



2021-2022 Deer Management Plan

Background

The Forest Preserve District of Will County (FPDWC) was established in 1927 to “acquire... and hold lands containing one or more natural forests or parts thereof or land or lands connecting such forests or parts thereof, or lands capable of being reforested, or capable of being restored to a natural condition, for the purpose of protecting and preserving the flora, fauna, and scenic beauties within such district, and to restore, restock, protect, and preserve the natural forests and such lands together with their flora and fauna, as nearly as may be, in their natural state and condition, for the purpose of the education, pleasure, and recreation of the public” (70 ILCS 805/5). Beginning in the early 1990s FPDWC staff noticed deer browse lines in several forest preserves. In 1993, the FPDWC began to document the number of deer in the forest preserve system using aerial surveys (Appendix A). Survey crews of two or more persons counted deer between December and March, ideally when the snow is less than three days old, at least three inches deep, and in the absence of foliage to allow better visibility. Without these conditions, it is extremely difficult to observe deer that blend into the brown backdrop of winter. Surveys indicated deer densities that exceed densities of 20 deer per square mile, which is widely considered the maximum density allowable to maintain plant community quality and diversity. The FPDWC also wanted to determine impacts to the vegetation within the affected habitats caused by high deer numbers. Numerous deer browse studies have been conducted on FPDWC properties that indicate significant deer browse pressure from high deer densities result in negative shifts in species composition, decreases in diversity, and an overall decline in the quality of these natural areas. It was also noted during the pilot year of deer management that where there is a lack of preferred native forage, likely due to decades of heavy deer browse, the deer are turning to plants from which they get less nutritional value.

Current regional research and deer management programs use deer densities as a meter to help determine the scale of their deer problem. The damage that white-tailed deer do to local ecosystems, specifically plant communities, is measured to determine the success rate of a program, while deer density numbers provide a guideline for establishing removal targets. Generally, organizations in northeastern Illinois target 10-30 deer per square mile and adjust their plans accordingly over time as recovery in the plant communities occurs and the structure of the deer herds are influenced by removing specific numbers of the animals annually. Current density numbers when looked at in conjunction with floristic surveys and deer browse data indicate that the high numbers of white-tailed deer are major contributors to the altering of ecosystems in Will County Forest Preserves.

During the 2020/2021 season, staff removed a total of 230 deer, including the deer removed at the request of IDNR for Chronic Wasting Disease (CWD) monitoring. The winter of 2021/2022 will be the eleventh year of the District’s deer management program. During the winter of 2020-2021, aerial surveys were conducted at thirty-three Forest Preserves. The seven management areas selected for deer removal this season are: Lockport Prairie Nature Preserve, Hickory Creek Preserve, Thorn Creek Woods Nature Preserve, Goodenow Grove Nature Preserve, the Romeoville Prairie Complex, the Messenger Woods Complex, and Plum Valley Preserve. The Kankakee Sands Complex is part of an ongoing CWD surveillance program and will also be included in the deer management program at the request of the Illinois Department of Natural Resources. These eight management units range in size from 320-1,541 acres and are incorporated in habitat management and restoration efforts. Results from the aerial surveys for these management sites, as well as proposed numbers for removal are discussed in the *Proposed Removals* section of this application. This season, the FPDWC proposes removing a total of 280 deer from the preserves listed (Table 2). Although the proposed removal numbers will not bring all populations to the target density of 10 deer per square mile, they have been determined as feasible goals based on experience culling these locations and available resources. The FPDWC expects to continue deer management in the subsequent years to reach browse and density goals.

Program Goals

The FPDWC deer management program goal is to establish and maintain white-tailed deer populations at densities that allow for a sustainable relationship between biological diversity and habitat structure. Succinctly, the deer population will be reduced to allow vegetation to recover from excessive browse.

Program Objectives

The program objectives are as follows:

1. Reduce deer browse damage to acceptable levels to promote the recovery of species diversity and community structure
2. Monitor deer browse rates on target species to evaluate the effectiveness of deer management efforts over time
3. Reduce and maintain deer populations at a target density of 10 deer per square mile within selected management sites

Site Descriptions

Lockport Prairie Nature Preserve (LPN)

*(Sections 22 & 27: Township 36N. - Range 10E.) (0.49 square miles counted**)*

Lockport Prairie Nature Preserve, a unique and critically endangered dolomite prairie and wetland habitat, is located on the west side of the Des Plaines River, both north and south of Division Street, east of Route 53 between the cities of Lockport and Crest Hill. This area is considered one of the highest quality dolomite prairie remnants left in Illinois, containing calcareous fens and seeps, sedge meadow and wetland communities. LPN supports many listed species on both the federal and state level. There is limited public access to this 320-acre site, and the site is actively managed with prescribed burns, native plant seeding, invasive species removal, and hydrological restoration efforts in order to enhance and restore the entire property. The U.S. Army Corps of Engineers is funding a five-year (2019-2023) Aquatic Ecosystem Restoration Project at LPN, which includes significant invasive species removal and native plantings. Given the exceptionally high quality of Lockport Prairie, the significant investment in ecosystem restoration being completed by the U.S. Army Corps of Engineers, and the planned installation of approximately 88,000 native plants in 2021 and 2022, a low deer density is needed to reduce browse pressure on the native plantings and facilitate habitat recovery. This site has been a part of the deer management program since its inception in 2010.

