

Classifying Male White-tailed Deer from a Helicopter

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Abstract: We evaluated how well observers in a helicopter classed male white-tailed deer (*Odocoileus virginianus*) into groups ≤ 3.5 or ≥ 4.5 years old. Resightings of individually marked and previously aged deer on 2 southern Texas ranches were used for evaluation during repeated helicopter surveys from 1986 to 1988. Classifications of marked males were at least $\geq 90\%$ correct on 11 of 14 flights on 1 ranch and 6 of 14 on the other. Although accuracy was acceptable on many flights, some flights gave inaccurate estimates ($>10\%$ misclassified) of male composition. Because managers make only a single, annual helicopter flight, we recommend male classifications made during helicopter counts be used as trend data and be evaluated over a number of years. Managers should avoid using male composition data from individual flights in calculations of harvest rate for a particular age class.

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Helicopters are used to gather population data on white-tailed deer in areas of the southeastern United States where woody plant cover is relatively low and open. DeYoung (1985) and Beasom et al. (1986) concluded that estimates of deer abundance obtained by helicopter were conservative. Compared to aerial mark-resighting estimates, they found that only 17%–65% of the deer were counted. Research regarding sex and age composition data obtained from helicopters has been more encouraging. Leon et al. (1987) used resightings of 314 individually marked deer to conclude that deer were encountered from a helicopter without sex or age bias.

Even though deer were encountered at random, Leon et al. (1987) did not investigate how accurately observers could classify deer by age and sex. One potential source of bias is the common practice of classifying males into size or age categories. Most managers involved in quality or trophy management programs attempt during helicopter surveys to classify males into broad groups such as spikes, young males, and mature males. Male composition data are important in setting harvest quotas (Brothers and Ray 1975:134).

We evaluated resightings of marked males during helicopter surveys on 2 southern Texas study areas to determine if observers could distinguish ≥ 4.5 year old males from younger males.

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Methods

The study areas were a 6,500-ha portion of the Camaron Ranch 45 km northwest of Freer, Texas, and an 8,500-ha portion of the Faith Ranch 40 km southwest of Carrizo Springs, Texas. Both areas had brush cover generally < 3 m high with about 50% canopy coverage.

On the Faith Ranch, 48, 54, and 48 males were caught by helicopter and drive net (Beasom et al. 1980) during fall 1986, 1987, and 1988, respectively. Camaron Ranch males caught the same way numbered 27, 21, and 9 for the respective years. After capture, all males were aged by tooth replacement and wear (Severinghaus 1949). All males on the Faith Ranch received a colored cattle ear tag in each ear. The color of the left tag was coded to year of capture while the color of the right tag denoted age of the male at capture. Across years, 52 of the Faith Ranch males were also marked individually with radio collars wrapped with colored tape. All of the Camaron males received radio collars and ear tags. However, the ear tags on this ranch were coded for individual recognition rather than year of capture and age. Males were released at the capture site.

After the captures in 1986, 1987, and 1988, 4 or 5 helicopter surveys were flown on each ranch as described by DeYoung (1985) and Beasom et al. (1986). For each flight, deer were counted in adjacent strip transects about 200-m wide until the study area was covered. Flight speed was about 56 km/hour, and altitude about 23 m. Two observers counted deer, although the pilot sometimes pointed out deer that otherwise would have been overlooked.

When a marked male was sighted on the surveys, it was classified as young (≤ 3.5 years) or mature (≥ 4.5 years). Observers used antler size and body musculature as general criteria for classification. Antler spread well beyond the tips of the ears, "heavy" appearance of the antlers, or long tines indicated a mature male. Mature males also were denoted by "thick" necks and front shoulders, and a "blocky" appearance of the body. Lack of these antler and body characteristics denoted a

young male. After a male was classified, the pilot flew the helicopter off the transect line and close to the male so that the markers could be read. Radio-collars were not marked in a way that would reveal age during counts. Although Faith Ranch ear tags were coded to year and age, it was difficult to identify both colors until the helicopter was flown close to the deer (i.e., after it had already been classified). Thus we do not believe the markers influenced the classification of the marked males. Seven observers participated in the counts. However, we did not record which observers classified which males. Observers ranged from very experienced at aerial surveys to inexperienced. Usually, at least 1 observer was experienced on each flight.

