WILDLIFE MANAGEMENT AND RESEARCH NOTES

DNR
Indiana Department of Natural Resources

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2061	Title: Wild Turkey Summer Brood Production Indices – 2019.	9/18/2019

Abstract: *Since 2016, a web-based brood reporting system using a Caspio ™ online data entry platform (https://www.caspio.com/) has allowed natural resource agency personnel and members of the public to submit observations of wild turkey hens and poults during the July-August brood survey period. In the fourth year, 2019, there was a 47% increase in the number of observations submitted and an apparent 575% increase in the number of registrants from 2018. The 2019 statewide mean wild turkey production index was 2.2 poults:hen (PI = total poults:total adult hens), with 69% of the hens observed with at least one poult. The 2019 PI was 21% less ($P \leq 0.05$) than the 2018 PI (2.8) and the 2014-2018 average (2.7). The six regional PIs ranged from 2.0 to 2.5 with all regions experiencing declines from 11% in the southwest to 50% in the southeast. Reasons for the declines are likely related to prevailing climatic conditions of above normal precipitation in spring/early summer that occurred statewide in 2019 and the 14th consecutive year of above normal precipitation and flood events in the southern 2/3 of the state during early brood rearing period of June-July.*

Project ID/Activity: W36R5/W36R510

From 1993 to 2015, wildlife biologists and conservation officers annually recorded observations of wild turkey hens and poults, including hens without poults, during July and August on observation cards. A wild turkey summer brood Production Index (PI) is calculated as the total number poults/the total number of adult hens (poults:hen ratio) observed in July and August combined into one index. The PI is a more accurate index of production because it includes all hens, including those without poults. A chronic bias in brood observation data is the tendency of observers to report hens with poults more readily than those without poults (*i.e.*, barren hens), resulting in a higher PI than actually occurred. The August production index is generally greater than in July due to "gang" brood behavior that occurs when several individual broods and hens without broods combine into brood flocks.

Since 2016, a web-based brood reporting system using a "Caspio" ™ online data entry platform *(https://www.caspio.com/)* has allowed natural resource agency personnel and members of the public to submit observations of wild turkeys during the July-August brood survey period. The addition of observations from the general public (*i.e.*, citizen scientists) will hopefully enhance the robustness of the survey by increasing statewide coverage and total number of observations. Instructions for reporting wild turkey observations were developed and posted on the new web-based system promoted through agency communications, including an online "Wanted Poster" to be printed as a letter size cardstock poster or smaller sized cards. Observers, including Department of Natural Resources (DNR) personnel, were requested to create a personalized username with their contact information and to report observations of wild turkey hens, poults, gobblers, county, date observed, and if the observation was on a natural resource agency property. The online observation system was active during the traditional brood reporting period (July and August).

RESULTS and DISCUSSION

A total of 1,195 usable observations of at least one wild turkey was received from 1,599 registrants (26% observation rate) during July (59% of observations) and August (41% of observations) reporting period in 2019. These represent a 47% increase in total observations and an apparent 575% increase in registrants from 2018. Participants are those who reported a brood as opposed to those registrants who did not see a brood to report. Observations from non-DNR personnel accounted for 79% of the observations. Four reports with either incomplete information or of questionable validity (*e.g.*, observer likely combined multiple observations into one report) were censored. The 1,195 useable observations represented 7,941 wild turkeys (2,514 hens, 5,427 poults) compared to 5,423 wild turkeys (1,434 hens, 3,989 poults) in 2018 that resulted in 899 brood observations. This represents a 71% increase from the 527 broods observed in 2018 (Table 1.) The 2019 production index (PI) was 2.2 poults: hen, with 69% of the hens observed with at least one poult. The 2019 PI was 21% less than the 2018 PI of 2.8 (Figure 1).

