

DEER BY THE NUMBERS

The N.C. Wildlife Resources Commission uses biological and survey data to help manage the state's growing deer herd

written by Moriah Boggess

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Regulated hunting is a vital component of the wildlife management model applied across North America. Specifically in the scope of deer management, the obvious and most-often cited benefits of hunting are its value as a tool to mitigate human-deer conflicts, provide sustainable healthy venison, fund conservation work and manage deer populations.

The last point, however, is more complex than it seems. While hunting is a very useful tool for applying or reducing harvest pressure on a population, and thus changing its trajectory, it also provides a stream of data to wildlife managers that is imperative for monitoring populations.

Hunters typically harvest well over 150,000 deer each year in North Carolina that are reported through the Big Game Harvest Reporting System. Of those deer, roughly 4,000 will provide biological data to the N.C. Wildlife Resources Commission, such as body weight, age, lactation status, etc. Add to this other data collected from the Hunter Harvest Survey and Deer Hunter Observation Survey, and the Commission ends up with a lot of data collected every year! These large sample sizes and varied deer population indices are vital to reliable population monitoring. If it wasn't for hunters' harvests and input, detailed county-level population monitoring would be impossible for statewide wildlife managers.

In this article, we will explore just how the Commission collects deer harvest information, biological data and survey data to monitor the deer population across all 100 counties. More importantly, we will see just how this data combined with deer ecology principles can be used to monitor deer populations.

Harvest Data Collection

Every successful deer hunter must report their harvest to the Commission through the Big Game Harvest Reporting System by phone, online or by visiting a local wildlife service agent. During the harvest reporting process, hunters must indicate county of harvest, equipment used, if the deer is antlered or antlerless and whether the deer was harvested on private lands or game lands.

These harvest records are immediately available to wildlife law enforcement officers and management biologists providing a real time barometer for the ongoing deer season and informing effective regulation enforcement. However, it isn't until well after hunting season has ended that all reported harvest is entered, irregularities in the data have been reconciled and the deer harvest summary is finalized. At this point, the statewide harvest data is ready to be used for population monitoring and regulation proposal evaluations.

One of the most important indices for monitoring overall population trends is the reported antlered buck harvest per square mile that is gathered through the Big Game Harvest Reporting System. As

populations increase, so does the antlered buck harvest density, and vice versa. Buck harvest is currently allowed during all open deer seasons and the buck bag limit is seldom adjusted, making this a strong long-term population index.

Biological Data Collection

The bulk of deer biological data is collected by district wildlife biologists across the state through voluntary data collection operations. Most often this happens through a close partnership with a deer processor who allows

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Commission employees to set up a temporary biological check station at their place of business.

Hunters coming to the processor are asked by biologists if biological data can be collected from their deer. With the hunter's permission, the deer is weighed and aged by tooth wear. Antler measurements are taken on bucks, lactation data are recorded

on does and lymph nodes are extracted from the deer's head to be submitted for chronic wasting disease (CWD) testing.

Other data collection methods also provide important biological data from segments of the deer harvest that are typically missed at Commission-staffed check stations. Hunters anywhere in the state can participate in the Deer Jawbone Submission Program. Once signed up for the program, hunters will receive prepaid mailing envelopes that they can use to submit jawbones from their deer harvests to the Commission.

Another source of biological data comes from the Deer Management Assistance Program (DMAP), which provides additional deer tags and management assistance to landowners and managers working to reach defined management goals. Biological data from all deer harvested on DMAP tags must be reported to the Commission.

Collecting biological data from a variety of sources across the state is important to obtaining a random sample that is representative of hunter harvest. This representative sample allows biologists to develop a clear picture of deer herd demographics and trends without examining every deer harvested in the state.

Deer age structure data collected through these sources is used as another index of deer population trajectory. Generally, the older the doe age structure in a population, the lower the harvest pressure. For example, if the doe age structure was to gradually increase, this would be an indication to biologists that the population could support more harvest. On the other hand, having a well-developed buck age structure with deer in all age classes, from yearling to maturity, is an earmark of a well-balanced deer herd.

Body weight, antler measurements and lactation data are excellent indications of the balance between the deer population



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and habitat quality. This data is used in the following ways:

- Average body weights for each age class of bucks and does can be monitored for indications of deer population imbalances. Most notably, a long-term decline in the average body weight of deer is an indication that either habitat quality should be improved or the deer population should be reduced to better balance the population with available habitat.
- Antler measurements can be used in much the same way as body weights but are a less sensitive metric for evaluating changes in habitat quality.
- Lactation in hunter harvested does is one of many ways to estimate fawn recruitment rates, and lactation status in yearling does is another sensitive metric of habitat quality since only well-fed doe fawns will grow large enough to breed during their first fall. Yearling does with fawns is an excellent indication that deer have access to good habitat.

