

**Spotlight Survey for
White-tailed Deer Population Trends on
Cumberland Island National Seashore**

CPSU Report No. 42

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December 1987

**U.S. National Park Service
Cooperative Studies Unit
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Abstract

A population survey technique for white-tailed deer populations trends on Cumberland Island National Seashore is developed utilizing night time counts by spotlight. A protocol is described and results given from two trial applications. The survey utilizes vehicles and follows two routes. Each vehicle is staffed by one driver and two observers. Deer are identified, when possible, by age classes and by sex. The survey should be conducted annually, preferably in late August or early September. Annual population surveys combined with data collected from managed hunts will provide the NPS with basic information necessary to make decisions concerning the management of the deer herd.

Introduction

A two-year study currently is being conducted on the white-tailed deer (*Odocoileus virginianus*) herd on Cumberland Island National Seashore (CUIS) to determine baseline biological parameters including: age and sex herd structure, food habits, reproductive season and potential, herd health including diseases and parasite burdens, and genetic diversity. Concurrently, there is an ongoing study utilizing deer-proof fenced exclosures to evaluate the impact of deer on the floral communities of the island, particularly on live oak regeneration, and a new radio-telemetry project to identify habitat preferences by deer and feral horses on the southern half of Cumberland.

In order to most effectively use these data for management decisions, a population survey technique was needed that could be conducted by NPS personnel. At the request of NPS staff, researchers at the School of Forest Resources and the Institute of Ecology, University of Georgia, were asked to help develop a survey technique to monitor trends in the deer population and to train NPS personnel in its implementation.

The spotlight survey technique was selected as the best survey method because of budgetary and staff limitations, as well as vehicular use restrictions in the wilderness and on retained rights property. This method was used by Southeastern Wildlife Services, Inc. (1980), thus allowing future data collection to be compared to their results. This technique is commonly used by state wildlife agencies to monitor deer population trends, and is based on a system used by Texas Parks and Wildlife (Anon. 1976).

Methods

A spotlight survey technique was implemented on CUIS during March and September 1986 in conjunction with NPS personnel. The following discussion describes the specifics for the spotlight survey and will allow the survey to be repeated in a standardized manner.

The spotlight survey uses a team of at least three people: one driver/data recorder and two observers with spotlights in the bed of a pickup truck. Surveys on CUIS can use the wooden racks built for the deer collection to provide protection from low hanging limbs and support for observers when traveling over the rough roads found throughout the wilderness portion of the island. The surveys should begin shortly after dark, usually 30-45 minutes after sunset or when the spotlight beams first become effective. Surveys should not be conducted during full moon. Deer are usually more active during the first hour or so after dark and would be more visible at this time. The

survey should be conducted about the same time each year. Late August or early September prior to mast fall seems to be the best time for the survey on CUIS. Bucks have finished growing their antlers and can be more easily distinguished from does. Yearlings and fawns are more easily separated from adults at this time.

The surveys should be conducted at least four and preferably six or more consecutive nights under similar weather conditions. The surveys should start at the same time each night and should begin at opposite ends of the route from one night to the next. Due to the dense vegetation and rough roads, vehicles should travel about 3-5 mph. The observers sweep their side of the road with the spotlight beam. They must be alert for eye shine from deer, the most easily seen part of a deer at night, but should be alert for a back or side view of a deer or for one that is lying down. Observers must concentrate in locating and identifying deer within approximately 100 yards on each side of the truck. Deer cannot always be identified accurately (sexed) beyond this distance without the aid of more powerful spotlights or spotting scope. Deer should be identified by sex and age class (adult, yearling, fawn), if at all possible. Stopping the truck is often necessary to accurately identify deer. Care must be taken to avoid counting the same deer more than once.

Once a deer is seen, the observers notify the driver. The use of small, two-way headset transceivers by all members of the survey team greatly facilitate this task. Otherwise, a light tapping on the roof of the truck cab will alert the driver to stop. Further directions or data can then be transferred from the observers to the driver.

