

Summer Deer Observations 2018

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Abstract

Fawn:doe ratios (FDRs) in 2018 were below or relatively unchanged from 2017 estimates for all county groups except the northwestern forest, western farmland, and southwestern farmland. The number of Summer Deer Observation (SDO) observers decreased in 2018 while Operation Deer Watch (ODW) observers increased. The statewide SDO-based FDR decreased from 0.90 in 2017 to 0.88 in 2018. As in previous years, average FDRs from ODW are smaller than those from SDO.

Introduction

Fawn:doe ratios (FDRs) are often used for monitoring white-tailed deer population trends (e.g., Roseberry and Woolf 1991) because they provide inference to fawn production and survival, primary vital rates in ungulate population growth (DeCesare et al. 2012). Roadside deer observation surveys are a commonly used method of collecting FDRs over broad geographic areas where deer observations are strategically or opportunistically recorded within a specified time frame. Although roadside surveys have known biases, particularly underrepresentation of habitat types, their low cost and relatively simple implementation makes them a useful method to assess deer demographics over a broad area. Roadside deer surveys have been used by the Wisconsin Department of Natural Resources (WDNR) for estimating summer FDRs across several geographic regions of Wisconsin since the 1960s. Due to sampling limitations, FDRs are only estimated for 9 groups of management units (now counties) 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.

Methods

The Summer Deer Observation (SDO) survey used WDNR and cooperating U.S. Forest Service and U.S. Fish and Wildlife Service personnel to record deer observations during August–September 2018 during normal duty travels. Deer observed during daylight hours were recorded by month and management unit (now county). Deer observations were classified as adult bucks; does without fawns; does with one, two, or three fawns; fawns without does; and unidentified. The number of fawns observed per doe was calculated by county group (Fig. 1) and the total numbers of fawns and does reported throughout the summer (August–September) was used to calculate summer-long FDRs for each unit group. July observations have not been included since 2011 because these estimates result in negative bias associated with adult does hiding their fawns through early July (Verme 1989). Agency staff participating in the SDO survey could submit their observations using a paper or electronic web-based method. Web-based instructions and regular paper survey protocol were identical.

The Operation Deer Watch (ODW) survey provided a mechanism for the public to opportunistically record deer observations during August–September 2018. This program was initiated in 2010 to increase public involvement in Wisconsin's deer management program while supplementing the Department's existing SDO database with additional deer observations. Public participants recorded deer observations into categories (e.g., adult bucks) analogous to

those in the SDO survey. Observations were submitted through a web-based interface that provided participants survey instructions identical to the SDO survey protocol. We used identical calculations to estimate unit group FDRs.

Results

Statewide, a minimum of 190 SDO observers recorded observations of 5,252 does and fawns, compared to at least 107 ODW observers (based on independent IP addresses) that recorded 2,387 does and fawns (Table 1). In 2018, SDO observers decreased by 14% from 2017 which was marked by a 26% increase from 2016. In 2018, ODW observers increased by at least 55% from 2017. The number of does and fawns observed by SDO observers in 2018 was 28% lower than the number observed in 2017 while ODW observers recorded 140% more does and fawns than the prior year.

The average FDRs among SDO observations across all county groups was 0.88, a 2% decrease from the 2017 statewide average. FDRs in 2018 were lower than or relatively unchanged from 2017 estimates in all county groups except the northwestern forest, western farmland, and southwestern farmland (Figure 2; and '[Fawn to Doe Ratio](#)' on [dnr.wi.gov](#)).

FDR estimates have recently shown more variation than previous years in the northwest forest county group which was 31% higher in 2018 compared to 2017. The northcentral forest county group FDR has been generally stable since 1997 with an average of 0.85. Similarly, the central forest county group FDR has been relatively unchanged for the last 4 years. In 2018, the northeast forest county group FDR was 30% lower than the 22-year high estimated in 2017. The western farmland county group has shown a general increase since a low of 0.72 in 2014 and the 2018 FDR estimate of 1.03 was 5% lower compared to 2017. The central farmland county group FDR has shown a general decrease since 2002 and the 2018 FDR was relatively unchanged compared to 2017. The Lake Michigan farmland county group has shown variation in recent years and the 2018 FDR was 11% lower than 2017. Similarly, the southwest farmland county group FDR has ranged from 0.79 to 1.54 and shown a general decrease since 2014. The southeast farmland county group FDR has generally ranged between 1.0 and 1.2 and the 2018 FDR fell within this range.

Across county groups, SDO FDRs were an average of 10% higher than ODW and ranged between 33% lower and 74% higher (Table 1).

Discussion

In 2013, the WDNR actively solicited help from 14,000 licensed deer hunters to boost participation in ODW. This resulted in at least a 7% increase in ODW observers over the previous year. However, such gains were short-lived, as ODW observations dropped by a third from 2013 to 2014, a further 35% in 2015, 76% in 2016, and 22% in 2017. Note - while the individual number of ODW participants that file their reports electronically is known, based on IP addresses, those that mail in their reports are not individually identified, thus we do not know how many individuals participated in ODW. Given declines in participation and low numbers of deer observed in ODW, it appears this citizen-science is not self-sustaining.

