Summer Deer Observations
2007

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Abstract

Statewide, the 2007 fawn:doe ratio (FDR) as well as the long-term (1960-2007) and 10-year (1997-2006) means were 0.86, 0.86, and 0.85, respectively. Fawn:doe ratios in the Central Forest (0.80) and in 7 of 8 northern unit groups ($\bar{x}$ = 0.71±0.13 SD) suggested below average FDRs. Reasons for these patterns are speculative but may be explained by differences in deer densities relative to carrying capacity. It is possible that density dependent effects associated with expanding deer populations in the Northern and Central Forests are contributing to reduced reproductive output across these regions. In contrast, mild winters and high quality food resources (i.e., agricultural crops) throughout the Farmland regions likely buffer the affects of winter impacts on spring/summer body conditions and subsequent fawn production, thereby contributing to relatively high reproductive output throughout these regions.

Introduction

Road sampling is a widely used survey method for distributing observations of abundant big game species over large geographic areas. Road sampling yields estimates of population characteristics important for management decisions, so obtaining the best estimates possible within the constraints of available resources (time and money) is desirable. Despite known biases and under-representation of habitat types, road sampling is commonly used for estimating white-tailed deer population trends, herd composition, and annual recruitment throughout much of North America. Due to low cost and relatively simple implementation, this technique has been used by the Wisconsin Department of Natural Resources (WDNR) for estimating summer FDRs across broad geographic regions of Wisconsin since the 1960s. Due to sampling limitations, FDRs are only estimated for 13 groups of management units across the state. Though no bias-free measure has yet been developed for measuring net addition of fawns to the fall deer population, roadside summer deer observations have tended to produce values that match expectations in the forested regions of Wisconsin. Thus, for northern management units, annual observed FDRs are used as parameter inputs in WDNRs Sex-Age-Kill deer population estimation procedures. Because of small samples and seemingly low (i.e., negatively biased) observed FDRs relative to other measures of yearling recruitment (i.e., yearling doe percents), fixed (FDR) constants are used in these units.

Methods

The WDNR and cooperating U.S. Forest Service and U.S. Fish and Wildlife Service personnel recorded deer observations during July, August, and September during normal duty travels during 2007. Deer observed during daylight hours were recorded by month and management unit. Deer observations also were identified as adult bucks, does without fawns, does with one, two, and three fawns, fawns without does, and unidentified. The number of fawns observed per doe was calculated by unit group (Fig. 1) and the total numbers of fawns and does reported throughout the summer (July-September) was used to calculate summer-long FDRs for each unit group, despite recognition that July observations negatively bias FDRs compared to August and September FDRs; negative bias associated with July observations is likely due to adult does hiding their fawns through early July.

Results

Field staff observed 8,441 deer (4,565 does and 3,876 fawns) during summer 2007. The number of summer 2007 deer observations was similar to the number of deer observed during 2006 (n = 8,370) and 2005 (n = 8,841). Interestingly, 2007 summer deer observations are 37% lower than the long-term (1960-2007) average ($\bar{x}$ = 13,423) and likely associated with WDNR efforts to increase total numbers of deer observations during the late 1990s and fewer personnel and miles-driven in recent years. Consequently, efforts to sustain greater numbers of summer deer observations were discontinued in 2004 due to logistical and budget constraints and summer deer observations have declined, yet remained stable, in recent years.

Statewide, the 2007 FDR as well as the long-term (1960-2007) and 10-year (1997-2006) means were 0.86, 0.86, and 0.85, respectively (Table 1). The FDR in the Northern Forest (Unit Groups A-H; Figure 1) averaged 0.74 and was slightly below 10-year and long-term averages (0.80; Figure 2). Interestingly, the observed FDR in Unit Group D (1.1) was substantially higher than the long-term average for the Northern Forest and matched the historical FDR recorded in 1978. However, 7 of the other 8 northern unit groups suggest below average FDRs ($\bar{x}$ = 0.71±0.13 SD). In light of the mild winters of 2005-06 (WSI = 36) and 2006-07 (WSI = 33), reasons for low FDRs remain unclear. It is possible that density dependent effects associated with expanding deer populations in the northern forest are contributing to reduced reproductive output across the region. The observed FDR in Unit Group D is difficult to explain and appears to be an aberration when compared to 10-year and long-term regional averages.

The FDR in the Central Forest (Unit Group L; Figure 1) was 0.80 and similar to the 10-year mean (0.85) but well below the long-term mean of 0.94 (Table 1). Reasons for this declining pattern (Figure 2) are speculative but may be explained by deer herd densities relative to ecological carrying capacity. Female deer in the Central Forest are less likely to achieve their physiological maximum for reproductive output than farmland deer. Additionally, relatively low quality food resources throughout the Central Forest are manifested in spring/summer body conditions and subsequent fawn production.