Survey Data Collection

The Commission gathers data directly from deer hunters through two surveys: the Hunter Harvest Survey and Deer Hunter Observation Survey. Each year, the Hunter Harvest Survey is sent to a random sample of roughly 30,000 licensed hunters statewide. The survey collects information from respondents on deer and several other wildlife species, including the number of days they hunted each game species, the county they hunted in and how many animals they harvested.

Harvest information collected from the Hunter Harvest Survey is used to estimate total deer harvest and nonreporting through the Big Game Harvest Reporting System. This makes reporting data from the Hunter Harvest Survey vital to accurately monitoring statewide harvest by accounting for deer that are harvested but not reported as required.

The Deer Hunter Observation Survey is a voluntary survey that any deer hunter can participate in. Volunteers should enroll in the survey during the summer so that they receive a survey form before the start of



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PEAK OF THE RUT

When is the peak rut in North Carolina? The answer depends on where you are located. Breeding peaks as early as Oct. 4 in Hyde County and as late as Dec. 19 in Macon County. The Commission publishes the Estimated Peak Rut Dates map online (ncwildlife.org/deer) that shows the peak breeding date for each county.

These peak dates are estimated by measuring fetus lengths collected from does killed by vehicles in winter or harvested late in the season. The length of the fetus is compared to standardized fetus development rates to estimate how many days prior to collection the fetus was conceived. With a fair level of certainty, the fetus conception date can be estimated, which in turn indicates when the doe was bred.

For a given local deer population, the peak of breeding will occur on approximately the same date every year, because it is triggered by the length of daylight. Breeding can span up to a month as some does naturally breed earlier or later than others each year. The peak breeding date, which essentially falls in the middle of the breeding season, is when the greatest number of does will be in estrus and is the date estimated on the map.

Peak breeding dates on the map change slightly over time as more data is gathered by Commission biologists, providing increased precision in the estimate of county-wide peak breeding dates. Between five and 269 deer have been sampled in counties where an estimated peak rut date is provided. In counties with fewer than five samples, the peak breeding date is not provided because of the high rate of variation in datasets this small.



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hunting season. Throughout the season, volunteers are asked to record information about their hunts as well as the number of deer, bear, turkey, squirrel, furbearers, feral swine or other animals they see while hunting.

Trends in animal sighting rates from the Deer Hunter Observation Survey provide insight into population trends. The ratio of fawn to doe sightings reported through the survey provides an important evaluation of fawn recruitment (the average number of fawns produced per doe annually) across the state. Fawn recruitment statistics are vital to monitoring the condition of a deer herd and its resilience to hunter harvest and other sources of mortality.

Connecting the Dots

Now that you understand how the Commission collects harvest, biological and survey data for deer management, we will explore how this data informs deer population management. Ultimately, the purpose of deer regulations set by the Commission is to regulate hunting so that a healthy and sustainable population of deer is conserved for future generations.

North Carolina is delineated into five deer zones: Northeastern, Southeastern, Central, Northwestern and Western. Deer bag limits are the same across all deer zones, allowing the harvest of two bucks and four does by every hunter. However, deer zones are used to differentiate different deer season structures across the state.

Each deer zone's archery season opens on the same Saturday in early September, but the timing of blackpowder and gun seasons vary widely by zone. The timing of blackpowder and gun seasons are impactful because these are the seasons when the highest proportion of deer are harvested. The timing of these seasons differs from east to west across the state following the same general trend of the white-tailed deer rut that peaks earlier in the East than the West.

Doe harvest is regulated by the either-sex season dates set on a county-by-county basis

that determines how many days in blackpowder and gun season hunters may take antlerless deer. By reducing or increasing the time available to harvest does, biologists can effectively adjust doe harvest. In this way, either-sex seasons are essentially the gas and brake pedals for deer population management. If the population is undesirably low, then either-sex seasons are shortened or eliminated until populations adjust. If the population is increasing and needs to be stabilized, then either-sex seasons are lengthened.

