Wildlife Populations: White-tailed deer

Background

New Jersey's white-tailed deer (*Odocoileus virginianus)* herd is a major component of the landscape throughout all but the most urbanized areas of the state. "White-tailed" refers to the white underside of the tail, which is held conspicuously erect like a flag when the animal is alarmed or running. The adult white-tailed deer has a bright, reddish-brown summer coat and a duller, grayish-brown winter coat. White fur is located in a band behind the nose, in circles around the eyes, inside the ears, over the chin and throat, on the upper insides of the legs and beneath the tail. The young, called fawns, have reddish coats with white spots.[1] Deer affect our forests, farms, gardens, back yards, health, and roadways. In the early 1900s, there was only a handful of deer in the state, but the population rebounded during the 21st century.

Deer are photographed, watched, and hunted by many New Jersey residents and visitors. In New Jersey, hunters spend more than 100 million dollars each year, which benefits a wide variety of New Jersey businesses.[2]

Deer also have negative impacts on humans, including vehicle collisions, depredation of agricultural and ornamental plantings, and the potential for harboring parasites which can transmit diseases to man or domestic animals. Deer are selective browsers, and over time, herds can eat some plants out of existence and reduce the populations of other plants. Because tree seedlings are especially vulnerable to hungry deer, the future species composition of forests can be determined by deer browsing. While trees eventually grow out of a deer's reach, many other plants never do. Because deer browsing can significantly change habitat composition, it also exerts a strong influence on other animal populations.

The size of the deer herd is managed through regulated hunting. The goal is to maintain a healthy deer population in New Jersey using licensed hunters to achieve tolerable densities. Deer are managed in New Jersey according to deer management zones, which are areas with similar land-use, ecological, and deer herd characteristics. The zone boundaries include roadways, rivers, and other easily identifiable landmarks.

White-tailed Deer (Photo by Craig Lemon, NJDEP)

Trends

Figure 1 below shows the deer population estimates for 1984-2018.[3] Although the trend appears to be decreasing before 2017, there are at least two factors which make it difficult to accurately determine statewide populations. First, changes in hunting regulations over the years introduce variability into the population estimates since the basic data is derived from hunter-harvested deer whose hunting behavior is affected by the regulations. Second, estimates for populations in non-hunted areas are not available, and this lack of information makes the population estimates conservative.[4] Deer populations vary geographically in the state. If deer were evenly distributed throughout the state, the 2017 population would average about 16.7 deer per square mile. However, urban areas typically have relatively few or no deer, and most suburban and rural areas with good deer habitat have more. For example, before recent culling efforts, Princeton Township had an estimated

deer population of 114 per square mile and nearby Hopewell Township estimated its deer population in 2010, prior to hunting season, as 54 per square mile.[5]

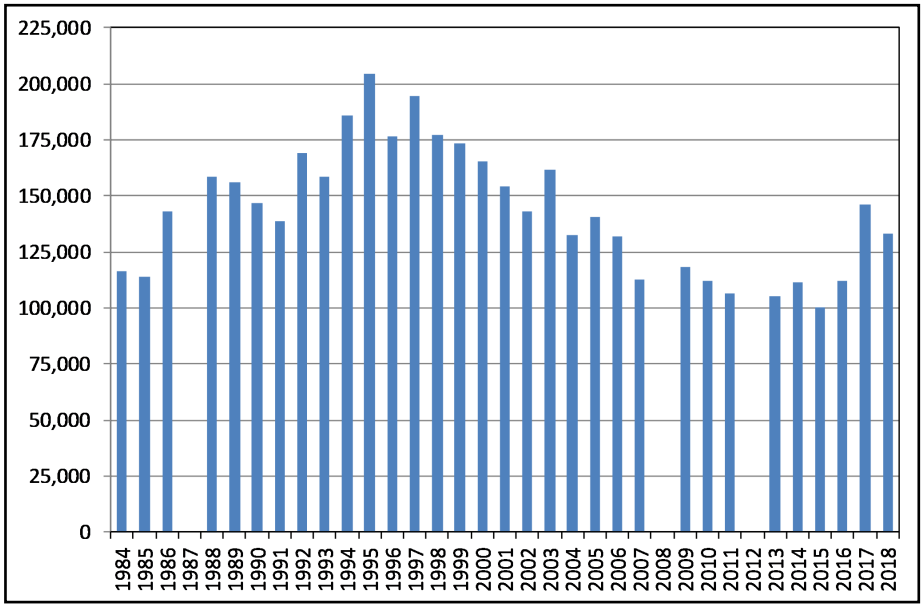

Figure 1: New Jersey estimated deer population from 1984 to 2018. Estimates are not available for 1987, 2008, or 2012.