The average WSI recorded in the north during the winter of 2017–2018 (WSI = 66.1) was in the lower half of the 'moderate' category and slightly above the 58-year average (WSI = 60.9). This moderate rating followed three consecutive mild winters. FDRs have exhibited interesting patterns in recent years. FDRs in most county groups had been steadily declining and reached

historical or near-historic lows during 2013-2014 (Figure 2; and '[Fawn to Doe Ratio](#)' on [dnr.wi.gov](#)). FDRs in most county groups rebounded to varying degrees from 2015 to 2018.

Fluctuations in FDRs are expected due to variation in fawn production and neonatal survival. These can be affected by a number of factors including nutritional condition of does, which is a function of population levels relative to biological carrying capacity and environmental stress (e.g., winter severity), as well as predation. The recently-completed fawn survival studies in northern and east-central Wisconsin suggest that predation is the leading source of neonatal fawn mortality in the northern study area, but starvation is the leading cause in the east-central study area. Starvation occurs when does do not have nutritional reserves to produce adequate milk for newborn fawns, and does will tend to be in poorer nutritional condition following a severe winter. Predation risk is related not only to abundance of predators, but also to other density-dependent (e.g., deer density and suitability of fawning habitat) and density-independent (e.g., winter severity) factors. Predation rates on neonate fawns were higher following harsh winters. Does in poor condition may provide inferior maternal care, which could increase a fawn's susceptibility to predation. In particular, an abandoned fawn may repeatedly bleat, which could alert predators to its presence. Recent pregnancy-rate surveys, using car-killed deer, have found that pregnancy rates of <1 year old deer are lower in the farmland region of Wisconsin, which plays a role in lower FDRs observed in recent years.

On average, FDRs from ODW are lower than FDRs from SDO. This may be due to the wildlife professionals conducting SDO having greater experience in observing deer and following protocol more carefully (i.e. taking time to observe deer with binoculars). Within unit groups, there is little consistency in the difference in FDRs between SDO and ODW. This is certainly due in part to sampling variation, but may also be due to variation in the spatial and temporal coverage of the observations and variation in skill level and interest of observers. The lack of consistency in SDO and ODW observations is a topic deserving of consideration.

Acknowledgements

The data presented in this report depends on the cooperative efforts and timely recording and reporting of deer observations by WDNR, U.S. Forest Service, U.S. Fish and Wildlife Service personnel, and the public. Sincere thank you go to all that participated. Also, thank you to several reviewers who provided comments to this report prior to publication.

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County Groupings Used to Summarize Fawn:Doe Ratio