Hickory Creek Preserve (HCP)

*(Sections 13, 14, & 24: Township 35N. - Range 11E. & Sections 16, 17, 18, 19, & 20: Township 35N. - Range 12E.) (2.41 square miles counted**)*

Hickory Creek Preserve is a 1,541-acre mosaic of natural communities including woodland, wetland, barrens, and prairie around numerous public use amenities, all of which is surrounded by private residential properties. This site is a sprawling preserve surrounded by suitable habitat on private property, both capable of supporting a large population of deer. The terrain ranges from flat, to rolling, to steeply sloped areas. This preserve has varying degrees of natural community quality, including some high-quality areas, and provides habitat for several highly conservative species. HCP receives regular management in the form of prescribed burning, invasive species control, selective woody removals, and plantings to maintain higher quality areas while improving more degraded sections. HCP has been a part of the deer management program since 2013.

Thorn Creek Woods Nature Preserve (TCN)

*(Sections 1,2,11 & 12: Township 34N. - Range 13E) (1.6 square miles counted**)*

Thorn Creek Woods Nature Preserve is a 1,025-acre preserve in Park Forest and University Park that is managed by the Forest Preserve District of Will County. It is owned by multiple partners including FPDWC, the Village of Park Forest, and University Park; all of whom comprise the Thorn Creek Woods Management Commission. This year the FPDWC acquired ownership of 473 acres from the Illinois Department of Natural Resources. TCN contains upland, bottomland, forested land, glacial potholes, ravines, prairie, and wetlands. The preserve has over three miles of hiking trails. Ecological management activities include limited invasive species control, prescribed burning, and seeding activities. TCN has been a part of the deer management program since 2016.

Goodenow Grove Nature Preserve (GGN)

*(Sections 23, 26, 27, 28, 33 & 34: Township 34N. - Range 14E.) (1.39 square miles counted**)*

Goodenow Grove Nature Preserve is an 891-acre site located east of I-394 and north of Goodenow Road. The site is characterized by wooded areas along Plum Creek and its tributaries, as well as barrens (shrubby prairies), savannas, and grasslands. Goodenow Grove contains high quality remnants of a diverse mixture of natural communities including dry-mesic and mesic upland forests, mesic and wet-mesic floodplain forests, forested seeps, savanna, dry-mesic and mesic prairies, wet-mesic prairie/sedge meadow, marshes, and vernal pools. In recent years, the site has received extensive management and restoration including invasive species control,

prescribed burning, seeding, and planting efforts. The FPDWC's ecological management activities are being assisted by a Habitat Fund grant awarded by the IDNR which contributes funding support for habitat restoration activities (2019-2021). This site has been managed for deer since the second year of the program in 2011.

Romeoville Prairie Complex (RPN): Romeoville Prairie Nature Preserve and Isle a la Cache

*(Sections 26, 27, 34 & 35: Township 37N. - Range 10E. & Section 3: Township 36N. – Range 10E.) (0.90 square miles counted**)*
Romeoville Prairie Nature Preserve occupies over 590-acres of the DesPlaines River Valley north of 135th Street on the west side of the river. It is dominated by prairie, sedge meadow, and marsh communities. It is comprised of predominantly high-quality remnant wet-mesic dolomite prairie and contains marsh, sedge meadow, springs, fens, and floodplain forest on shallow soils over limestone bedrock. The preserve has no public access areas and is well buffered from residential and other public spaces. The Isle a la Cache occupies 106-acres on an island in the DesPlaines River north and south of 135th Street. While the Isle a la Cache Museum and associated amenities occur in the southern unit, the preserve is flat and largely wooded with a few isolated open areas well suited for sharpshooting. There has been a management emphasis on invasive species removal, hydrological control, and the expansion, enhancement, and monitoring of the property for rare and conservative plant species. Deer management at the Romeoville Prairie Complex began in 2011, with management occurring during seven seasons.

Messenger Woods Complex (MWN): Messenger Woods Nature Preserve and Messenger Marsh Preserve

*(Sections 23, 24, 25, 26, & 27: Township 36N. – Range 11E.) (1.66 square miles counted**)*

Messenger Woods Nature Preserve consists of 441 acres of high-quality, remnant wet-mesic and mesic Oak/Hickory woodland, wet-mesic floodplain forests, shrub swamps, and wet prairie. Messenger Woods is widely known for beautiful, but once spectacular spring ephemeral displays. Messenger Marsh Preserve which encompasses over 620 acres of cattail marsh, woodlands, grassland, and ponds is adjacent to Messenger Woods Nature Preserve. When combined, these two preserves make up the core of the Spring Creek Greenway. Some major mitigation projects have been undertaken at both preserves including a large-scale wetland, prairie, and savanna restoration funded through the O'Hare Modernization and Mitigation Account and savanna/woodland re-creation as required mitigation by the Illinois State Toll Highway Authority for impacts related to the extension of I-355. Management activities throughout Messenger Woods include invasive species removal, understory tree thinning, prescribed burning, seeding, and planting. The Messenger Woods Complex was only part of the deer management program during the inaugural year.

