



By PGC Deer Biologists Christopher Rosenberry, Jeannine Fleegle and Bret Wallingford

DEER management is a lively enough topic. Just ask a few hunters about how many deer were harvested and you'll quickly see. It's like asking how many jellybeans are in the jar. Everyone has a guess, but nobody truly knows. However, there are a few ways one can get close to the answer. As biologists, we hang our hats on data. And defendable data are the bottomline for biologists estimating harvests and making management recommendations.

First, let's be clear. Unless there is a complete count, no one—biologist or hunter—knows exactly how many deer were harvested. While counting dead deer is easy compared to live ones, a simple count to answer this question does not exist. We know every deer harvested is not reported. In fact, 60 percent or more are not reported. We hope all hunters will report the deer they kill, but time and research have proven hunters won't and don't. So we collect data from those hunters who cooperate and from dead deer, following sound scientific standards, and then analyze it with statistically appropriate methods.

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Now that sounds like fun. At this point, you may be tempted to skip ahead to the next article or perhaps reread a few Field Notes, but don't go yet. Who says a dry scientific discussion of statistics has to be...well, dry?

Let's start by following our hunters and, more importantly for this discussion, their harvests from the beginning. Every year, hunters head into Penn's Woods in pursuit of our state animal. Every year, some of those hunters—maybe even you—harvest a deer. After a successful hunt, the fun is kind of over. Now comes the field-dressing, the dragging, the trip to the butcher, the drive home, cleaning up. If you process your own deer, the work more than doubles. All hunters are

required to report their harvest to the Game Commission using any of three methods: postage-paid report card, toll-free phone number, or online. But in the hustle and bustle of the after-harvest activities, more than 60 percent do not.

Hunting is the No. 1 mortality cause of white-tailed deer in Pennsylvania. Given that most deer meet their end at the hands of a hunter, attempting to make management recommendations based on data from less than 40 percent of the harvest would be foolish. So we do what biologists do; we collect data—from every wildlife management unit, assemble our facts and then estimate the jellybeans...or harvest.

Nobody likes estimates. For

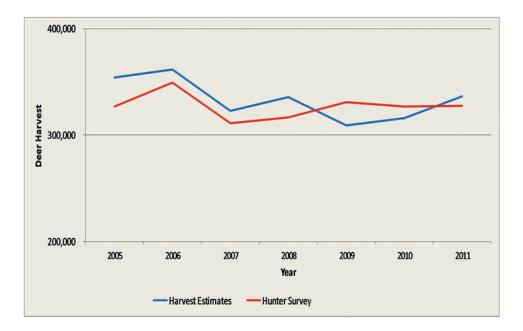
biologists, they complicate and often unfairly influence the public's perception of our work. For hunters, they seem deceptive and unreliable. However, with more than 60 percent of the harvest not being reported annually, estimates are the only way to find out how many jellybeans are in that jar.

There are standard methods and techniques with every profession. Wildlife biology is no different. Just as the engineer is trained to design, construct and maintain a bridge using data on traffic volume, maximum weight limits, and landscape features, we use deer harvest data and a



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basic wildlife technique to estimate the harvest. These data include the reported harvest (i.e., information from successful hunters who submit a harvest report) and the reporting rate. In practice, here's what it looks like: If 1,000 deer were reported and the reporting rate was 50 percent, those 1,000 harvest reports would represent half of the harvest. The total harvest would be 2,000.

We could call it a day and be satisfied with this harvest estimate. But we always strive to do this work better and faster, and have stronger results. Millions of Pennsylvanians are counting on us.

Better: There are assumptions to any method of estimating, so we regularly evaluate assumptions directed at our work. To be thorough, we even documented our data collection and analysis procedures and submitted them to a scientific journal for professional review. Our process was

considered scientifically appropriate and our evaluation was published in the Journal of Wildlife Management so others may benefit from our findings.

Stronger: Even with this "stamp of approval," we still don't rest on our laurels. We continue to doublecheck our harvest estimates. Each year, the Game Commission asks nearly 20,000 hunters how many deer they harvested. The results from the survey are compared to our harvest estimates. For more than 20 years, these two sources of harvest information have tracked each other. Recently, we were able to triple-check our harvest results using a separate deer hunter survey. Thousands of deer hunters were randomly selected and through their survey responses, we calculated what percentage of hunters harvested an antlered deer. The three different methods gave very similar answers—17 to 18

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percent of deer hunters harvested an antlered deer during the 2010 hunting seasons.

Faster: Well, there is no faster. Estimates take time. Hunters would like to know how many deer were harvested right after the gun season, but as managers, we need all the harvest data. Consider that deer seasons in some WMUs in the 2012-13 license year did not end until Jan. 26, 2013. Add to this the time allowed to send in report cards, and we are well into February. Over the years, we have improved and streamlined our methods to collect and analyze the data we require. As a result, there are few alternatives that may improve our harvest estimates. And little will speed up data collection when hunting seasons extend into late January.

Because our deer harvest estimates regularly match independent survey and deer hunter survey results, our confidence in their reliability is high. But, there is one thing that would make them obsolete.

If every hunter who harvests a deer remembers to accurately re-

port his or her deer to the Game Commission—as required by law—we can eliminate estimates forever. This would be a "win-win" for both hunters and biologists. Hunters would be providing complete and accurate data on the most important mortality cause of our valuable white-tailed deer resource, thereby alleviating any doubts they have about deer harvests. Biologists would be relieved of the burdens associated with the statistics, assumptions and uncertainty of estimates.

Achieving this goal is within reach. We can know how many jellybeans are in the jar! Successful hunters have free (to the hunter) and convenient methods available to report their harvests. Take a five-minute break from the "work" that successful hunting creates after your deer is harvested, and report it.

Christopher Rosenberry is the supervisor of the Deer and Elk Section and Jeannine Fleegle and Bret Wallingford are deer biologists.

What They're Saying About the Game Commission

Mr. Bill Akers emailed, "Dear *Game News* staff, I'm taking a moment to drop you a line. I've been a subscriber for 45 years and have all my issues in *Game News* binders, as I really enjoy your magazine. I commend Barbara McCleester on her article 'Thanks, Ray' in the July 2013 issue. I read the article three times and it brought tears to my eyes each time. A well-written piece on someone we would all like to have known. Please share my thoughts with the author."

Your comments have been passed along to Barbara McCleester, Mr. Akers, and I'm sure she appreciated hearing from you.

-Bob D'Angelo

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