

Delaware Deer Population Management: 2009 Deer Densities and Population Estimates

Survey Background

The State of Delaware completed its first aerial infrared deer population survey in December 2005. This gave residents their first comprehensive deer population estimate for the state. Since the 2005 season, various programs have been put into place to help increase the deer harvest, specifically the harvest of female deer. In 2009, a second survey was completed to determine how the deer population has responded to these changes. Comparing the survey techniques between the 2005 and 2009 surveys, the State made some improvements. Some of those changes were:

- 1) New survey blocks were flown within each management zone based on the new 2007 aerial habitat photos
- 2) Location of blocks were randomly selected by a computer program to eliminate survey bias and to more accurately represents habitats within the management zone
- 3) The survey was conducted in March rather than December to provide a more accurate measure of the post-hunting deer population.

What We Learned

The completion of this second statewide aerial deer survey provided a much needed comparison with the 2005 aerial survey to verify results and determine measures of variability. This comparison confirmed that:

- 1) This technique only estimates the deer population and should not be considered anything more (not a census)
- 2) There is temporal differences (between survey nights based on weather or moon phase) and detection differences (among habitats) that create a degree of variability of approximately 20% or on average ± 8 deer
- 3) Spatial variability by moving blocks within zones was not an issue except in Deer Management Zone 1.
- 4) This comparison confirmed the need to develop additional indices of population abundance to continue to verify and refine the aerial survey estimates because due to its expense, the aerial survey probably can only be funded every 5 years.

Results

Results of the aerial survey showed wide differences in some of the 17 individual management zones, suggesting future management efforts might need to be based on a large scale, i.e., combining zones or on a county level. The statewide deer population estimate (post-hunting season) was 31,071 deer which was a 17.3% reduction from the 2005 estimate. This population estimate is still 10.7% above the target goal of 40 deer/square mile of deer habitat with an estimates statewide density of 44.3 deer/square mile. Achieving this target density has been complicated by the fact that deer habitat has been reduced by 18.4 square miles (2.6%) since 2005 by conversion to non-deer habitat. County population estimates show that the deer

population in Sussex County has been reduced 5.8% (50.3 deer/square mile) since 2005, while the Kent County population has been reduced by 11.4 % (30.8 deer/square mile). The density estimates for New Castle County are 47.9 deer/square mile; however a comparable reduction percentage was not available due to significant differences in population estimates cause by relocating the survey block. This difference between survey blocks suggests splitting Zone 1 into two deer management zones, one above and one below Interstate 95. Deer management zone data indicated that the deer population was still significantly above target levels in, Zones 2, 7, 10, 14 and the north portion of Zone 1. Zones with populations below target levels were Zones 5 and 12. The other 11 zones were close to target levels when considering survey variability.

The 2009 aerial survey data was determined to be correlated with another population index, antlered buck harvest/square mile of deer habitat. Deer management zones with the lowest deer population also had the lowest harvest of antlered bucks per square mile. Buck harvest/square mile is an index used by many other states and this comparison with another index helps verify the aerial survey data and provides an index to look at during years when aerial data is not collected.

Summary

The Delaware statewide deer population has stabilized and started to decrease since 2005, but the population level is still above the statewide goal. Several management zones have excessive deer while a few might be below target levels. The second aerial survey allowed for a comparison and a measure of detection variability but appears to be correlated with other population indices. Variability measurements will be incorporated into management population goals and additional indices will be developed and used to verify and refine the population estimates and target levels. Finally large differences between zones might suggest management at a larger scale, e.g. county-wide or combining management zones.