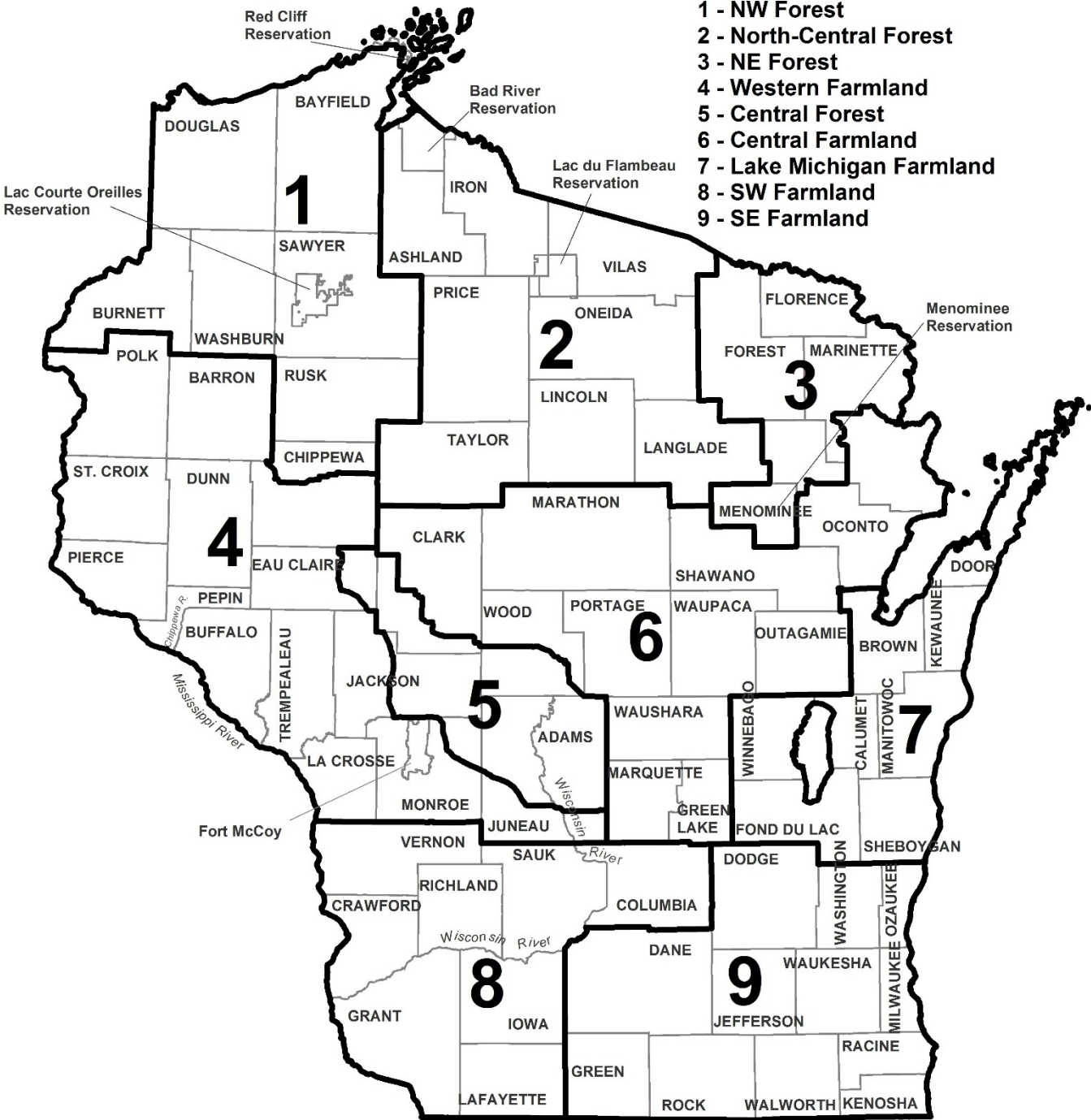


Figure 1. Groups of deer management units used for 2018 summer deer observations.

Table 1. Number of does and fawns observed during 2018 Summer Deer Observation survey and Operation Deer Watch and estimated fawn:doe ratios by county group.

County group	Summer Deer Observation			Operation Deer Watch			SDO and ODW Combined			SDO+ ODW/2	SDO/ ODW
	N. does	N. fawns	Fawns/ doe	N. does	N. fawns	Fawns/ doe	N. does	N. fawns	Fawns/ doe		
NW Forest	608	521	0.86	130	85	0.67	738	606	0.82	0.76	1.31
NC Forest	811	686	0.85	398	197	0.49	1209	883	0.73	0.67	1.71
NE Forest	54	40	0.74	59	38	0.64	113	78	0.69	0.69	1.15
West Farm	193	198	1.03	139	153	1.09	332	351	1.06	1.06	0.93
Central Forest	54	46	0.85	98	88	0.90	152	134	0.88	0.87	0.95
Central Farm	527	478	0.91	387	327	0.84	914	805	0.88	0.88	1.07
Lk Mich Farm	155	142	0.92	45	62	1.38	200	204	1.02	1.15	0.66
SW Farmland	278	234	0.84	71	62	0.87	349	296	0.85	0.86	0.96
SE Farmland	111	116	1.05	25	23	*	136	139	1.02		
Total	2,791	2,461	0.88	1,352	1,035	0.77	4,143	3,496	0.84	0.87	1.09