The average size of the 899 broods reported in which at least one adult hen and one poult were observed together was 7.7 birds. The overall 2.2 PI and percent of hens with broods (69%) in 2019 was less ($P \leq 0.05$) than the 2.7 PI and 80% of hens with broods from 2014 through 2018 (Table 2). Since 1993, the average PI has progressively declined from around three to four in the 1990s to around two from 2005 through 2013, with encouraging signs of recovery and stabilization in the last decade fluctuating around a mean of 2.4 (SE = 0.14). The general downward trend in the PI (Figure 2) is indicative of a wild turkey population transitioning from a colonizing phase with geometric growth during restoration to an established one in which annual production and growth rates flatten to maintenance levels of a relatively stabilized population.

Changes in annual production are often reflected with in the proportion of juvenile males (jakes) in the following fall and spring harvests and two years later in the pre-season gobbling surveys and spring harvest because 2-year-old males are the most active gobbling cohort and generally the most vulnerable to spring harvest. Long-term trends in turkey populations are influenced more by availability of suitable habitat across the landscape but multiple, consecutive years of poor production can influence turkey population levels for up to a decade. Recent declines in the eastern United States are likely a manifestation of various density-dependent factors as populations peaked following restoration (Porter et al. 2011). Downward trends in spring harvests and summer production indices were observed in the last decade throughout the eastern United States (Eriksen et al. 2015). Periodic fluctuations above and below the long-term production mean are expected to continue as turkey populations stabilize at lower, "new normal" levels (Casalena et al. 2015). The changing population dynamics of maturing wild turkey populations will likely influence future harvest trends, hunter success, and hunting opportunities (Parent et al. 2015).

Despite an noticeable increase in the brood reports (3 of 6 regions had ≥ 100 brood reports) and greater participation, inferences from regional production summaries (Figure 3) should be viewed cautiously due to the relative scarcity of brood reports in some regions of the state that typically support higher spring harvests (*e.g.*, southeast Indiana; Figure 4). The six regional PIs ranged from 2.0 to 2.5 with all regions experiencing declines ranging from 11% in the southwest to 50% in the southeast, with a statewide drop of 21%. Reasons for the declines are likely related to prevailing climatic conditions of above normal precipitation during the spring/early summer that occurred statewide in 2019 and the 14th consecutive year of above normal precipitation and flood events in the southern 2/3 of the state during early brood rearing period of June-July. The annual precipitation across Indiana from 1998-2018 exceeded that for 1958-78 by 18% with significant growth in the summer months of June-August (Fredrick 2018).

The substantial increases in observer participation and brood observation reports in 2019 was certainly welcomed and likely increased the sensitivity of the survey to provide more accurate estimates of wild turkey production. The increased observer participation is even more meaningful because 2019 was a poor brood production summer that lowered the likelihood a participant to see a brood and reduced observer participation (sample size) as a potential factor influencing the estimated PIs across the state. Hopefully gains in participation and observation numbers will continue to increase annually with greater coverage across the state. To illustrate, there were 20 counties without a single brood reported in 2018 compared to only nine in 2019 (Figure 5). Other potential biases include variable brood detection rates among regions due to differences in vegetation, road density and topography.

Efforts to increase participation in the summer brood survey in 2019 through greater publicity appeared to succeed across the state. This level of effort needs to continue to reach the minimum goal of 3,000 brood reports evenly distributed across the various regions of the state (899 brood reports in 2019).

LITERATURE CITED

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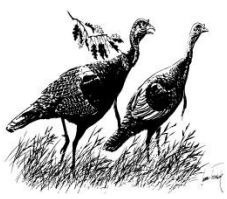

Table 1. Indiana wild turkey brood production - Summer 2019.