Estimated Deer Density in 2005 and 2009 within each of Delaware's 17 Deer Management Zones

Deer Management Zone	2005 Deer Density*	2009 Deer Density*
1	134.8**	46.7**
2	59.7	85.4
3	33.2	22.0
4	42.1	34.8
5	42.1	14.5
6	15.2	37.6
7	72.4	65.4
8	57.9	59.4
9	39.2	22.5
10	37.7	108.7
11	43.5	21.1
12	36.0	16.8
13	16.3	53.6
14	73.2	114.4
15	70.8	29.8
16	74.6	51.8
17	11.3	53.8
Statewide Average	52.2	44.3 (-15.1%) ***

* Deer Density is calculated as the number of deer per square mile of deer habitat. Due to detection variability with this survey technique, estimates have a variability of +/- 20.75%

The total statewide post-hunting season deer population in 2005 was estimated at 37,563 deer, while in 2009 it was estimated at 31,071 deer, a 17.3% statewide reduction***.

County-wide deer population changes between 2005 and 2009 were:

Sussex County - reduced 5.8% County density - 50.3 deer mi²

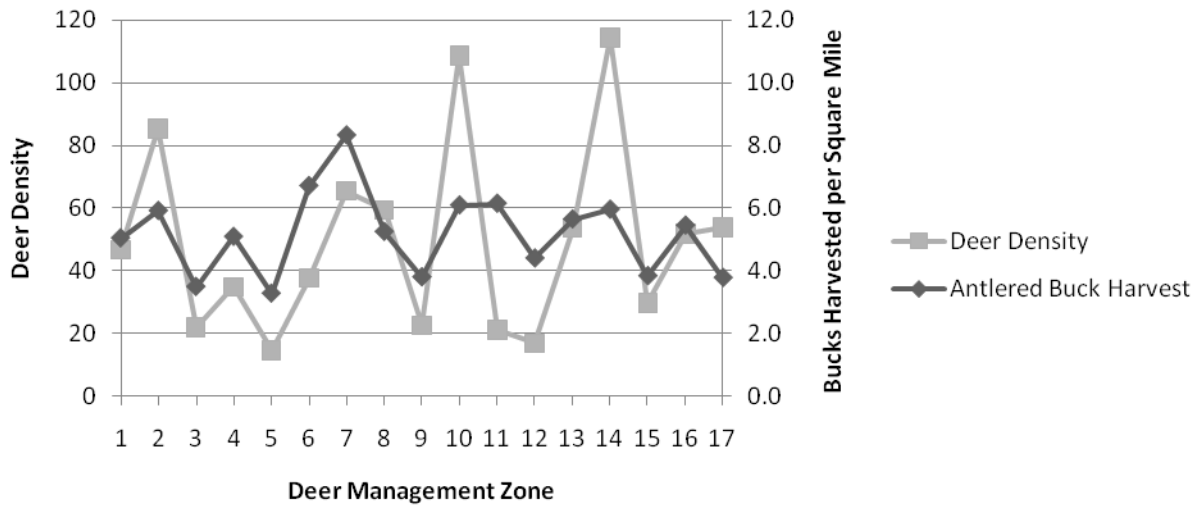
Kent County - reduced 11.4 % County density - 30.8 deer mi²

****New Castle County** - County density – 47.9 deer mi²

**We were unable to calculate the population change due to extreme variability between surveys in northern and southern portions of Zone 1. This might justify splitting the zone.

***The total available statewide deer habitat (forests, wetlands, and rangelands) in 2005 was 720.2 mi², while in 2009 it was 701.8 mi². Indicating 18.4 mi² of deer habitat was lost to development or another habitat conversion, causing a 2.6% reduction in habitat.

2009 Deer Density and Antlered Buck Harvest per Square Mile of Deer Habitat



The 2009 Deer Density obtained from the aerial survey work and the 2009 Antlered Buck per square mile obtained from our harvest data is correlated (with the exception of Zone 11). Buck harvest per square mile provides another index of population change, an index used by many other state wildlife agencies. Unfortunately the buck harvest data from 2005 was unable to be used because 41% of the harvested bucks had unknown zone locations. This index as well as others will be used to provide additional measures of population change in addition to the aerial survey work.