Plum Valley Preserve (PVP)

*(Sections 13, 23, & 24: Township 34N. – Range 15E.) (0.71 square miles counted**)*

Plum Valley Preserve is comprised of 490 acres of upland and floodplain forests and successional fields undergoing woodland restoration. This site has a dog park and amenities located at the north end, and a one-mile trail running south through the preserve. Plum Creek runs through the length of this preserve and connects it to Goodenow Grove. Ecological management has been limited but includes prescribed burning and planting native trees and shrubs. This season is the first year of deer management at this preserve, and it will aid in maintaining deer populations at Goodenow Grove.

Kankakee Sands Complex (KGA): Kankakee Sands Preserve, Braidwood Dunes and Savanna Nature Preserve, Sand Ridge Savanna Preserve and Nature Preserve

*(Sections 10, 11, 14, 15, 16, & 26: Township 32N. – Range 9D.) (2.21 square miles counted**)*

The Kankakee Sands Complex is 1,414 acres comprised of four adjacent preserves in southern Will County. These preserves contain a wide variety of high-quality remnant and restored areas that support a wide variety of species unique to sands habitats. Some restoration efforts include invasive species treatments, prescribed burning, seeding, and restoring agricultural fields to prairie habitats. This unit and surrounding areas have produced five positive CWD cases since 2013.

**Area surveyed may differ slightly from actual area of site

Documentation of Problem

Deer Browse Monitoring 2021

To monitor changes in browse rates in response to deer management, permanent deer browse plots were established at each of the proposed sites. Plots were selected based on known populations of native plant species, with special attention given to listed species, species of concern, more conservative species, and native species, in descending order of priority. Secondary plots were selected to document additional notable browse damage. At least eight permanent plots were sampled per site to illustrate extensive plant damage caused by an overabundance of deer. The coordinates have been recorded for each 3m radius plot for annual sampling. Within each plot, the total number of plants of a designated target species, as well as the number of those plants damaged by deer browse, were recorded. Plants with damage that could not confidently be identified as deer browse, were included in total number of plants, but not in number browsed. Each season, effort will focus on completing the herbaceous plots within a month of the original plot. The data recorded was then placed into an Excel spreadsheet, sorted, and assigned C-values as per *Flora of the Chicago Region* (Wilhelm and Rericha, 2017). Plants were categorized as generalist (C-value 0-3), moderately conservative (C-value 4-6), and highly conservative (C-value 7+). The results varied by site, but each location experienced substantial browse damage rates well above 30%, which has been deemed an unacceptable level of browse (Table 1).

Table 1. Summary of deer browse rates at each management site by plant type, C-value, and total percent browsed

Site	% Forbs Browsed	% Shrubs Browsed	% Trees Browsed	% Vines Browsed	% Browse on C-value 0-3	% Browse on C-value 4-6	% Browse on C-value 7+	Total % Browsed
LPN	43%	94%	N/A	N/A	N/A	16%	52%	49%
HCP	54%	66%	27%	69%	N/A	52%	62%	56%
TCN	40%	89%	N/A	N/A	84%	61%	49%	59%
GGN	45%	82%	N/A	66%	N/A	36%	75%	63%
RPN	64%	61%	58%	N/A	73%	52%	72%	63%
MWN	38%	90%	95%	N/A	94%	39%	75%	60%
PVP	68%	89%	72%	N/A	100%	87%	63%	82%

Proposed Methods and Procedures

The FPDWC sharpshooting program will utilize FPDWC police personnel and qualified volunteers as sharpshooters, field dressers, and for coordinating transportation of the deer carcasses to an authorized meat processing facility. Deer will be taken at bait stations by FPDWC sharpshooters, and all bait stations will adhere to the IDNR regulations for safety. Bait stations will be located at least 100 yards into management sites as per FPDWC requirements. All sharpshooter candidates will be tested and seasonally approved by the IDNR prior to deer program implementation. Each volunteer candidate must be an Illinois resident, possess a valid firearm owner’s identification (FOID) card, and pass a verbal interview, background check, drug screening, and practice shooting qualification round conducted by FPDWC police before being considered for testing by the IDNR. The program will not authorize the use of archery equipment, handguns, shotguns, muzzle-loading rifles, etc. Only modern rifles firing 0.223 or 0.308 rounds are proposed for use in the sharpshooting program.