The FDR in the Farmland Regions (Unit Groups J, K, M, and N; Figures 1 and 2) was 1.05, which was above the 10-year and long-term means of 0.97 and 0.96, respectively. Fawn:doe ratios for all four farmland unit groups (J, K, M, N) were similar to the 2007 mean (range: 0.95-1.25; Table 1). Notable differences in reproductive performance continue to occur between heavily forested and Farmland regions, and is likely explained by differences in deer densities relative to carrying capacity and regional population goals. Mild winters and high quality food resources (i.e., agricultural crops) throughout the Farmland regions likely buffer the affects of winter impacts on spring/summer body conditions and subsequent fawn production. However, due to weak correlations between observed FDRs and other measures of herd recruitment (yearling buck percents, yearling doe percents, percent forked antlers) in the farmland unit groups, fixed FDRs continue to be used in current deer population estimation procedures. Fixed FDRs are derived largely from long-term yearling doe percents as observed during annual fall harvest. Farmland summer deer observations continue to be evaluated as WDNR Study 025: Evaluation of deer population monitoring and management system. This study continues to explore and develop measures to improve the WDNR deer survey and its interpretation.

Table 1. *Fawn:doe ratio by management unit groups, 1991-2007.*

	Management Unit Groups													
Year	A	B	C	D	E	F	G	H	J	K	L	M	N	Statewide
1991	0.79	0.78	0.68	0.90	0.90	0.69	0.89*	0.70	1.24*	0.82	1.07	0.79	0.76*	0.81
1992	0.48	0.64	0.63	0.78	0.82	0.74	0.51	0.59	1.15	0.92	0.91	1.17*	1.09	0.77
1993	0.92	0.90	0.87	0.81	0.99	0.91	0.83*	0.80	0.93	0.86	1.06	1.08	1.07	0.93
1994	0.91	0.90	0.98	0.91	0.87	1.02	1.11*	0.91	0.88	1.00	1.14	0.92	1.00	0.96
1995	0.88	0.89	0.88	0.97	0.88	1.01	0.94	0.76	1.05	0.94	1.11	0.96	1.24	0.94
1996	0.60	0.70	0.51	0.75	0.64	0.81	0.69*	0.43	0.81	0.74	0.79	0.92	0.81	0.71
1997	0.75	0.90	0.67	0.81	0.71	0.72	0.61*	0.86*	0.93	0.95	0.81	1.09	0.70	0.80
1998	0.91	0.91	0.78	0.95	1.00	1.05	0.53*	1.02	0.95	1.12	0.86	1.27	1.07	0.94
1999	0.81	0.91	0.85	0.85	0.86	0.97	0.76	0.81	1.10	1.04	0.93	1.23	1.10	0.92
2000	0.76	0.85	0.77	0.87	0.82	0.94	0.79	0.76	1.02	1.02	0.92	0.99	0.96	0.87
2001	0.69	0.83	0.76	0.74	0.79	0.94	0.82	0.79	1.03	0.92	0.78	1.04	0.97	0.84
2002	0.90	0.81	0.87	0.82	0.74	0.97	0.85	0.67	1.04	0.95	0.91	0.94	1.23	0.90
2003	0.70	0.88	0.70	0.69	0.70	0.98	0.81	0.82	0.88	0.88	0.72	0.84	0.95	0.80
2004	0.63	0.75	0.74	0.70	0.69	0.88	0.56	0.65	1.06	0.76	0.64	0.87	1.01	0.80
2005	0.74	0.88	0.72	0.84	0.81	0.96	0.65	0.69	1.10	0.81	1.12	0.89	1.07	0.86
2006	0.52	0.86	0.74	0.89	0.89	0.93	0.80	0.66	1.00	0.99	0.86	0.85	1.11	0.86
2007	0.58	0.68	0.72	1.05	0.67	0.95	0.67	0.68	1.25	0.95	0.80	1.07	1.07	0.86
Long-term Average														
1960-2006	0.78	0.84	0.74	0.82	0.85	0.84	0.77	0.84	1.00	0.91	0.94	1.00	1.01	0.86
10-year Average														
1997-2006	0.73	0.84	0.76	0.84	0.79	0.93	0.71	0.76	1.00	0.95	0.85	1.01	1.02	0.85

*Ratios computed from relatively small sample sizes (48 ≤ adult doe observations ≤ 99).