* Sample size too small for a reliable estimate of fawn:doe ratio

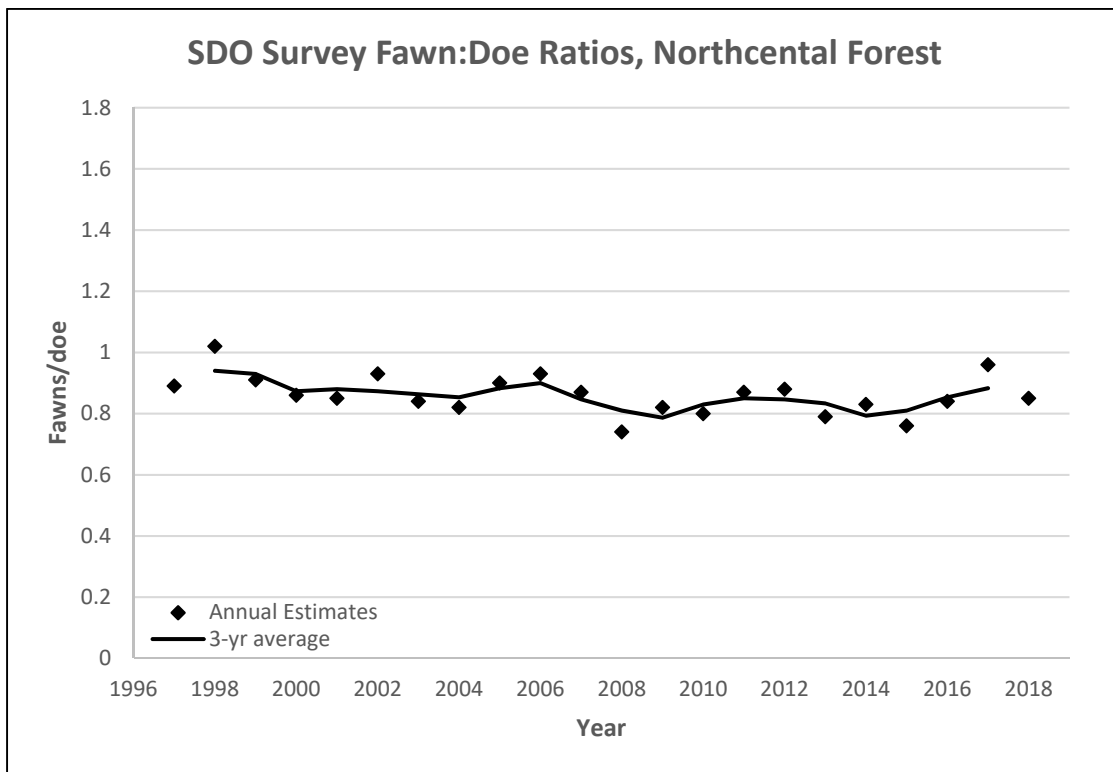
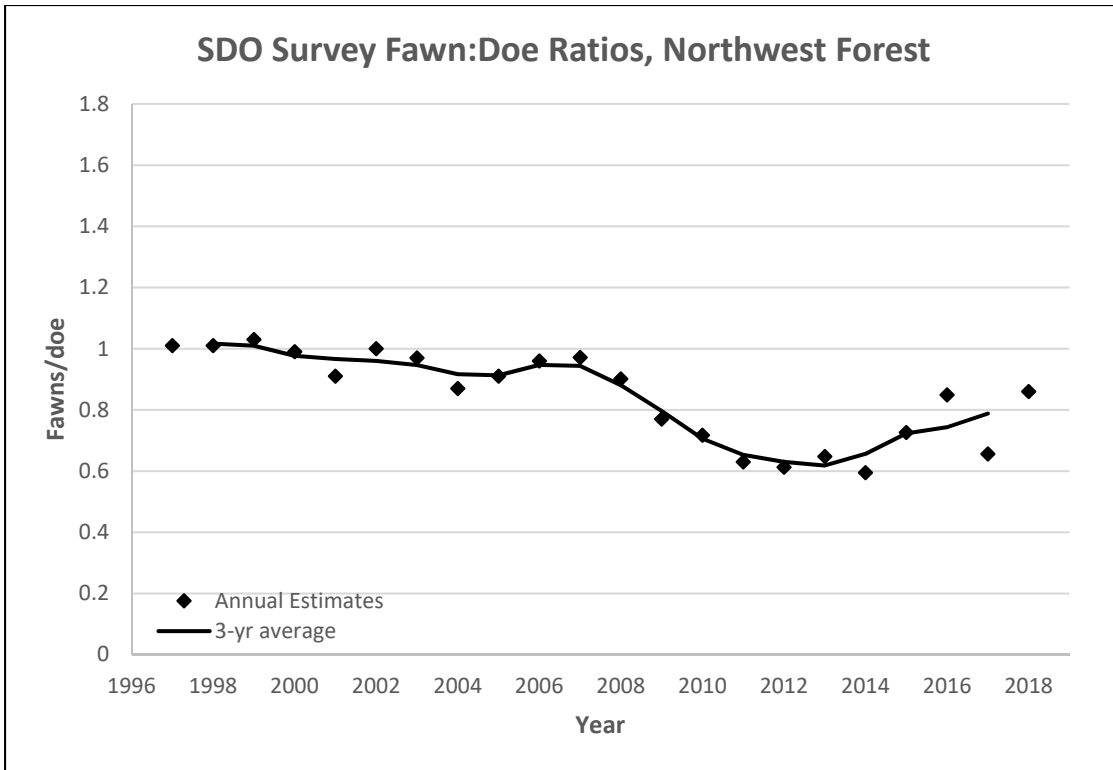


Figure 2. Trends in fawn:doe ratios estimated from the Summer Deer Observation survey in the nine county groups of Wisconsin, 1997–2018.