Techniques authorized under deer population control permits require that the resulting deer carcasses are suitable for human consumption. The permittee is required to have all usable deer carcasses processed at an IDNR-approved meat processing facility and to donate the processed venison to a bona fide charitable organization. FPDWC utilizes Freedom Sausage in Earlville for meat processing, and the meat is donated to the Northern Illinois Food Bank. Unusable deer carcasses must be disposed of in accordance with the Illinois Dead Animal Disposal Act. Since deer collected under deer population control permits must be used for human consumption, the FPDWC’s permit season would take place during the cooler late fall and winter months (November to March).

The FPDWC must return all unused tags along with a deer removal summary within 30 days after permit expiration. The removal summary must list the tag number, location, sex, age, and physical condition of each animal collected, as well as the total amount of processed venison donated and the names of the charities receiving the donated meat. The FPDWC is responsible for all costs associated with the deer control program.

Staff has reviewed and researched current urban deer programs and recommendations extensively. The FPDWC has set the target density to 10 deer per square mile based on this research (current literature suggests that pre-settlement densities of white-tailed deer were approximately 9 deer per square mile). The target number of deer to be removed from each site (Table 2) was determined based on the stated desired density, the estimated deer population based on the most recent aerial surveys, as well as being contingent on the resources available to the FPDWC.

Activity	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Restoration Activities													
Conduct Deer Browse Surveys													
Prepare DPCP Application													
Submit DPCP Application to IDNR													
Train and Certify Volunteers													
IDNR Review and Approval of DPCP and Firing Stations													
Post Deer Management Updates on Website													
Mail Notification Letters to Adjacent Landowners													
Sharpshooter Qualification Testing													
Implement Culling Activities													
Conduct Aerial Deer Population Surveys													
Submit Annual Summary Report to IDNR													
Submit Annual Summary Report to Public Relations													

Figure 1. Timeline of tasks for the FPDWC Deer Management Program

Proposed Removals

The expected fall densities for the proposed deer management sites range from 29-134 deer/mi², which are well above the target density of 10 deer/mi² (Table 2). Therefore, the FPDWC proposes removing 280 deer from eight management units during the 2021-2022 deer management season. Results of the aerial surveys and rationale for proposed removals are discussed for each site below.

Lockport Prairie Nature Preserve

As part of the 2020/2021 DPCP, 10 deer were removed from LPN. This season's survey counted 28 deer on site, and the average recruitment into this population over the last eight years has been 11 deer. The fall density is estimated to be 80 deer/square mile before management. Removing 15 deer would result in a density of 49 deer per square mile (Table 2). Even though this site does consistently hold a deer population, it is not prime deer habitat. Deer numbers here are prone to high levels of fluctuation since this site is part of the river wildlife corridor. There are also very few locations to set up bait stations, and the deer quickly become gun-shy. These factors limit the ability of the sharpshooters to remove a higher number of deer from this site, which is why continued yearly management is needed.

Hickory Creek Preserve

Last season, 80 deer were removed from this site. The current population estimate is 131 deer, and the average recruitment is 26 deer. The fall density is estimated to be 65 deer per square mile. Reducing the population by 65 deer in the 2020/2021 management season will result in a density of approximately 38 deer per square mile (Table 2). Despite heavy management since the 2013/14 season, the deer density has increased (Figure 2). Therefore, continued aggressive deer management in subsequent years will be necessary to reach and maintain density goals.

Thorn Creek Woods Nature Preserve

Deer control at TCN in the 2020/2021 season consisted of 25 deer being removed. This year's aerial count places the population at approximately 158 animals, and recruitment was calculated to be 32% of the aerial count. This means the fall density is estimated to be 134 deer per square mile. Reducing the population by 50 deer in the 2021/2022 management season will result in a calculated density of approximately 102 deer per square mile (Table 2). In past seasons, the highest number of deer removed from this site has been 33 deer (Table 10). All deer management activity must be located on property within FPDWC ownership. With the additional land now owned by the FPDWC, a record number of deer will be attempted to be removed from this preserve as the population has reached its second highest density ever recorded (Figure 2).

Goodenow Grove Nature Preserve

Last season's efforts resulted in 50 deer being removed, which is a record high for this site. Current aerial counts place the population at approximately 93 deer, with an average recruitment of 15 deer. This would put the fall density at 78 deer per square mile. Reducing the population by another 50 deer in the 2021/2022 management season will result in a calculated density of approximately 42 deer per square mile (Table 2). While this population did decrease in density from 2013-2017, successfully reaching the previous density goal of 20-30 deer per square mile in 2017, the most recent years have shown an increase in density (Figure 2). Continued management will be necessary to reduce the population to the newly lowered target density.

Romeoville Prairie Complex

The Romeoville Complex was not managed last season due to insufficient conditions to conduct an aerial survey. The 2018-2019 management season concluded with an achieved density of 28 deer per square mile, which was within the desired density at the time of 20-30 deer per square mile. This season's aerial put the population at 21 deer, and the average recruitment is 23% of the aerial count. The estimated fall density is 29 deer per square mile and removing 10 deer will result in a density of 18 deer per square mile (Table 2). If the population can be reduced to the desired density in the next few seasons and browse rates are at acceptable levels, this site may not require deer management every year.

