

**GREAT SMOKY MOUNTAINS NATIONAL PARK:
WHITE-TAILED DEER POPULATION MONITORING PROTOCOLS**

**by
Kim DeLozier**

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WHITE-TAILED DEER POPULATION MONITORING

PROTOCOLS

GREAT SMOKY MOUNTAIN NATIONAL PARK

INTRODUCTION

Several methods (e.g., pellet counts, mark-recapture, daytime drive counts, roadside night counts, etc.) have been used in Cades Cove to estimate the white-tailed deer population density (Kinningham 1980). The two methods chosen to monitor the deer population status and density on a long-term basis include: 1) roadside night counts; and, 2) abomasal parasite counts (APC). Roadside night counts have been conducted since 1971 to determine relative estimate of deer density. The APC technique is a standard monitoring technique for land management agencies throughout the southeastern United States. In the park, APC's have been conducted three times since 1984 to evaluate population status. Abomasal parasite counts are used to determine deer herd health in relation to habitat. The technique is based on the principle that parasites in the abomasum of deer increase as deer herd health and habitat quality decline.

MONITORING DESIGN

Roadside night counts are conducted biweekly throughout the fall, winter and spring seasons. The technique, which is a modification of the drive count method (Overton 1971), involves driving the 17.7 km Cades Cove Loop road and selected side roads and recording all deer observed (Wathen and New 1986). An imaginary drive line is projected perpendicular to both sides of the road. As this line sweeps through fields, all deer that pass through are counted. Density estimates are derived by dividing the total number of deer observed by the total area surveyed.

An additional technique to monitor status of the Cades Cove deer herd is the utilization of the APC. For comparisons and relationships, the APC is conducted biennially in late August or early September. The technique involves removal of approximately 10 deer, 1 year of age or older. Deer are free ranged darted using a combination of Telazol and Xylazine. Once tranquilized, deer are humanely euthanized. Abomasal parasites are collected as follows: 1) after the abdominal cavity is opened, the abomasum is isolated from viscera by clamping and is removed; 2) the abomasum is placed in a deep, round bottomed one-gallon pan and opened longitudinally; 3) a metal spatula is used to scrape the abomasal contents and the mucosa into the pan; 4) fresh water is used to wash into the pan all remaining

stomach contents from the abomasum, hands, and tools; and, 5) the pan contents are poured into a one-gallon plastic container and preserved by adding 13 oz of 100% formalin (Eve and Kellogg 1977). Samples are shipped to Tennessee Wildlife Resources Agency laboratory in Nashville, Tennessee, for analysis. Laboratory analysis is described in detail by Eve and Kellogg (1977). Analyses are reflected by an APC value that represents the average number of adult abomasal parasites. Values are represented as follows: 500 or fewer indicating a "below" carrying capacity situation, 500-1,500 indicating a "within" carrying capacity or ideal situation, and greater than 1,500 indicating a situation where the herd exceeds carrying capacity (Eve and Kellogg 1977).

Figure 1. White-tailed deer roadside night count data sheet.

Date: _____

Observers: _____

Starting Time: _____

Ending Time: _____

Moon Phase: FQ FM LQ NM

Official Sunset: _____

Spotlight (Candle Power) _____

Weather Data:

Temperature _____ Windy _____ Calm _____

Clear _____ Partly Cloudy _____ Cloudy _____

Rain _____ Snow _____ Fog _____

Comments: _____

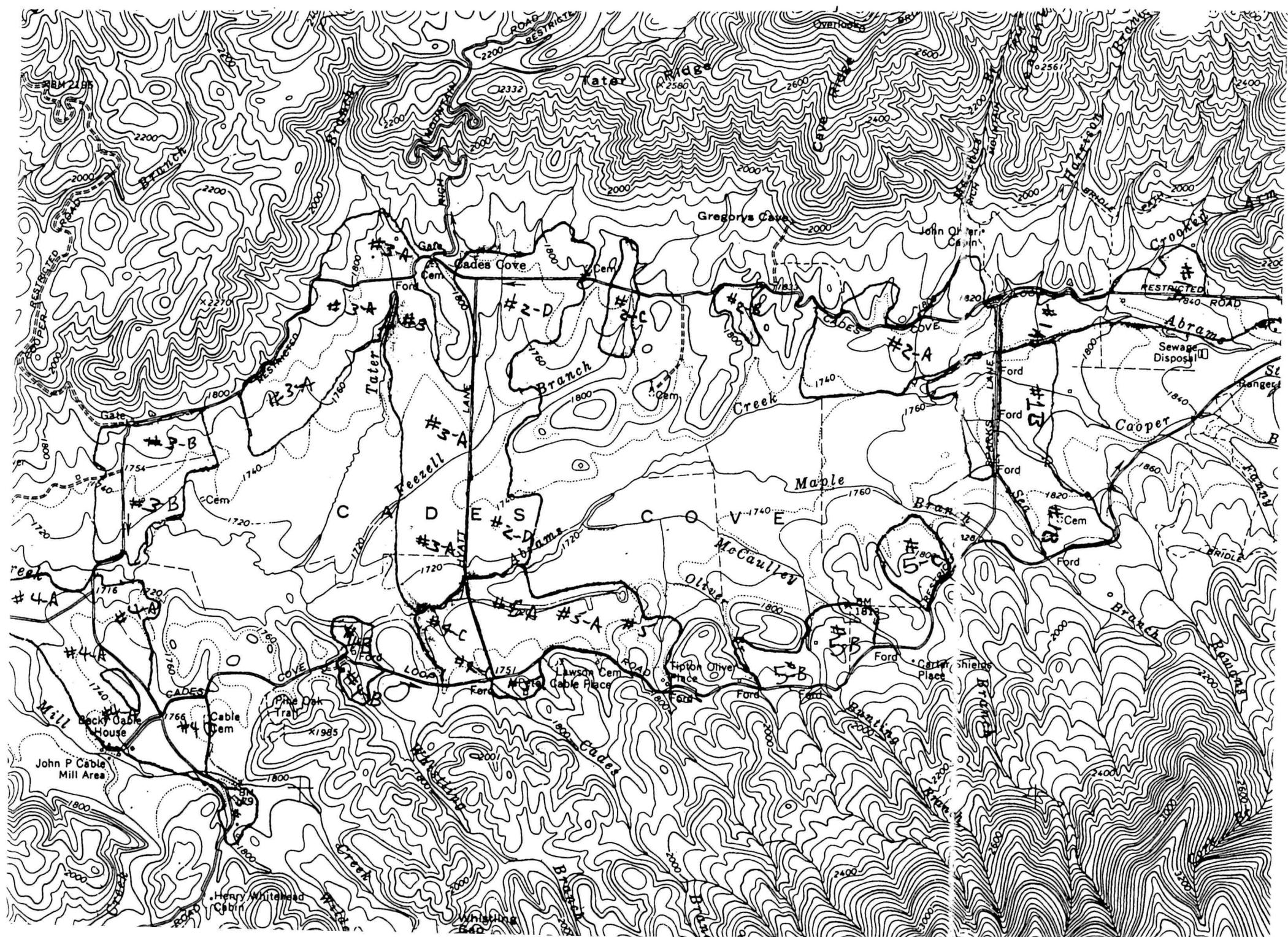
Number Observed In Area

Species	1	2	3	4	5	Total
DEER						
RACCOON						
BEAR						
COYOTE						
OPOSSUM						
SKUNK						

Comments: _____

AMOUNT OF AREA SURVEYED: _____

ESTIMATED DEER DENSITY: _____



LITERATURE CITED

- Eve, J.J., F.E. Kellogg. 1977. Management implications of abomasal parasites in southern white-tailed deer. *J. Wildl. Manage.* 41 (2):169-177.
- Kinningham, M.J. 1980. Density and distribution of white-tailed deer (*Odocoileus virginianus*) in Cades Cove, Great Smoky Mountains National Park. Unpubl. M.S. Thesis, Univ. of Tennessee, Knoxville. 93pp.
- Overton, W.S. 1971. Estimating the numbers of animals in wildlife populations. R.H. Giles, Jr., ed., pp. 403-455. *Wildlife management techniques*, 3rd ed. The Wildl. Soc., Washington, D.C. 633pp.
- Wathen, W.G. and J.C. New. 1986. The white-tailed deer of Cades Cove: population status, movements and a survey of infectious disease. NPS Research/Resources Mgt. Report SER-89/01.

APPENDIX
LETTERS OF INTEREST/SUPPORT



TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

December 21, 1992

Mr. Kim Delozier
Wildlife Biologist
United States Department of the Interior
National Park Service
Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

Dear Kim:

Thanks for the opportunity to review the protocols for long term monitoring of the Cades Cove deer herd. I agree that the two techniques (roadside counts and APC's) outlined are the most economical and effective in maintaining a long term database on the Cades Cove deer herd.

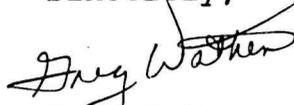
I would suggest that the APC collections be used to obtain additional data from the deer that are collected. Examples of the type of data that could be collected include, weight, age, kidney fat index, tail fat index, lactation, blood parameters, etc. I would also make it a standard practice to perform a complete examination of each deer collected for external and internal parasites, and other signs of disease. By expanding the scope of the APC collections in this manner, they would be more similar to the herd health examinations performed by the Southeastern Cooperation Wildlife Disease Study (SCWDS), and should provide valuable additional information on the deer herd health in Cades Cove. Collection of these data should not require much additional effort or manpower since they could be obtained as a part of the APC collections.

The State of Tennessee

AN EQUAL OPPORTUNITY EMPLOYER

I hope my comments are helpful to you in formulating your monitoring strategy for white-tailed deer. Please let me know if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Greg Wathen". The signature is written in dark ink and is positioned above the printed name.

Greg Wathen
Assistant Chief of Wildlife

GW/vc/bh01109/greg/KDelozier

cc: Ron Fox
Larry Marcum
Ben Layton

26 January 1993

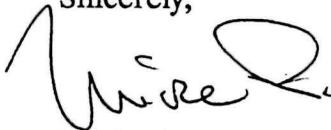
Department of Forestry, Wildlife
and Fisheries
P. O. Box 1071
Knoxville, TN 37901-1071
(615) 974-7126

Mr. Kim Delozier
Resources Management
Park Headquarters
Great Smoky Mountains National Park
Gatlinburg, TN 37738

Dear Kim:

I reviewed the protocol for long-term monitoring of white-tailed deer in Cades Cove, Great Smoky Mountain National Park. The combination of spotlight counts and APC surveys is a logical and relatively efficient method for assessing the status of this species. Procedures as outlined in the protocol have been previously researched, tested, and proven to be generally reliable monitors of herd status. Cades Cove offers an ideal area in which to conduct this monitoring program, and in the long term I am sure there will be ample benefits from conducting these surveys on a regular and systematic basis.

Sincerely,



Michael R. Pelton
Professor