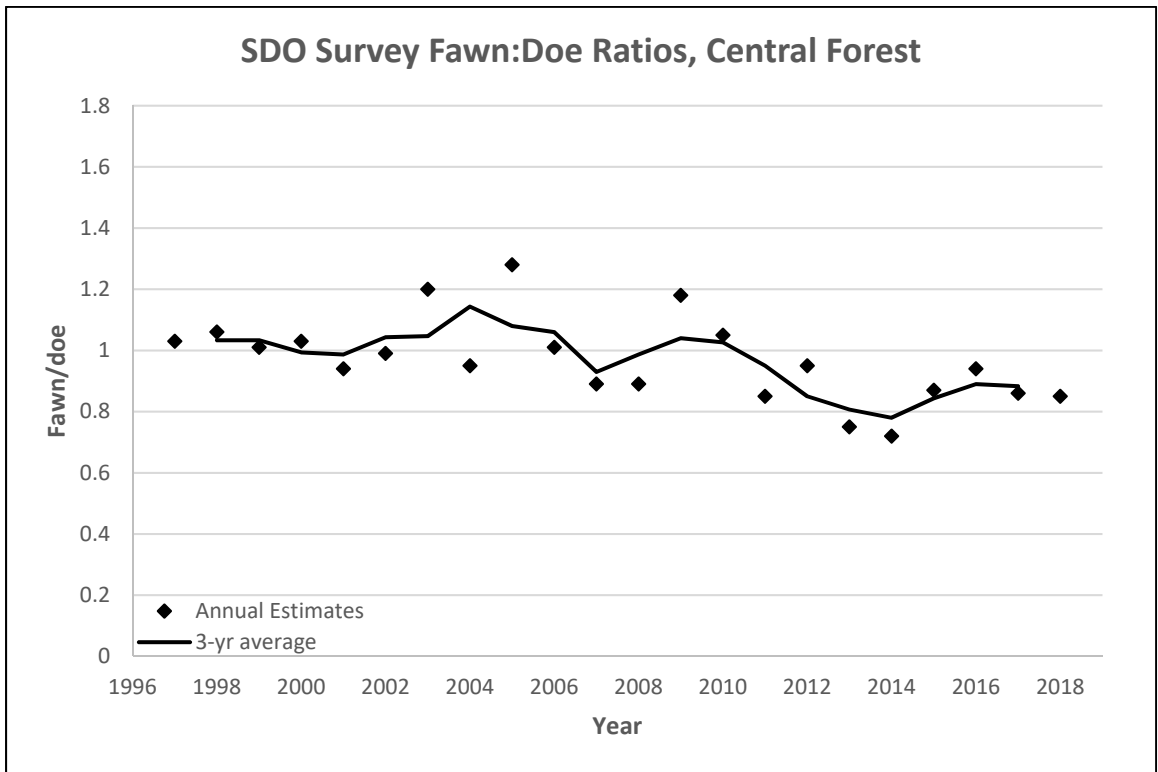
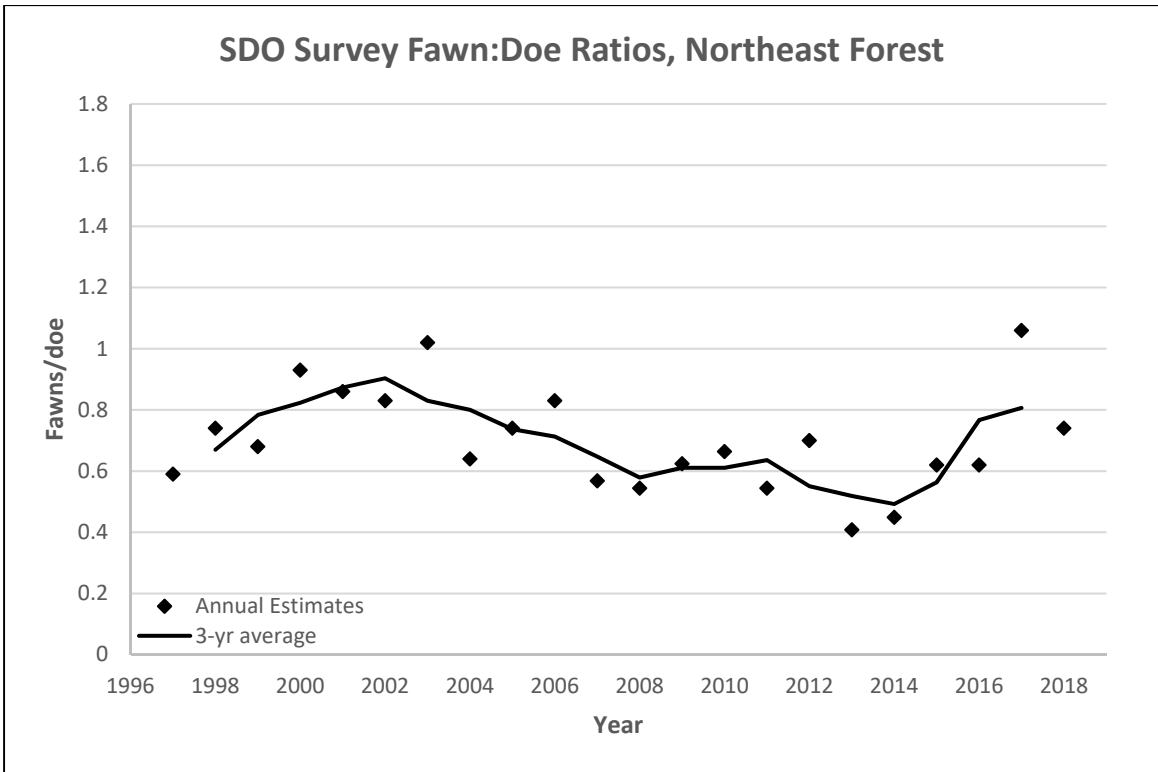