Messenger Woods Complex

This complex has only been managed once during the pilot year when 49 deer were removed. Since that time, the density of the deer population has been on the incline with the absence of deer management (Figure 2). The population was surveyed to be approximately 93 deer this winter, which is a density of 56 deer per square mile. Approximately 30% of the population was removed from the population in 2010/11, and that percentage is reflected in the goal to remove 30 of the 93 deer this season. That would put the density at 38 deer per square mile (Table 2). Because there is insufficient data to calculate average recruitment for this site, the FPDWC will use the surveyed density to guide management decisions. This does mean the fall deer population and expected density post-culling are likely to be underestimated until sufficient data is collected in the next few years to calculate average recruitment.

Plum Valley Preserve

This season is the pilot year for this preserve. The aerial survey resulted in an estimated 73 deer, which is a density of 103 deer per square mile. Removing the proposed 30 deer from this population would result in a density of 61 deer per square mile (Table 2). This site also lacks sufficient data to calculate average recruitment, so the fall population and expected density after culling will likely be underestimated for the next few years of deer management. Ideally, the population will be at a more manageable size when recruitment can finally be accounted for.

Kankakee Sands Complex

The Kankakee Sands Complex has been a part of IDNR's Chronic Wasting Disease monitoring program since 2011. A positive case was discovered in the unit in 2013. Last season, two deer from this complex tested positive for CWD, so surveillance efforts will likely continue for at least another five years. IDNR has requested 30 deer be removed for CWD testing this season regardless of aerial survey results.

Table 2. Surveyed deer populations from the beginning of 2021 with estimated densities before and after proposed removal

Management Area	Surveyed Population (# of Deer)	Estimated Fall Density (Deer/mi ²)	Proposed Removal (# of Deer)	Estimated Density after Removals (Deer/mi ²)
Lockport Prairie Nature Preserve	28	80*	15	49
Hickory Creek Preserve	131	65*	65	38
Thorn Creek Woods Nature Preserve	158	134*	50	102
Goodenow Grove Nature Preserve	93	78*	50	42
Romeoville Prairie Complex	21	29*	10	18
Messenger Woods Complex	93	56**	30	38
Plum Valley Preserve	73	103**	30	61
Kankakee Sands Complex***	22	N/A	30	N/A
Total Deer to Remove			280	

*Estimated Fall density calculated by adding average recruitment calculated for individual sites to aerial survey

**Estimated Fall density calculated directly from aerial survey due to insufficient data to calculate average recruitment

***This site is included at the request of IDNR for CWD surveillance and control; two deer tested positive for CWD last season

Evaluation of Management Program

The Forest Preserve District of Will County has been managing the deer populations at high-quality sites since 2010. After this season, twelve sites will have been a part of the Deer Management Program (Appendix A). There has been a decrease in deer densities at our most consistently managed sites, yet very few have reached and stayed at acceptable density levels (Figure 2). There are three sites that demonstrate this program's success having reached the new target density of 10 deer per square mile or less: McKinley Woods Preserve (density=5), Raccoon Grove Preserve (d=0), and the Kankakee Sands Geologic Area (d=10). McKinley Woods started out completely over browsed by starving, overpopulated deer, that the task of finding identifiable browsed plants was incredibly difficult. After ten years of deer management the woodland understory has been revived. Raccoon Grove has been in the target density since the end of the 2018/19 season and has not needed management since. During the aerial this year, a large herd of deer was observed directly across the street from Raccoon Grove, so a density of zero is not cause for concern. Kankakee Sands has been managed for CWD monitoring since 2011, and two deer tested positive this past season. FPDWC will continue CWD management at the request of IDNR regardless of the population's estimated density from the winter aerial. With the large amount of surrounding habitat suitable for deer, the number of deer utilizing KGA is prone to high levels of fluctuation and is likely underestimated. Having successfully reduced the number of sites requiring management this year, there are two new additions to our management program: the Messenger Woods Complex (d=56) and Plum Valley Preserve (d=103). Having only been culled once during the inaugural year of this program, it has become apparent that the lack of deer management at Messenger Woods has caused browse levels to become detrimental to plant diversity and community composition, therefore, this site has been reinstated to the program. The second addition to the program, Plum Valley Preserve, was added this season because it has one of the highest deer densities for a high-quality site. This addition may also aid management efforts at Goodenow Grove since it is a neighboring preserve. There are five sites have been continuously managed: Romeoville Prairie (d=23), Lockport Prairie (d=56), Hickory Creek (d=54), Thorn Creek (d=99), and Goodenow Grove (d=67). All of these sites, except Hickory Creek, have negative trendlines depicting decreasing densities (Figure 2). Continued management will be required for these sites to reach and maintain the new target density. The two remaining sites—Lockport Prairie East (density=124) and Prairie Bluff Preserve (d=3)—are very difficult to manage due to the lack of acceptable areas for bait stations and are not likely to be managed again.