All data would be recorded correctly on the data sheet. An example of the data sheet currently used on CUIS is attached at the end of the report. Most of the categories on the sheet are self-explanatory. Habitat categories should be listed as described by Hillestad et al. (1975). Information on antler characteristics, particularly spike or branched antlers should be recorded. This information may be helpful as an indicator of the habitat quality (e.g., spikes may be more common in lower quality habitat). Observers should not hesitate to use the unknown deer section when positive sex or age class determination cannot be made. They should be certain, however, that the deer is within the 100-yard zone and that it actually is a deer, not a horse, raccoon, or hog. Other wildlife may be noted (e.g., hogs, horses, radio-collared animals, bobcats, etc). It also would be of interest to record any piebald deer, injured deer, deer with abnormalities such as lumpy jaw or deer in poor or emaciated condition. Dead deer also should be recorded.

Due to the size of CUIS, it is recommended that two survey teams be used. For survey purposes the island has been divided into two parts. The northern route extends from the Hunt Camp, Plum Orchard area east along Duck House Road to the intersection with Grand Avenue. The route then turns northward along Grand Avenue and continues to the intersection of North Cut

with the old North Cut Road, at the edge of the 1981 burn, a distance of approximately 7.8 miles. The southern route begins at the intersection of Duck House Road and Grand Avenue and proceeds southward on Grand Avenue, around Dungeness Ruins, and southwestwardly until road end on Raccoon Kays, a distance of approximately 8.3 miles.

Discussion

A preliminary spotlight survey was conducted as described 5-9 March 1986, on CUIS. The results of this survey are summarized in Tables I and II. Another survey was conducted 9-13 September 1986, as a training exercise for NPS personnel. Results of this survey are shown in Tables III and IV. The spotlight survey route utilizing Grand Avenue does not traverse the major habitat types proportionate to their distribution on the island. Therefore, extrapolations from the spotlight data to estimate the specific size of the deer herd on CUIS should be avoided.

The population data collected from spotlight surveys can be very useful in monitoring the deer herd's overall condition. A predominance of branches antlered bucks or a high fawn:doe ratio may indicate the herd is in good condition. A predominance of spike antlered bucks or a low fawn:doe ratio may suggest a herd in poor condition. This type of information compared with the data set of baseline biological data currently being collected will allow the NPS to formulate a basic management strategy for the deer herd and to prepare for future problems.

Preliminary data from the ongoing deer study indicate that the hemorrhagic disease virus is present on CUIS. This disease can cause devastating losses to a deer herd. If the deer population on CUIS were to become more nutritionally stressed due to a mast failure for one or more years or extended drought, the hemorrhagic virus may become active and cause a deer die-off. There also would be a severe impact on the vegetation resources on CUIS as the deer herd searched for food. The herd is already heavily utilizing available forage as evidenced by the very visible browse line on CUIS.

Monitoring the population trends by annual spotlight surveys supplemented with periodic collections and data from hunter-killed deer will allow the NPS to predict times of potential problems. Successful management of problems of a high populations under stress may require increased hunting to reduce the number of deer or herd reduction through other means.

Literature cited

Anonymous. 1976. Procedures for establishing spotlight deer census lines and conducting spotlight deer surveys. Texas Parks and Wildlife, Austin. Mimeo. 12 pp.

Hillestad, H.O., J.R. Bozeman, A.S. Johnson, C.W. Berisford, J.I. Richardson. 1975. The ecology of the Cumberland Island National Seashore, Camden County, Georgia. GA Marine Science Center Tech. Rep. Ser. 75-5. 299 pp.

Southeastern Wildlife Service, Inc. 1980. Preliminary Report : Cumberland Island National Seashore Deer Survey. Mimeo, 15 pp.