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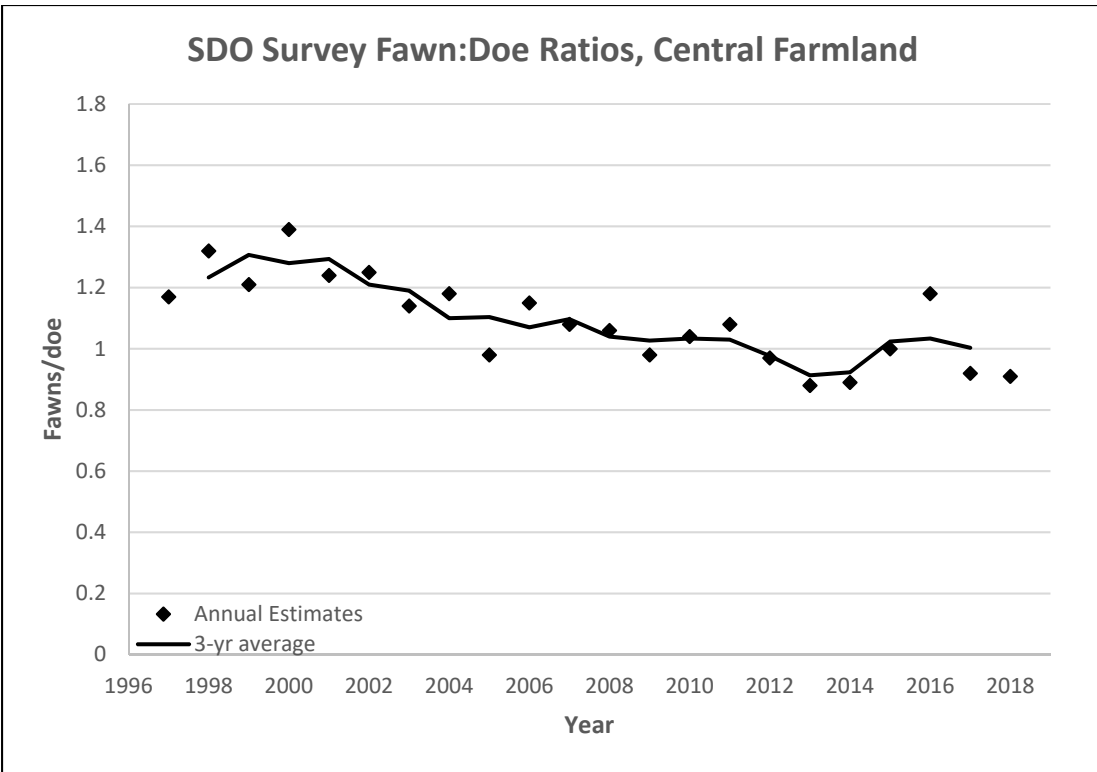
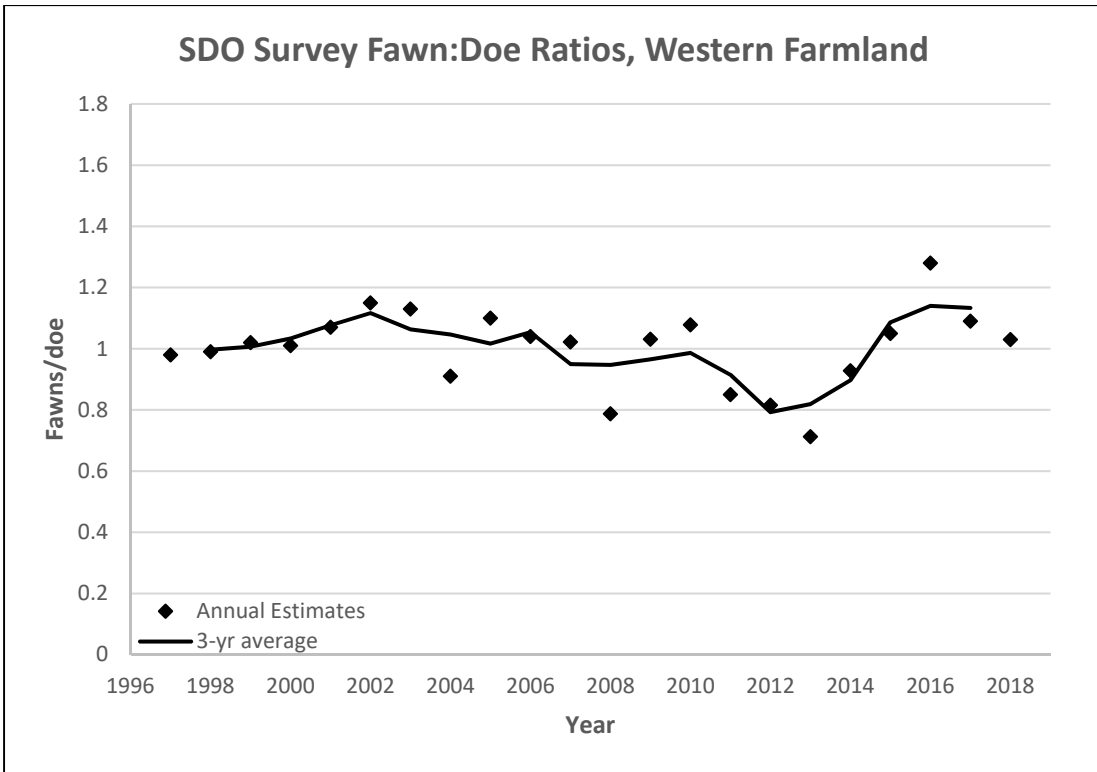