July & August	Adult Hens	No. of Poults	Brood Size *	Poults/ Hen **		
Total	2,514	5,427		**2.2**	Percent hens with broods	69%
No. Observations	1,195	899	899		Mean No. "barren" hens in a group	2.7
Mean	2.1	4.6	7.7		Observations of "barrens" hens	296
SE	0.06	0.17	0.28			

Jul-19	Adult Hens	No. of Poults	Brood Size *	Poults/ Hen **		
Total	1,358	3,030		**2.2**	Percent hens with broods	65%
No. Observations	699	507	507		Mean No. "barren" hens in a group	2.5
Mean	1.9	4.3	7.2		Observations of "barrens" hens	104
SE	0.05	0.16	0.19			

Aug-19	Adult Hens	No. of Poults	Brood Size *	Poults/ Hen **		
Total	1,156	2,397		**2.1**	Percent hens with broods	73%
No. Observations	496	392	392		Mean No. "barren" hens in a group	3.1
Mean	2.3	4.8	8.3		Observations of "barrens" hens	192
SE	0.07	0.19	0.22			

* Brood size = all hens + all poults observed as a group at one time.
** The total poults/total hens.
The total poults/total hens observed each month; July + August = annual Production Index (PI).

Figure 1. Wild Turkey Brood Production, 1993-2019

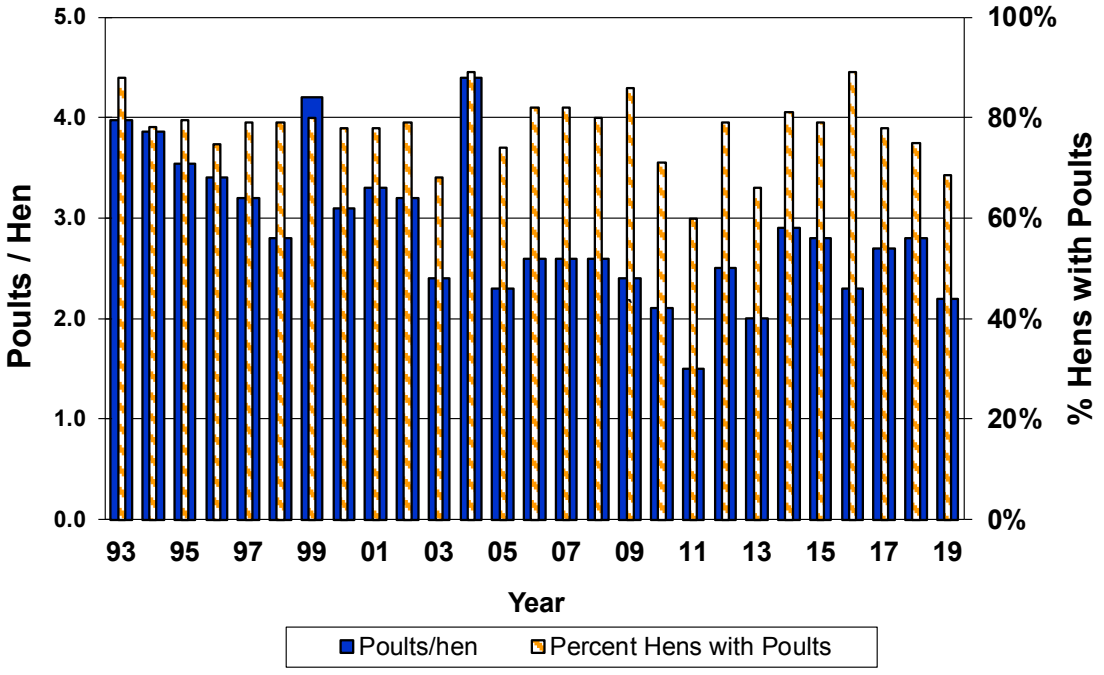

Table 2. Indiana wild turkey production indices, 1993-2019.