The classification of each male was later compared with records on its age. Accuracy and precision of the age classifications were obvious from inspection so no statistical tests were employed in analyzing the data.

Results and Discussion

We present data according to individual flights (Tables 1, 2) because managers commonly fly only 1 count per year. Males classified correctly per flight ranged from 70% to 100% on the Faith Ranch (Table 1) and from 63% to 100% on the Camaron Ranch (Table 2). If 90% correct is considered "acceptable" accuracy, then 3 of 14 flights were unacceptable on the Faith Ranch and 8 of 14 were unacceptable on the Camaron Ranch. There was no obvious reason why accuracy of classification

Table 1. Observer classifications of marked and previously aged young (≤ 3.5 years) and mature (≥ 4.5 years) male white-tailed deer during helicopter surveys on the Faith Ranch, Texas.

Year	Flight	Number correctly classified		Number incorrectly classified		Percent correctly classified
		Young	Mature	Young classed as mature	Mature classed as young	
1986	1	3	9			100
	2	4	15	1	1	91
	3	1	8			100
	4	1	13	1		93
1987	1	6	10	6	1	70
	2	3	12	1		94
	3	5	16	1	1	91
	4	5	15	2		91
	5	7	13			100
1988	1	9	17	1	5	81
	2	5	11		1	94
	3	7	12	1	2	86
	4	10	6			100
	5	7	15			100

Table 2. Observer classifications of marked and previously aged young (≤ 3.5 years) or mature (≥ 4.5 years) male white-tailed deer during helicopter surveys on the Camaron Ranch, Texas.

Year	Flight	Number correctly classified		Number incorrectly classified		Percent correctly classified
		Young	Mature	Young classed as mature	Mature classed as young	
1986	1	5	4		1	90
	2	4	1	2		71
	3	1	3			100
	4	2	4	1		86
	5	3	2	3		63
1987	1	4	7			100
	2	3	1			100
	3	3	1			100
	4	1	1			100
1988	1	5	3	1		89
	2	10	2	1	1	86
	3	3	2		1	83
	4	3	2		2	71
	5	1	3		2	67

was poorer on the Camaron area. Curiously, all males were classified correctly on this reach in 1987.

Another, and perhaps more useful, way to assess the data was to calculate how well our classifications estimated the known composition of the marked male sample that was sighted per flight. In this way, misclassifications of young deer as mature and mature deer as young “cancelled” each other. For example, for Flight 2 in 1986 on the Faith Ranch (Table 1), we correctly estimated the composition of marked males sighted on that flight, even though 2 males were misclassified. Using this approach, our Faith Ranch estimates of young males ranged from 50% to 180% of actual, whereas the range for mature males was 81% to 200%. On the Camaron Ranch, estimates of the number of young and mature males ranged from 50% to 300% of actual.

There was no clear trend across flights or ranches as to whether young males were misclassified as mature or mature misclassified as young. DeYoung (unpubl. data) found considerable overlap in an antler size index among age classes of southern Texas males. Thus, based on antler size alone, it is surprising that classifications from a helicopter were as accurate as indicated in Tables 1 and 2. Perceptions of body musculature, in conjunction with antler size, may have improved the accuracy of classifications. Regardless, criteria for classifying males from a helicopter are largely subjective, and likely to remain that way.

In conclusion, whereas accuracy of age classification was acceptable on many flights, classification errors were sufficient on some flights to give an incorrect

indication of male composition. Therefore, we recommend that managers use male classifications from a helicopter as trend data through time and avoid calculating harvest rates of mature males based on results of any 1 flight.

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