

Efficacy of Pellet Count Surveys to Estimate Density of White-tailed Deer (*Odocoileus virginianus*)

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Accurate density estimates are critically important for managing many species of wildlife, as management is often based on achieving a goal of increasing, decreasing, or maintaining a certain population density. White-tailed deer, the most sought-after game species in North America and the foundation of the North American Model of Wildlife Conservation, is a species for which accurate population estimates are important. Population estimates are critical for the implementation of proper management of the species, for the analysis of birth and death rates, and for monitoring population development. Pellet count surveys, although an often overlooked and dated technique, have been previously suggested to be ineffective for determining density (Fuller, 1991). However, pellet count surveys have rarely been applied to populations of known density, which limits understanding of the accuracy of this technique (White, 1992). As seen in White's comment in 1992 to Fuller (1991), an accurate conclusion on the efficacy of pellet count surveys cannot be made unless the density estimate is compared to the true density of white-tailed deer in the area.

The Auburn University Captive Deer Facility, a 174-hectare high fence facility located in Camp Hill, Alabama, offers a unique, controlled environment for examination of pellet count surveys. Specifically, the high number of tagged individuals (~80%) in the facility provides an opportunity to generate accurate estimates of density using photographic data and mark-recapture models. During fall through winter of 2020-2021, we systematically established 684 points across Auburn University's Deer Research Facility using the Avenza Maps® application (Avenza Maps, Avenza Systems, Toronto, CA; accessed January 2020). Each point was systematically established using a 50-m grid across the entire facility. Any point located within 2 m of the fence line, in a body of water (creek, etc.), in a food plot, on

a road, or within 50 m of a feeder was excluded. Beginning in October 2020, a circular plot of 1.5-m radius was set up at each point and centered on a pin flag. Using a stake centered on the flag that was attached to a 1.5-m string, the plot was carefully walked in a circle and cleared of any fecal pellets. In November 2020, December 2020, January 2021, and February 2021, plots were revisited and checked for fecal pellet groups using the same method as when plots were first established. If a pellet group was found during a survey, it was counted and subsequently removed from the plot. To compare estimates from pellet count surveys, we used camera trap data from marked, known-age deer to identify the true density of the population.

If proven to be accurate, this method will help land owners generate accurate estimates of white-tailed deer on their land without having to invest extra time or money in more expensive population estimation techniques. Additionally, the generation of more accurate population estimates will enable more refined management and improve quality of the herd.

Statement of Research Advisor

Sarah's research examines a long-overlooked density estimation technique that could change the manner in which deer biologists manage their herds.

-Stephen Ditchkoff, Forestry and Wildlife Sciences

References

Fuller, T. K. 1991. Do pellet counts index white-tailed deer numbers and population change? *Journal of Wildlife Management* 55:393-396.

White, G. C. 1992. Do pellet counts index white-tailed deer numbers and population change?: A comment. *Journal of Wildlife Management* 56:611-612.