundamentals for Effective Environmental Commissions course each spring. Credit ANJEC

Fortifying the future:

NJ's Priority Action Plan tackles climate change

By Sheila Baker Gujral, ANJEC Resource Center Director



Climate change is coming down the (turn)pike in New Jersey and local governments need to be prepared. The NJ Department of Environmental Protection has received a federal Environmental Protection Agency grant to explore how to reduce greenhouse gas emissions (GHGs) and which actions should be prioritized. The result, the *New Jersey Priority Climate Action Plan* was released in March and is the first of three deliverables resulting from the four-year grant.

The Plan was created to guide and prioritize future federal investments in the State's pollution reduction efforts. It lists priorities in several sectors – transportation, buildings, electric generation, food waste, natural and working lands and halogenated gases. For each section, it lists the top priority measures along with guidance on which local government actions will support those goals. This is kind of a dream document for environmental commissions, answering key questions: What's the problem? What should we tackle first? How do we do it? How do we fund it?

The role of local governments includes:

- developing local climate action plans;
- implementing projects;
- connecting with stakeholders to foster collaboration;
- ensuring equity and accessibility; and
- engaging and coordinating with the private sector.

Here is a sampling of the many goals and measures outlined in the plan.

The transportation sector

Responsible for 38 percent of net statewide GHG emissions, this sector's number one priority is to "achieve 30

percent of zero-emission medium- and heavy-duty vehicle sales by 2030 and 100 percent by 2050." The local government action to pursue this goal is to "replace diesel medium- and heavy-duty vehicles and school buses with electric vehicles (EVs)."

For the sector's second priority, to "achieve light-duty vehicle electrification goals in *NJ's Electric Vehicle Law*," there are three local government actions to take: 1) electrify local government fleets; 2) create and expand eMobility programs that provide electric ride sharing and ride hailing services¹; and 3) install and expand publicly available EV charging infrastructure.

Another goal is to "reduce vehicle miles traveled," by 1) expanding transportation infrastructure and complete streets; 2) promoting and increasing NJ Transit ridership and becoming a "Transit Village;" and 3) expanding work-from-home and ridesharing programs.

The building sector

Responsible for 23 percent of NJ's total GHG emissions, the building sector has as priority measure number five: "install zero-carbon emission space-heating and -cooling and water-heating systems in 400,000 residential properties and in 20,000 commercial properties."

There are three actions that local governments can take: 1) pilot building decarbonization efforts at local government facilities; 2) pilot beneficial use of wastewater for building electrification at

¹ Such as the Go Trenton! all-electric shuttles and van service – www.gotrenton.org/



The NJ Priority Climate Action Plan calls for supporting the development of 11.0 GW of offshore wind by 2040.

Photo credit: Pixabay

The *Plan* also includes funding opportunities to match the implementation goals.

This is just a taste of the analysis, goals and recommendations you

wastewater treatment facilities; and 3) help implement the NJ Board of Public Utilities' Higher Education Decarbonization Pilot Program.

Electric generation

This sector, which accounts for 18 percent of statewide GHGs, has goals of achieving 12.2 GW of in-state solar generation by 2030; facilitating the integration of clean distributed energy sources into the grid; and supporting the development of 11.0 GW of offshore wind by 2040. The *Plan* proposes an array of actions in pursuit of those goals.

Food waste

Food waste in NJ comprises 22 percent of total municipal waste and a top priority is to "achieve a 50 percent reduction in food waste by 2030." This is accompanied by a suite of local government actions: 1) update district soil waste management plans to include food waste reduction; 2) encourage schools to adopt the New Jersey School Food Waste Guidelines and institute a food waste reduction curriculum in K-12 schools; 3) implement a community-scale reusable foodware system pilot; 4) support food waste recovery systems, such as anaerobic digesters and co-digestion of food waste at wastewater treatment facilities; and 5) implement local and regional composting programs.

will find in this inspiring guidance document. Not only does it tell you which sectors need attention first, but it provides a menu of solutions and a variety of funding options to help make your community's goals a reality. How will you use the *Priority Climate Action Plan*? What's your first project? Let us know at info@anjec.org.