Evaluation of the deer management program will be based on documenting the changes in vegetation browse rates over time and aerial population survey results. In order to make the Deer Management program more effective and efficient at reaching browse and density goals, three major changes have been made to the program this year. The first change was to lower the target density from 20-30 deer per square mile to 10 deer per square mile. While it will take time to reach this new target density at most management sites, it will now be possible to reduce the deer population enough to lower the browse damage to more acceptable levels. Since larger populations quickly rebound from culling efforts, lowering the target density will also lead to smaller, and therefore more easily maintained, populations.

The second change was to include recruitment into the population estimates by developing simple population models. Aerial surveys conducted after culling was completed showed that the expected densities after culling were not being reached each year. This is attributed to the fact that summer births had not been accounted for, so the fall population size was consistently being underestimated. To remedy this, the summer recruitment was calculated for each year at individual sites and then averaged. The average recruitment was then added to the current aerial count to estimate fall population size. It is clear by comparing the two population estimate methods ("No Recruitment" vs "Average Recruitment") that including average recruitment is more comparable to actual population counts than assuming the population is unchanged from summer to fall (Figure 3). Preserves without culling data do not have a calculated average recruitment, therefore fall populations will continue to be underestimated at such sites until that data can be collected.

The third change was to update the deer browse data collection methods. In the past, browse plots were found during meander surveys, which potentially biased the data towards heavily browsed plots. This method also did not allow the FPDWC to functionally monitor changes in browse levels in relation to deer densities over time. The new method of utilizing permanent plots reduces plot selection bias, allows us to monitor single species populations over time, and will better reflect the effects of deer removal on browse levels. These plots will be monitored each year, regardless if the site is being managed for deer that year. That means during years where the deer densities have reached acceptable levels, browse damage may have also reached acceptable levels. If deer densities are acceptable, but browse rates remain too high, it may become necessary to reduce the target density even further for individual sites. Over the last five years, deer management sites have experienced average browse rates between 50-79% for highly conservative plant species and between 50-75% for total browse. After a few seasons conducting browse surveys and deer management with these new methods, "acceptable" browse levels should become apparent for each preserve. A gradient of acceptable browse levels is expected to develop with highly conservative species requiring the lowest browse rates and generalist species enduring at more moderate browse rates. Until these acceptable values can be defined, the FPDWC considers browse rates of 30% or higher to be unacceptable.