Year	Poults/Hen [a] (PI)		% Hens with poults		No. Observations	
1993	4.0		88%		101	
1994	3.9		78%		175	
1995	3.5		80%		121	
1996	3.4		75%		142	
1997	3.2		79%		126	
1998	2.8		79%		134	
1999	4.2		80%		229	
2000	3.1		78%		227	
2001	3.3		78%		313	
2002	3.2		79%		338	
2003	2.4		68%		312	
2004	4.4		89%		597	
2005	2.3		74%		240	
2006	2.6		82%		477	
2007	2.6		82%		477	
2008	2.6		80%		328	
2009	2.4		86%		311	
2010	2.1		71%		320	
2011	1.5		60%		320	
2012	2.5		79%		318	
2013	2.0		66%		394	
2014	2.9		81%		363	
2015	2.8		79%		302	
2016	2.3		89%		323	
2017	2.7		78%		522	
2018	2.8		75%		527	
2014-2018 Mean (SE)	*2.7*	*(0.11)*	*80%*	*(2.4%)*	*407*	*(48.8)*
2019	2.2		69%		899	

[a] *P*roduction index (PI) is the total poults/total hens observed in July and August.

Figure 2. Wild Turkey Production - Indiana

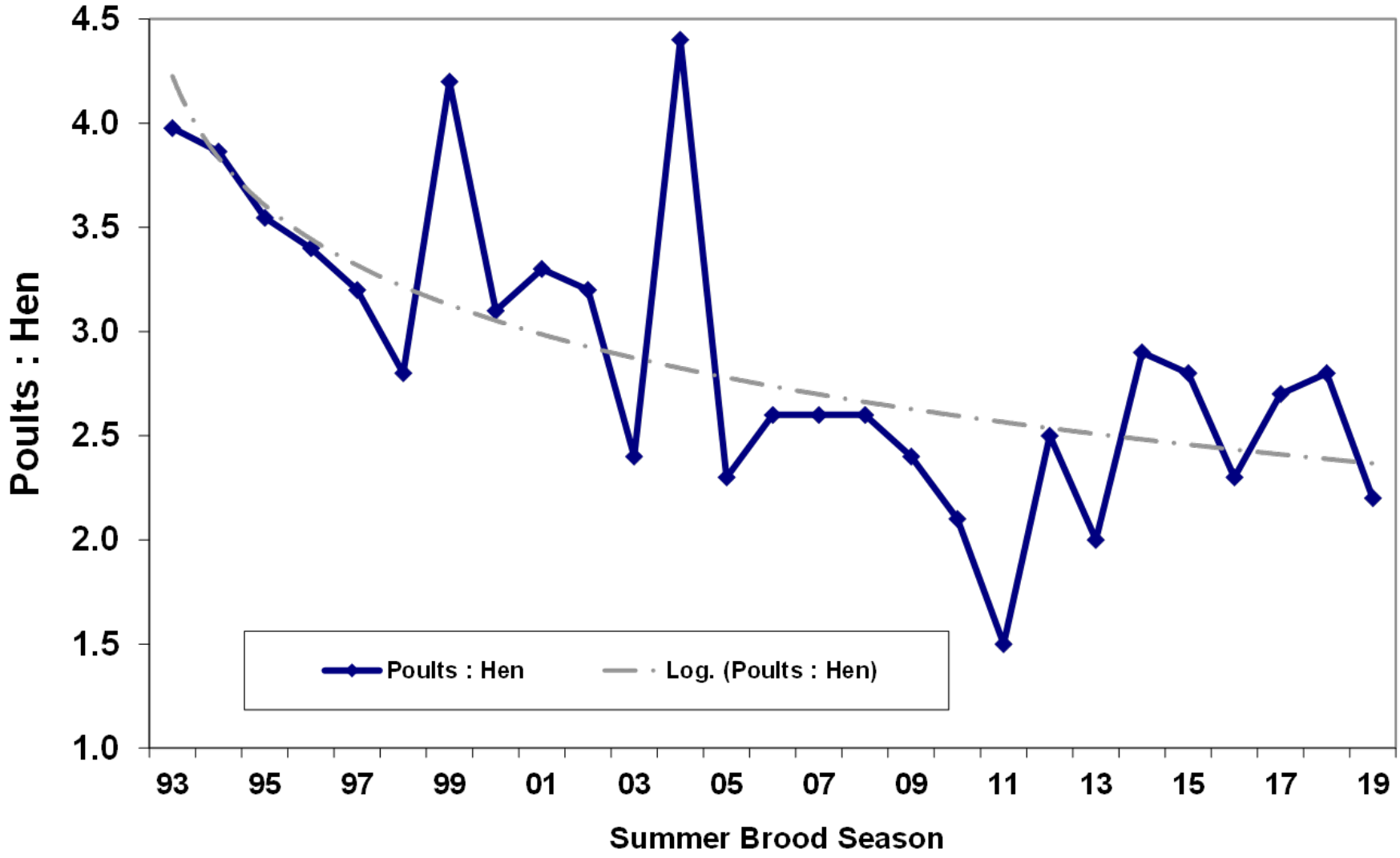

Figure 3. Summer wild turkey production by regions for July and August, 2019.

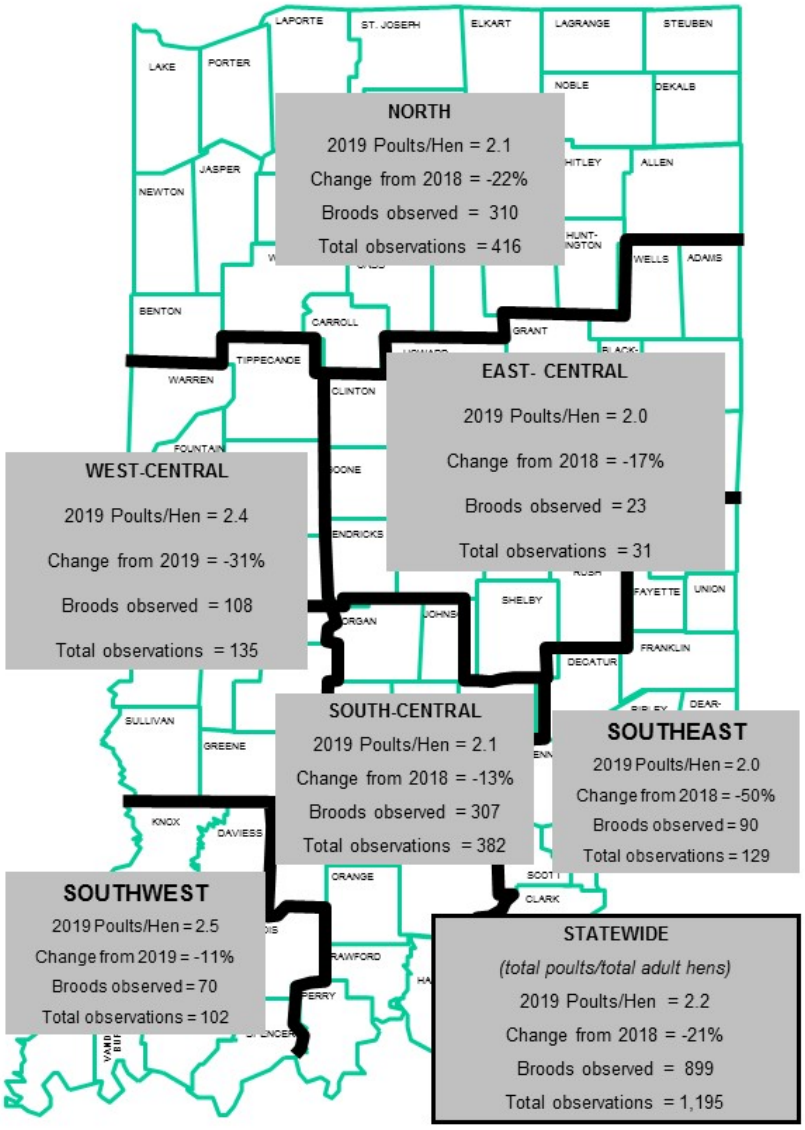

Figure 4. Distribution of web-based wild turkey observation reports (n = 1,195) for July and August, 2019.