Table I. North Route Spotlight Survey Summary, March 1986

	5 March				6 March				7 March				8 March				9 March			
	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T
North Cut and Old North Cut																				
0.00-0.50	-	1	-	1	2	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3
0.51-1.00	-	1	-	1	2	-	1	-	-	1	-	-	-	-	-	-	-	-	6	6
1.01-1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	2
1.51-2.00	-	-	-	-	-	-	1	1	1	3	-	-	-	-	-	-	2	2	-	4
2.01-2.50	-	-	-	-	-	-	1	1	-	2	-	-	-	-	-	-	1	-	-	1
2.51-3.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	4
3.01-3.50	-	1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
3.51-4.00	-	1	-	-	1	-	-	-	-	2	-	-	-	-	-	-	2	2	-	4
4.01-4.50	-	-	-	2	2	-	1	1	-	2	-	-	-	-	-	-	-	-	-	2
4.51-5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.01-5.50	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.51-6.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.01-6.50	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-
6.51-7.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
7.01-7.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Hunt Camp																				
7.51-8.00	-	-	-	-	-	1	1	1	-	3	-	-	-	-	-	-	-	-	1	1
Total	-	5	-	6	11	2	5	5	3	15	-	3	2	7	12	-	-	1	11	12
B = Bucks D = Does F = Fawns U = Unknown																				

Table II. South Route Spotlight Survey Summary, March 1986

	5 March				6 March				7 March				8 March				9 March				
	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T	
Raccoon Key																					
0.00-0.50 mi.	-	-	1	4	5	1	1	-	1	3	-	1	1	4	6	-	-	-	-	-	
0.51-1.00	-	2	1	2	5	-	1	1	9	11	-	-	-	-	-	-	1	2	3	6	
1.01-1.50	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1.51-2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2.01-2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2.51-3.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3.01-3.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3.51-4.00	-	8	1	-	9	-	1	5	1	2	9	-	2	1	2	5	4	1	-	-	
4.01-4.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4.51-5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5.01-5.50	1	1	-	1	3	-	-	-	3	3	-	-	-	1	3	4	-	1	1	4	
5.51-6.00	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	1	-	4	1	1	
6.01-6.50	1	3	-	2	6	-	1	1	2	4	-	1	1	5	5	5	1	1	11	12	
6.51-7.00	-	-	-	1	1	-	-	-	-	-	-	1	1	4	6	-	-	-	-	-	
7.01-7.50	-	-	-	2	2	-	-	-	-	-	-	-	1	2	2	-	-	1	2	-	
7.51-8.00	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3	6	-	-	-	-	
Duck House and Grand Avenue	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
8.01-8.50																					
Total	3	15	3	13	34	2	8	3	17	30	1	5	7	24	37	4	9	5	21	39	
B = Bucks D = Does F = Fawns U = Unknown																					
																	-	5	-	81	86

Vehicle problems--
survey stopped

Table III. North Route Spotlight Survey Summary, September 1986

	9 September				10 September				11 September				12 September				13 September			
	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T	B	D	F	U	T
North Cut and Old North Cut																				
0.00-0.50	-	2	-	2	4	-	-	-	-	-	-	1	1	-	-	-	1	-	6	7
0.51-1.00	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3
1.01-1.50	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.51-2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.01-2.50	-	-	-	-	1	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
2.51-3.00	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.01-3.50	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.51-4.00	-	2	2	4	7	-	1	2	3	8	-	2	1	2	6	-	1	-	1	2
4.01-4.50	-	1	1	5	8	-	-	-	-	-	-	-	1	-	1	-	-	-	1	2
4.51-5.00	1	1	-	1	3	-	1	-	6	6	-	-	-	-	-	-	-	-	-	-
5.01-5.50	1	-	-	1	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5.51-6.00	1	-	-	1	2	-	1	-	3	4	-	1	1	-	2	1	1	-	1	2
6.01-6.50	1	1	-	-	2	-	-	-	1	1	-	1	1	-	1	-	-	-	1	1
6.51-7.00	1	-	-	-	2	-	-	-	1	1	-	1	-	-	2	1	1	-	2	3
7.01-7.50	2	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.51-8.00	-	-	-	7	7	1	-	-	-	3	-	1	2	-	-	2	-	-	-	1
Hunt Camp																				
8.01-8.50																				
Total	8	7	3	24	42	2	6	-	7	14	3	8	2	16	29	6	7	4	8	25
B = Bucks						D = Does					F = Fawns					U = Unknown				

SPOTLIGHT SURVEY

Date: _____ Observers: _____ Weather Conditions: _____

Location Start: _____ Mileage: _____ Time: _____

Location End: _____ Mileage: _____ Time: _____

[illegible]