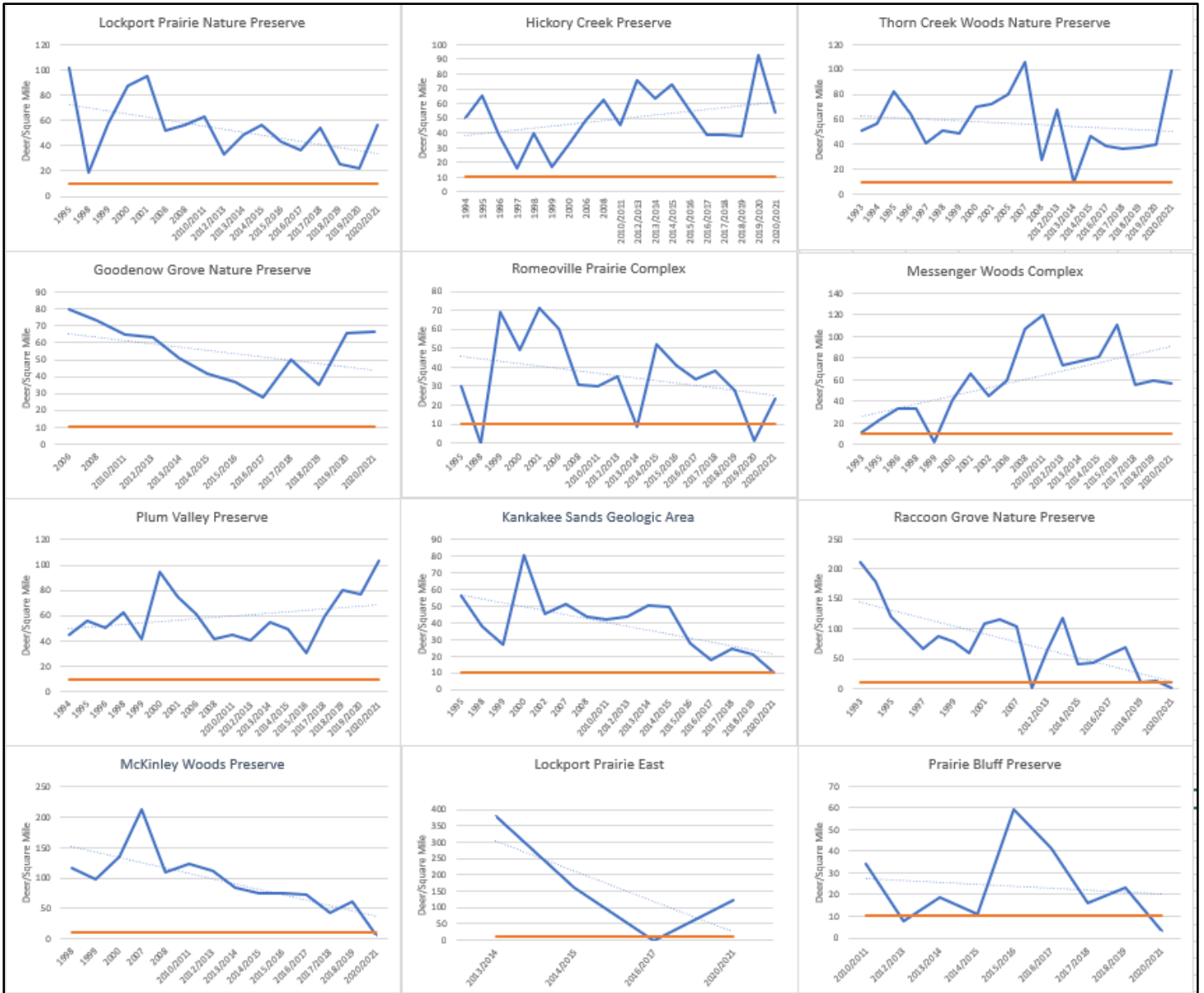


Figure 2. Densities of the deer populations with trendlines for each site involved in the Deer Management Program over time, excluding years when an aerial survey did not occur. Orange lines represent the target density of 10 deer per square mile.

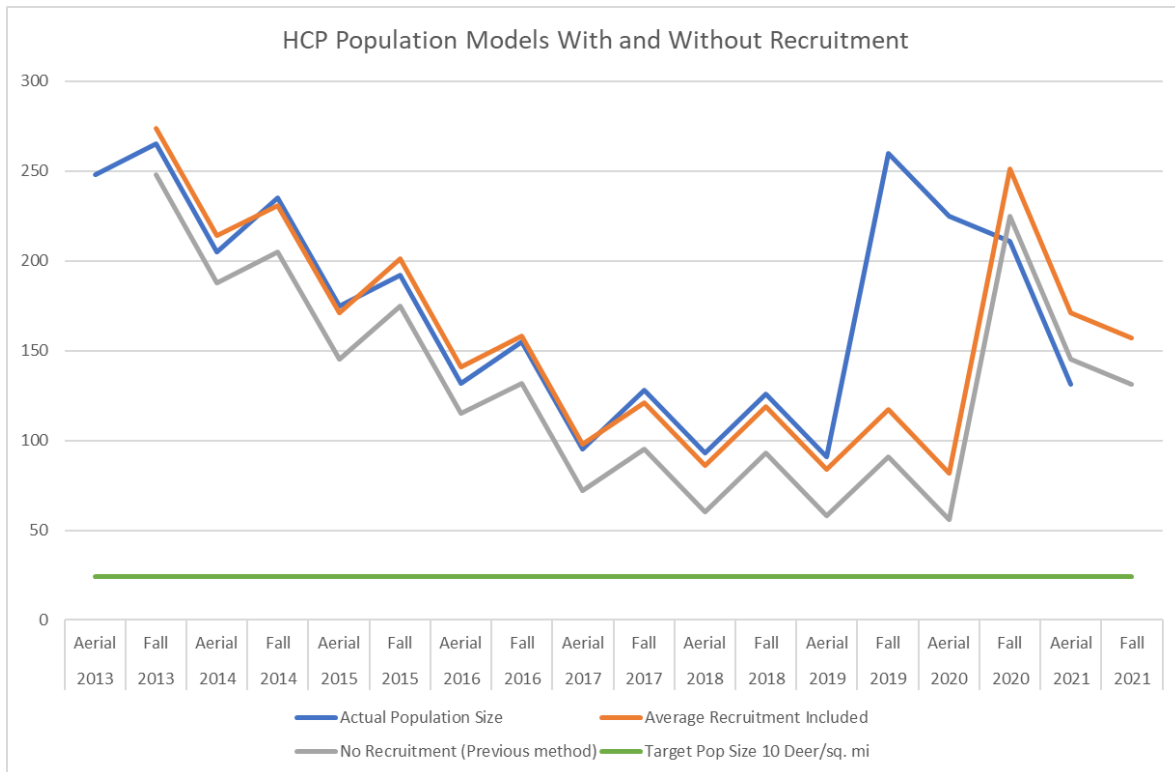


Figure 3. Graph comparing the accuracy of “Average Recruitment” & “No Recruitment” models to the surveyed size of Hickory Creek Preserve’s deer population

Literature Cited

Downstate Forest Preserve District Act. 70 ILCS 805/5. Ch. 96 1/2, par. 6308.

Wilhelm, Gerould, and Laura Rericha. *Flora of the Chicago Region: A Floristic and Ecological Synthesis*. Indiana Academy of Science, 2017.