Resources:

- *NJ Priority Climate Action Plan* – <https://tinyurl.com/277bd8ra>
- Implementing *NJ Priority Climate Action Plan* slide deck – <https://tinyurl.com/7cer4j6p>
- Implementing *NJ Priority Climate Action Plan* YouTube – www.youtube.com/watch?v=z_NkK84Pjxw
- *Priority Climate Action Plan*, Funding, Webinar links, Resource links – <https://dep.nj.gov/climatechange/mitigation/cprg/>
- EPA Climate Pollution Reduction Grants – <https://tinyurl.com/yc3x6bbf>
- NJBPU Higher Education Decarbonization Pilot Program – www.njcleanenergy.com/LEUPDecarb 

Business member spotlight



Student-driven sustainability: Green Matters' grants in action

By **Kathy Lynch**, President, Green Matters

Green Matters is a 501(c)3 nonprofit that has been funding environmental projects for and by students in New Jersey since 2022. Past grants to high schoolers include funds for an aquaponics system, tree planting, a pollinator garden, a residential composting pickup pilot program, supplies to start a beekeeping club (including a hive) and a seed library.

Money has also been given to organizations to support their work for or with students, such as internships at Sourland Conservancy and Herrontown Woods, programming for The Ripple Center and curriculum training for Earth Friends. Green Matters is also proud to sponsor the climate change track at the Association of Environmental Educators' fall conference for a second year and to support the great work of ANJEC.

Green Matters initially sought out high school-age students as applicants, then

realized that it's never too early to spark interest in and gain understanding of why we need to protect our planet and its inhabitants. If you have an idea for a project, please check out our website and application, and feel free to contact us if you have any questions or want to brainstorm a bit: www.green-matters.org. 💧



This project explored the use of aquaponics as a means of sustainable food production in a courtyard at Princeton High School.



*In honor of
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ANJEC established the Candace McKee Ashmun Memorial Fund in her honor to support the **ANJEC Open Space Stewardship Grant Program**. The annual program provides small grants to help environmental commissioners carry out local stewardship projects.



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To donate, use the QR code or mail a check to ANJEC, PO Box 157, Mendham NJ 07945.

Hopeful signs

For the first time since WWII, a renewable energy source has out-paced fossil fuels. The US added 32.4 gigawatts of solar capacity, which shatters the 2021 record of 23.6

gigawatts. That represents 52 percent of all added energy capacity in the US, with natural gas coming in a distant second at only 18 percent. This solar boom can be



attributed to a few things-chief among them the Inflation Reduction Act, which set aside roughly \$369 billion for investment in and production of clean energy

tech, as well as major incentives for installing rooftop solar (www.popularmechanics.com/science/green-tech/a60130391/solar-breaks-record-2023/). 



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Congratulations 2024 Open Space Stewardship Grant winners (page 25)



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The State We're In

Regenerating native forests to fight climate change



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May 6, 2021

In the effort to slow climate change, forests are a powerful ally. Trees naturally remove harmful carbon dioxide from the air and store, or “sequester,” it in their roots, branches and wood.

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[\(https://www.njconservation.org/staff/\)](https://www.njconservation.org/staff/).

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But future generations of giant canopy trees must be able to reproduce. As individual trees are lost to storms, drought, or disease, new generations of saplings and seedlings must be waiting in the understory to fill in gaps that open in the canopy. Recent studies show that resilient, mature forests will continue to sequester more carbon than newly planted or recently logged forests well into the future.

In New Jersey and many other states, deciduous forests are being ravaged by an over-abundant white-tailed deer population, and one consequence is a severe lack of regeneration and new saplings

Over a century ago, deer had virtually disappeared from New Jersey as a result of over hunting. A state program to restore deer succeeded, but by about 1980 the deer population exploded and this state were in's native trees, shrubs, and wildflowers began to decline.

Dr. Jay Kelly, a biology and environmental science professor at Raritan Valley Community College, has been researching deer impacts on forests since 2014. He found that about 50 years ago, in the 1970s, central and northern New Jersey averaged about 10 deer per square mile. Today, there are 10 times that number, an estimated 112 deer per square mile.