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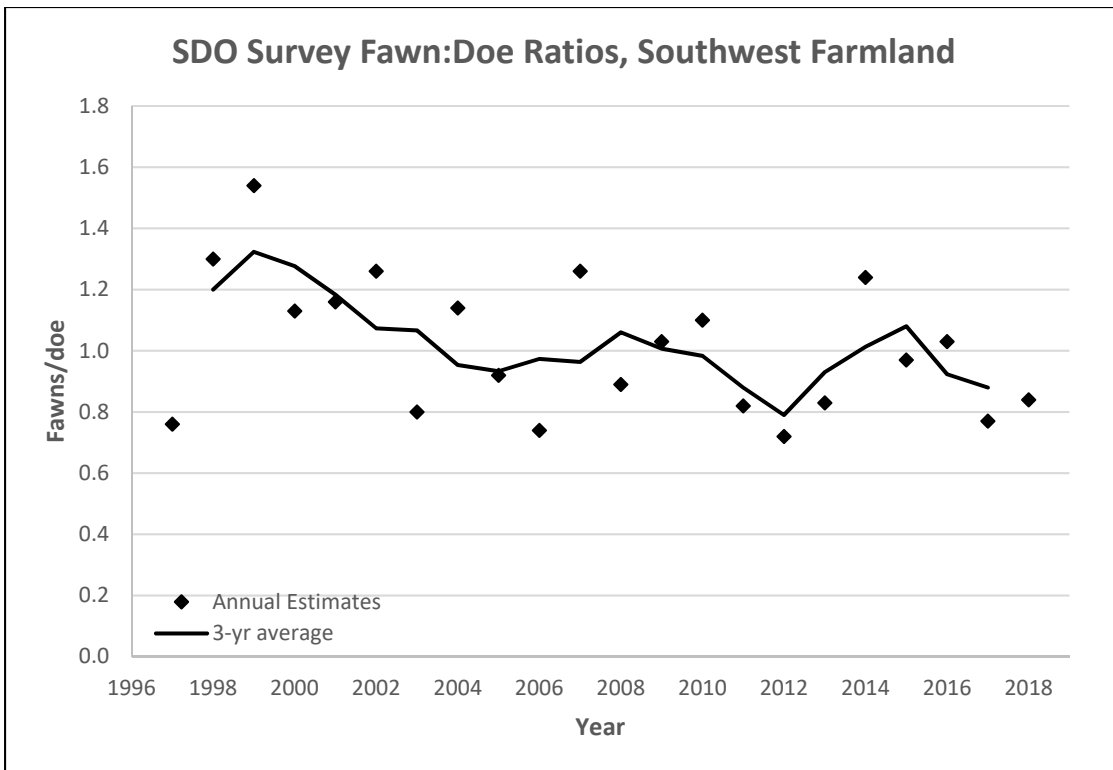
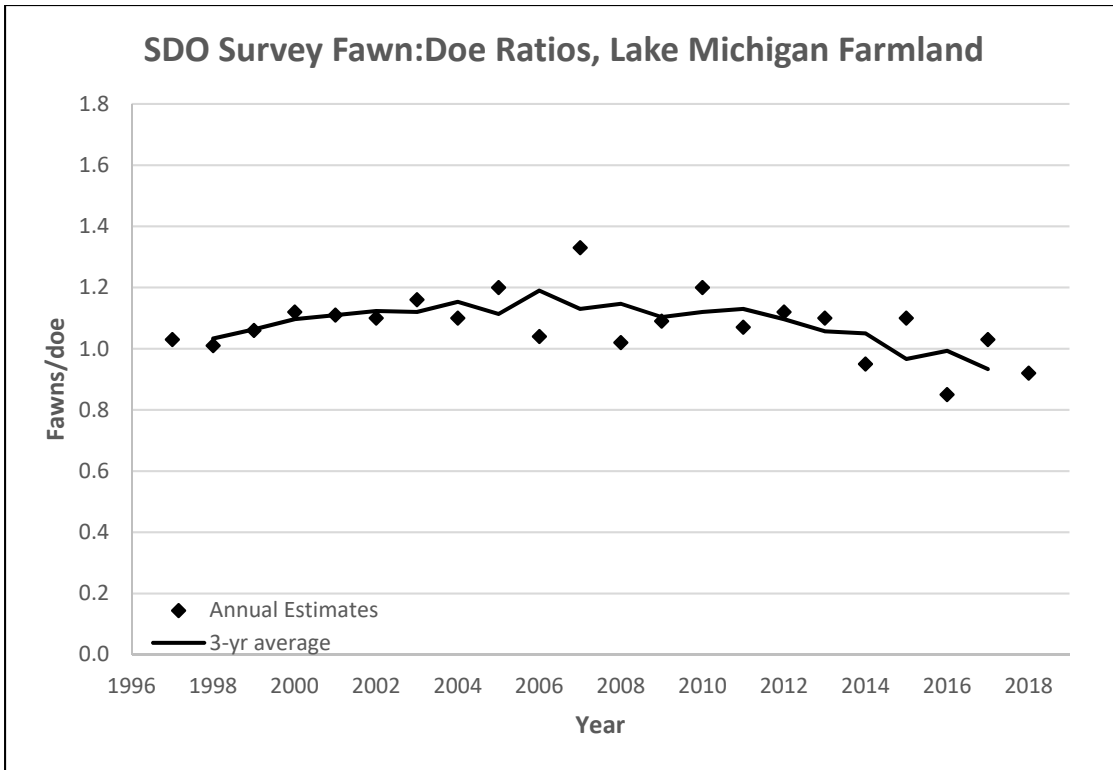