Summary of Aerial Survey Areas, Deer Counts, and Densities from 1993-2021 at all Deer Management Sites

Appendix A																												
Area Counted (square miles)*																												
Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008	2010/2011	2012/2013	2013/2013	2014/2014	2015/2015	2016/2016	2017/2017	2018/2018	2019/2019	2020/2020	2021/2021			
Romeoville Prairie Area			0.61			0.61	0.61	0.61	0.66			0.90		0.90	0.90	0.95	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Lockport Prairie Nature Preserve			0.43			0.43	0.43	0.43	0.43			0.56		0.43	0.43	0.43	0.43	0.45	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49		
Lockport Prairie East																	0.05	0.05								0.21		
McKinley Woods Preserve						0.68	0.68	0.68					0.84	1.11	1.11	1.11	1.11	0.88	0.88	0.88	0.82	0.82	0.82	0.82	0.82	0.82		
Hickory Creek Preserve		2.36	2.46	2.36	2.36	2.36	2.36	2.36				3.25		3.25	3.25	3.25	3.25	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	
Raccoon Grove Nature Preserve		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.33
Thorn Creek Nature Preserve		4.67	3.52	4.99	4.99	3.52	3.52	3.52	3.52		4.08		3.52	3.52	3.52	2.92	2.92	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.6	
Goodnow Grove Nature Preserve												2.10		1.50	1.50	1.50	1.50	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	
Kankakee Sands Geologic Area			0.75			1.04	1.04	1.04		1.79			2.57	2.57	2.57	2.57	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	
Messenger Woods and Marsh		1.94		1.86		1.73	1.73	1.73	1.94	1.84		2.30		1.49	1.49	1.49	1.49	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Prairie Bluff Preserve															0.98	0.98	0.98	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	
Plum Valley Preserve			0.88		0.88		0.88	0.73	0.73	0.73		1.21		1.36	1.36	1.36	1.36	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	
Aerial Count																												
Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008	2010/2011	2012/2013	2013/2013	2014/2014	2015/2015	2016/2016	2017/2017	2018/2018	2019/2019	2020/2020	2021/2021			
Romeoville Prairie Area			18			0	42	30	47			54		28	27	33	16	47	37	31	34	34	25	1	21			
Lockport Prairie Nature Preserve			44			8	25	38	41			29		24	27	14	21	25	21	18	27	12	11	28	28			
Lockport Prairie East																	19	8	0						26			
McKinley Woods Preserve						79	66	92					180	122	137	123	93	65	65	64	35	51			4			
Hickory Creek Preserve		119	159	92	38	94	40	75				155		200	147	248	205	175	132	95	93	91	225	131	131			
Raccoon Grove Nature Preserve		106	89	60	47	44	39	30	54		58		52	0	32	59	20	20	22	29	34	5	6	0	0			
Thorn Creek Nature Preserve		237	199	411	320	110	181	174	247	252	327	169	373	99	200	30	73	73	59	59	56	59	63	158	158			
Goodnow Grove Nature Preserve																										93		
Kankakee Sands Geologic Area			42			39	28	84		81			132	110	98	94	76	59	52	38	70	49	92	22	22			
Messenger Woods and Marsh			22			43	4	72	127	82		136		160	178	110	116	135	183	91	98	98	93	93	93			
Prairie Bluff Preserve															33	8	19	12	63	43	17	24			3			
Plum Valley Preserve			40		49	44		69	55			74		57	61	54	75	35	35		42	57	55	73	73			
Densities (per square mile)																												
Preserve & Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2005	2006	2007	2008	2010/2011	2012/2013	2013/2013	2014/2014	2015/2015	2016/2016	2017/2017	2018/2018	2019/2019	2020/2020	2021/2021			
Romeoville Prairie Area			30			0	69	49	71			60		31	30	35	18	52	41	34	38	28	1	23	23			
Lockport Prairie Nature Preserve			102			19	58	88	95			52		56	63	33	49	56	43	37	54	25	22	56	56			
Lockport Prairie East																	380	160		0					124			
McKinley Woods Preserve						116	97	135					214	110	123	111	84	74	74	73	43	62			5			
Hickory Creek Preserve		50	65	39	16	40	17	32				48		62	45	76	63	73	55	39	39	38	93	54	54			
Raccoon Grove Nature Preserve		212	178	120	94	66	88	60	108		116		104	0	64	118	118	40	44	58	68	10	12	0	0			
Thorn Creek Nature Preserve		51	57	82	64	41	51	70	72		80		106	28	68	10	10	47	39	39	36	38	40	99	99			
Goodnow Grove Nature Preserve												80		73	65	63	51	42	37	28	50	35	66	67	67			
Kankakee Sands Geologic Area										46			51	44	42	44	51	50	28	18	24	21			10			
Messenger Woods and Marsh										45				107	119	74	78	81	110		55	59	56		56			
Prairie Bluff Preserve															34	8	19	11	59	41	16	23			3			
Plum Valley Preserve		45	56	50		63	41	95	75			61		42	45	40	55	49	31		59	80	77		103			

*Area surveyed may differ slightly from actual area of site