Each spring, the Commission's deer team—comprised of several agency wildlife biologists across the state—meet to begin examining the deer data from the most recent season. Long-term datasets are used to monitor trends in specific deer population indices, which are used as evaluations of the condition of the deer population across the state. These indices include:

- Sustained antlered buck harvest per square mile.
- Age structure of doe and buck harvest.
- The percentage of total harvest that is does.
- The sex ratio of harvest prior to peak breeding.
- The timing of buck harvest in relation to the rut.

When deer population indices in a county continually fall outside the bounds of the Commission's deer management objectives, or they are trending in the wrong direction, the deer team and other biologists will

recommend a regulation change to address the concern. For example, if a county was harvesting fewer than one buck per square mile and the harvest rate was declining annually, this would be an indication to biologists that the deer population was falling and harvest density was below objective.

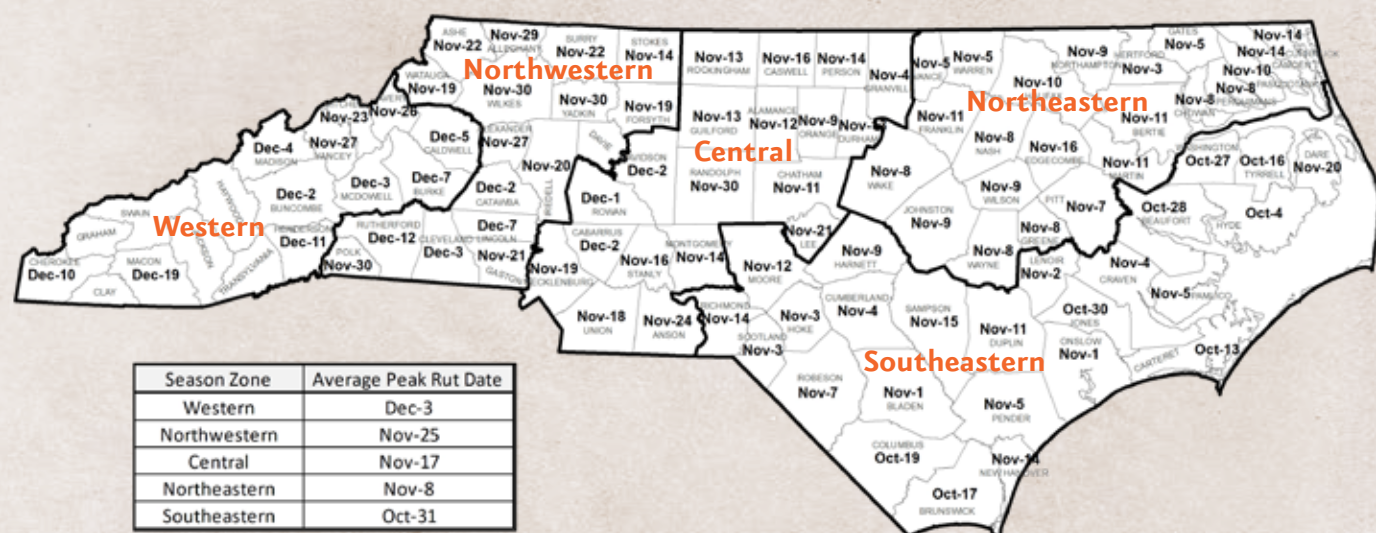
To confirm the population trend, the deer team would refer to other indices, such as doe harvest age structure, deer hunter observation survey trends and input from local biologists working in the county. Once biologists are confident that the overall trend is true, a regulation proposal would be developed and, in this case, would likely reduce either-sex season length to alleviate harvest pressure on does and allow the population to stabilize.

Full Circle

Deer management is a constantly evolving process that requires annual data collection and evaluation. The relationship between regulation development and hunting comes full circle as hunter harvests provide vital data for statewide population monitoring and therefore inform regulation adjustments to address changing deer herds. In this way, deer hunters and wildlife managers work in unison to provide a constant stream of data evaluations vital to the management of the species. ♦

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2022 ESTIMATED PEAK RUT DATES



Peak rut dates are estimated for each county based on reproductive data collected by biologists from various sources, including roadkill and late season hunter harvested does. The accuracy/precision of the estimated peak rut date for any given county can be influenced by the number of samples collected, and typically there is less confidence in estimates that are based on few samples. Within any given area, there is considerable variation in the timing of rut activity, and some does are bred before peak rut while others are bred well after peak rut. Little variation exists in peak breeding activity from one year to the next within a given area as doe estrus cycles are triggered by shortening day length during the fall, rather than weather events, including moon phase.