Hungry deer have gobbled up the forest understory – the layer made up of native herbaceous plants, shrubs and young trees – leaving only the large canopy trees.

“If these trends hold out, we’re concerned that there won’t be enough new young trees to replace the older trees that are dying,” explained Dr. Kelly.

Outside the Pine Barrens, most New Jersey forests now lack native tree seedlings and saplings, so when sunny forest openings occur, these openings are rapidly taken over by invasive weeds and vines. These invasive, non-native plants do not support native insects, birds and wildlife.

You don’t need to be a researcher or scientist to see the impacts of deer. Drive past any deciduous forest in central or northern New Jersey and you will see large trees with masses of invasive plants in the understory. The deer are taking a severe toll on our forests.

The encouraging news is that recent research shows that the problem can be reversed. By aggressively reducing deer populations, it’s possible for forests to regenerate and increase their ability to sequester carbon.

“Managing Deer to Restore Forests and Sequester Carbon” was the topic of a recent webinar sponsored by Duke Farms and New Jersey Conservation Foundation. The webinar drew over 100 participants, including landowners, conservation groups, ecologists and forest restoration experts.

Tom Gilbert, New Jersey Conservation Foundation’s campaign manager for energy, climate and natural resources, noted that New Jersey’s target under the Global Warming Response Act is to reduce carbon emissions 80 percent (from 2006 levels) by 2050.

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He added that New Jersey's forests currently sequester about 8 percent of annual state greenhouse gas emissions, "so there's a lot at stake here in terms of forest health." One of the state's strategies for reaching its goal is relying on natural solutions like preserving and restoring ecologically resilient, mature forests.

Can New Jersey's forests regain their resilience? Research conducted at Duke Farms indicates that they can. Located in Somerset County, the 2,700-acre Duke Farms property is now a model of environmental restoration.

About 20 years ago, explained Thomas Almendinger, Duke Farms' director of natural resources and agro-ecology, there were so few native understory plants that the land couldn't even support breeding populations of rabbits and chipmunks. In 2004, the deer population was estimated at an unsustainable 75-100 deer per square mile.

Duke Farms launched its effort to improve habitat by fencing in about a square mile of forest and farmland. The deer population both inside and outside the fenced area was reduced through hunting. There are now almost no deer within the fenced area.

As the deer population dropped inside the fenced area, native plants and shrubs as well as the seedling and sapling layers of forest understory rebounded.

"The long and short of it is: it worked," said Dr. Michael Van Clef of Ecological Solutions LLC and head of the New Jersey Invasive Species Strike Team.

Young trees survived long enough to reach a size where they're out of reach of hungry deer and can grow into the forests of tomorrow. Invasive plants like Japanese stiltgrass and Japanese barberry diminished. "Invasive plants are not supernatural; they can be outcompeted," Van Clef said.

Duke Farms' successful experiment shows that it's possible, by significantly reducing deer populations, to regenerate forests that will sequester carbon and provide habitat for diverse wildlife. When deer are at tolerable levels, native plants can compete successfully against invasives.

It will take an enormous effort to replicate the same results in forests throughout New Jersey, but there's now solid science to guide agencies as they work to meet the state's climate goals and ensure the future of our forests and the many benefits they provide.

To view the full webinar on YouTube, go to <https://www.youtube.com/watch?v=yvhL40rmfPA> (<https://www.youtube.com/watch?v=yvhL40rmfPA>).

To learn more about New Jersey's Global Warming Response Act, go to <https://www.nj.gov/dep/climatechange/docs/nj-gwra-80x50-report-2020.pdf> (<https://www.nj.gov/dep/climatechange/docs/nj-gwra-80x50-report-2020.pdf>).

And for information about preserving New Jersey's land and natural resources, visit the New Jersey Conservation Foundation website at www.njconservation.org (<http://www.njconservation.org>) or contact me at info@njconservation.org (<mailto:info@njconservation.org>).



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