Outlook and Implications

Deer populations have reached problematic numbers in numerous areas of the state. In an effort to help reduce these populations, the NJDEP Division of Fish and Wildlife (Division) has lengthened hunting seasons, increased limits on the number of deer that can be harvested (bag limit), increased the number of hunting permits issued, and offered incentives for hunters to harvest more does and fawns. However, in some areas, factors such as development patterns, properties where hunting is prohibited, regulations or ordinances that severely restrict or preclude hunting, and landowner decisions not to allow hunting, have reduced the effectiveness of hunting. Public open space with full hunter access typically has much lower deer densities than surrounding areas where hunting is not allowed or is restricted. Although New Jersey has some of the most liberal deer hunting regulations in the nation, lack of or restricted hunter access results in undesirable deer densities in many areas of the state. In areas where sport hunting is not considered to be a practical management tool, the Division has permitted alternative methods of controlling deer populations under the Community-Based Deer Management Permit program.[6] These alternative methods include controlled hunting, shooting by authorized agents, capture and euthanization, capture and removal, and fertility control. There is also a "Deer Management Assistance Permit" (DMAP) for landowners or property managers who have land in zones with lower bag limits. These permits allow the applicants and their agents to remove additional antlerless deer. Farmers also get free permits to hunt their property and free depredation permits to allow for the take of deer during off-hunting season to mitigate agricultural damage.

Deer are an "ecosystem engineer" species that, in conjunction with other species, appear capable of affecting the ecosystem at many levels and of degrading deciduous forests in New Jersey.[7] Studies in Pennsylvania involving enclosed areas have revealed a loss in animal and plant diversity as deer populations exceeded 10 per square mile. The depletion increased in a nearly linear fashion as deer density increased.[8,9,10,11] A major concern that is related to biodiversity is forest regeneration. It is clear that overbrowsing by deer does inhibit the growth of some species of trees. However, it should be noted that because many other factors affect forest regeneration, no blanket assumptions should be made about what is a desirable density of deer. Deer density as it relates to ecosystem health is site dependent. A 2004 study by DEP biologists found greater diversity of plant species, but not a higher stem density, in areas of lower deer density than in areas of higher deer density, within a given physio-geographic region and in areas of comparable soil and habitat.[12] More recent research by DEP involving approximately 30 deer exclosures has found that plant stewardship indices and diversity indices are generally higher inside the deer exclosures than outside, but that those indices are not necessarily correlated with deer densities between sites.[13] These studies are complicated by a variety of factors, including soil types, prior land use, slope, and canopy cover.

More Information

https://www.nj.gov/dep/fgw/deer.htm, NJDEP Division of Fish and Wildlife

http://www.nhptv.org/natureworks/whitetaileddeer.htm, a public television site

https://njaes.rutgers.edu/fs1202/ , NJ Agricultural Experiment Station

References

Much of the information in this report is available on the NJDEP Division of Fish and Wildlife website at https://www.nj.gov/dep/fgw/deer.htm

[1]Desert USA https://www.desertusa.com/mag99/june/papr/wtdeer.html, accessed 8/28/2019.

[2]U.S. Fish and Wildlife Service and U.S. Census Bureau, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation- New Jersey. Revised December 2013. https://www.census.gov/prod/2013pubs/fhw11-nj.pdf, accessed 8/28/2019.

[3]NJDEP Division of Fish and Wildlife, 2011, Carole Stanko, NJDEP Division of Fish and Wildlife, personal communication, 11/7/14. Data not available for 1987, 2008 or 2012.

[4]Joseph Penkala, NJDEP Division of Fish and Wildlife, Bureau of Wildlife Management, personal communication.

[5]Hopewell Valley Deer Management Task Force, 2010, Hopewell Valley Deer Management Plan, submitted to Hopewell Township Committee, September, 2010, http://www.hopewelltwp.org/DocumentCenter/View/501/Hopewell-Valley-Deer-Management-Plan---Report-PDF, accessed 8/28/2019.

[6]NJDEP Division of Fish and Wildlife, 2014, Community-Based Deer Management, https://www.nj.gov/dep/fgw/cbdmp.htm , accessed 8/28/2019.

[7]Baiser, B., J. Lockwood, D. LaPuma, and M. Aronson, 2008, A perfect storm: two ecosystem engineers interact to degrade deciduous forests of New Jersey, *Biol Invasions*, 10, 785-795

[8]Katz, Larry, 2004, Rutgers University, personal communication.

[9]Tilghman, Nancy, 1989, Impacts of white-tailed deer on forest regeneration in Northwestern Pennsylvania, *Journal of Wildlife Management, 53*, 524-532.

[10]DeCalesta, David, 1994, Effects of white-tailed deer on songbirds within managed forests in Pennsylvania, *Journal of Wildlife Management, 58,* 711

[11]U.S. Forest Service, 1991, Effect of Deer Population Levels on Natural Regeneration of Allegheny Hardwoods. https://www.fs.fed.us/ne/global/ltedb/catalogs/cat50.html, accessed 8/28/2019.

[12]NJDEP, 2004, Unpublished study, personal communication, Susan Predl, NJDEP Division of Fish and Wildlife

[13]NJDEP, 2008, Unpublished study, personal communication, Susan Predl, NJDEP Division of Fish and Wildlife