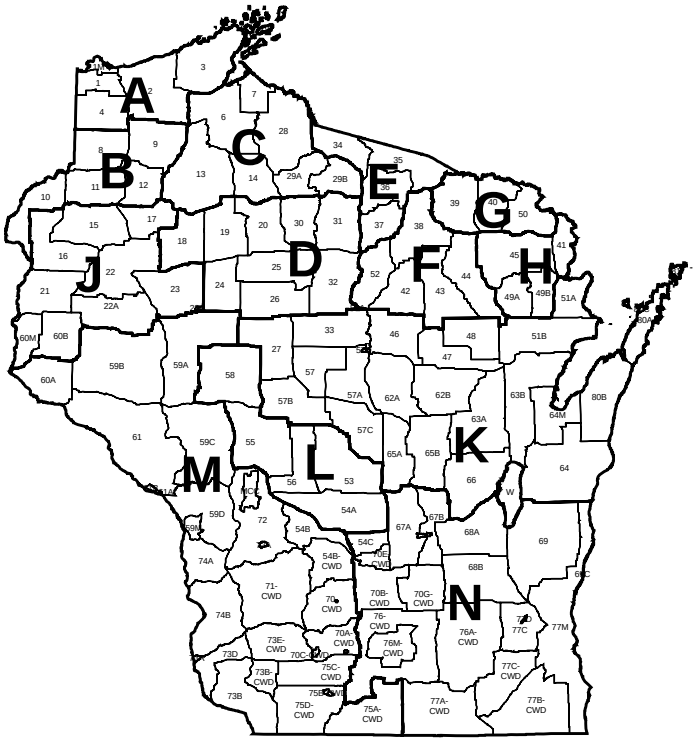

Figure 1. *Groups of deer management units used for 2007 summer deer observations.*

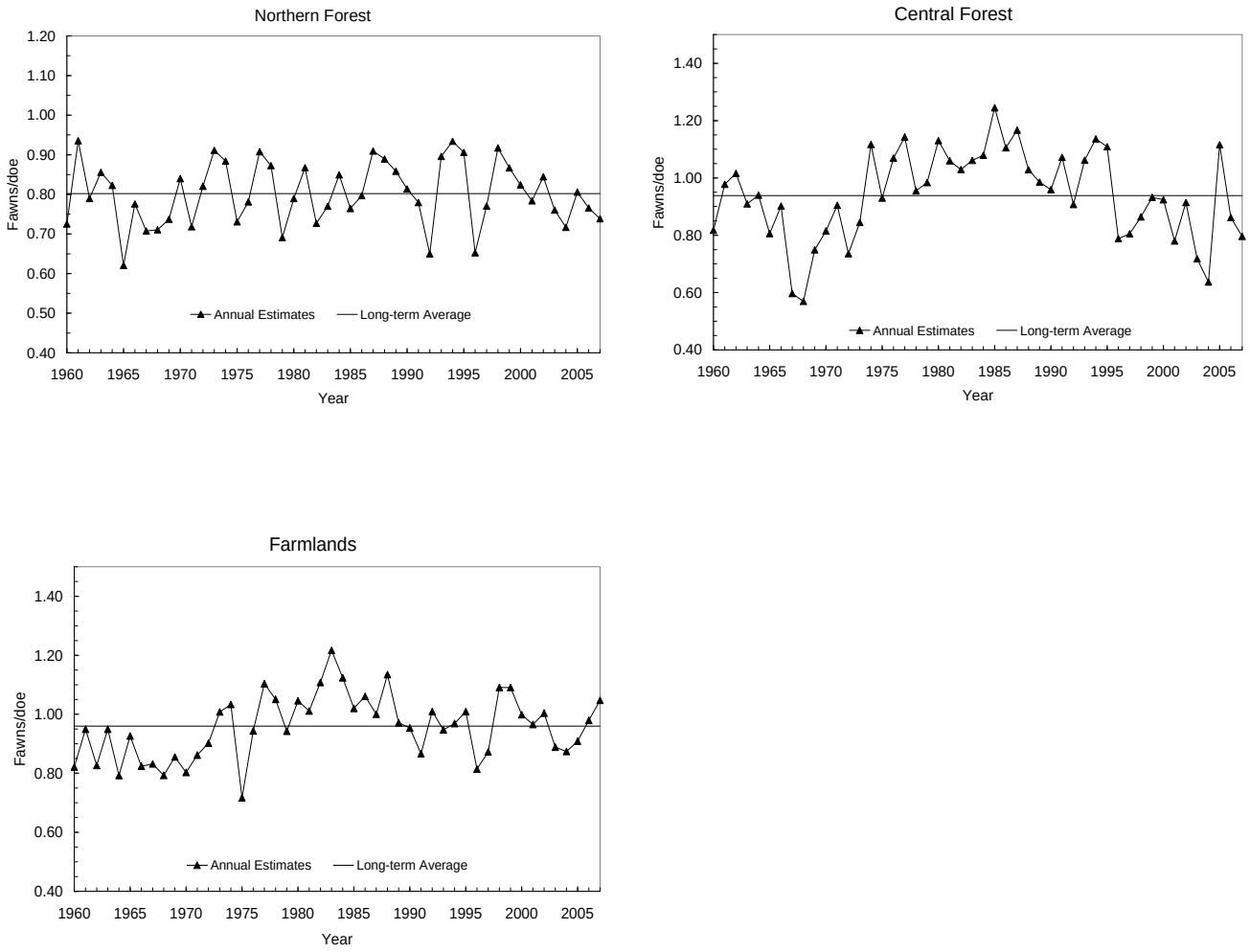

Figure 2. *Regional trends in fawn doe ratios from Wisconsin summer deer observations surveys, 1960-2007.*