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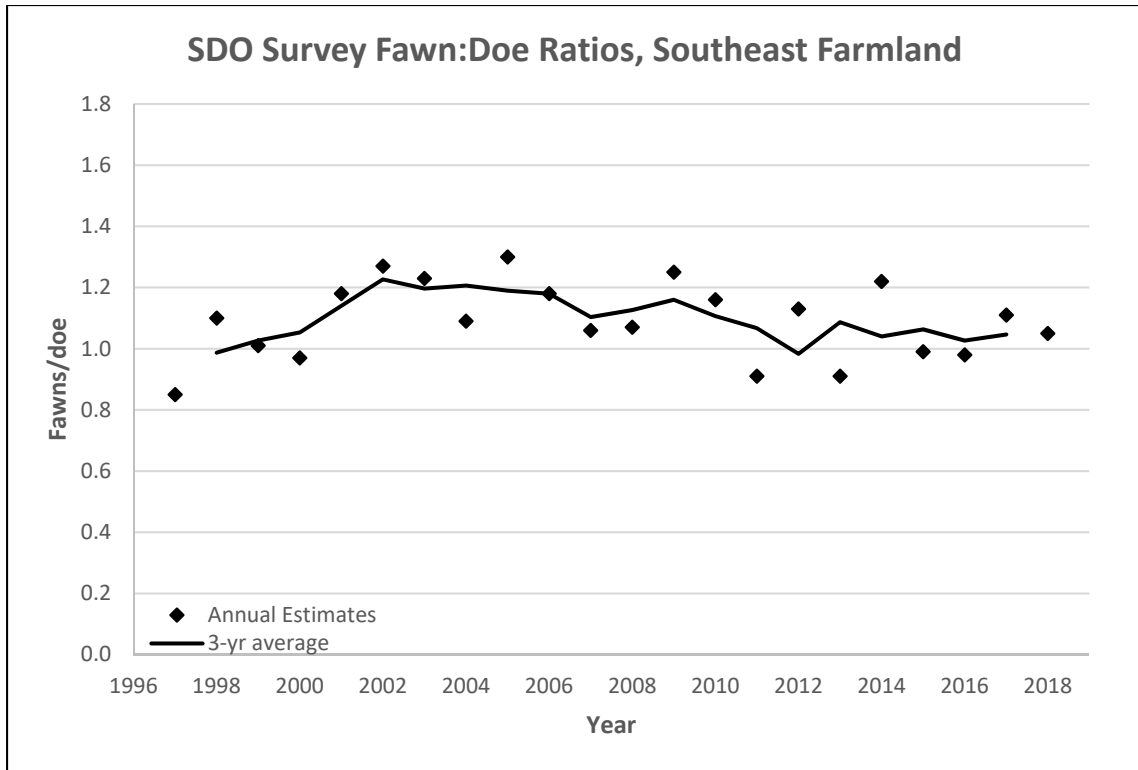


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