

# WILDLIFE MANAGEMENT AND RESEARCH NOTES

No.	AUTHOR: Steven E. Backs, Wildlife Research Biologist	Date
2067	Title: Wild Turkey Summer Brood Production Indices – 2020.	11/16/2020

**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 the public to submit observations of wild turkey hens and poults during the July-August brood survey period. In the fifth year, 2020, there was a 4% decrease from the previous year in the number of observations submitted. The 2020 statewide mean wild turkey production index was 2.3 poults:hen (PI = total poults:total adult hens), with 71% of the hens observed with at least one poult. The 2020 PI was 4% greater than the 2019 PI (2.2) and within the range of values from 2015 to 2019, which averaged 2.6. The six regional PIs ranged from 1.7 to 2.7 with four regions increasing from 4 to 29% but the southwest and southcentral regions experiencing 4% and 20% declines respectively. These declines are likely related to two prevailing climatic conditions: 1) above normal precipitation in spring/early summer that occurred statewide in 2020; and 2) 15 consecutive years of above normal precipitation and flood events in the southern of the state during early brood rearing period of June-July.

Project ID/Activity: W51R/513

From 1993 to 2015, wildlife biologists and conservation officers annually recorded observations of eastern (*Meleagris gallopavo sylvestris*) 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 observed 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 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 the public to submit observations of wild turkeys during the July-August brood survey period. The addition of observations from the 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 Indiana 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 public property. The online observation system was active during the traditional brood reporting period (July and August).

## RESULTS and DISCUSSION

A total of 1,143 usable observations of at least one wild turkey was received during July (59% of observations) and August (41% of observations) reporting period in 2020. This represents a 4% decrease in total observations from 2019. Observations from non-DNR personnel accounted for 81% of the observations. Two reports with either incomplete information or of questionable validity (*e.g.*, observer likely combined multiple observations into one report) were censored. The 1,143 useable observations totaled 8,007 wild turkeys (2,412 hens, 5,595 poults) and 862 broods (Table 1), compared to 7,941 total turkeys (2,514 hens, 5,427 poults) and 899 broods in 2019, a 4% decrease in the number of broods observed. The 2020 PI was 2.3, with 71% of the hens observed with at least one poult. The 2020 PI was 5% greater than the 2019 PI of 2.2 (Figure 1).

The average size of the 862 broods reported in which at least one adult hen and one poult were observed together was 8.5 birds compared to 7.7 birds in 2019. The 2.3 PI of 2020 was within the range of values observed the previous five years, but the percent of hens with broods (71%) and the number of observations were greater ( $P < 0.05$ ) than observed during the same period (Table 2). The

average PI has progressively declined ( $P < 0.05$ ) in 27 years from a mean of 3.6 (SE = 0.18; 1993-1999) to 2.4 (SE = 0.13; 2011-2020), where it appears to have stabilized in the last decade. The decline in the PI (Figure 2) is indicative of a turkey population transitioning from a colonizing phase with geometric growth during restoration to an established one with stable annual production and growth rates that periodically and expectedly fluctuates above and below the long-term means (Porter et al. 2011, Casalena et al. 2015).

Long-term trends in turkey populations are primarily influenced by availability of suitable habitat across the landscape but consecutive years of poor production can influence turkey population levels for up to a decade. Changes in annual production are often reflected 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 two-year-old males are the most active gobbling cohort and generally the most vulnerable to spring harvest. A 50-year examination of Indiana's spring harvests indicated that the proportion of two-year-old gobblers in the population was a principal driver in annual harvest levels (Backs and McCallen, *in press*).

Despite an increase in brood observations reported statewide during the last two years with greater public participation (4 of 6 regions had  $\geq 100$  brood reports), inferences about regional production (Figure 3) should be viewed cautiously due to the noticeable decline of brood reports in some regions of the state. To illustrate, southcentral Indiana had 118 fewer brood reports (-38%) in 2020 than the previous year. The regional PIs ranged from 1.7 to 2.7 with four regions increasing from 4 to 29%, but the southwest and southcentral regions experiencing, respectively, 4% and 20% declines. The southern half of the state, in general, has experienced chronically low production related to 15 consecutive years of above normal precipitation during the spring/early summer and flood events during early brood rearing period of June-July. The annual precipitation across Indiana from 1998 to 2018 exceeded that for 1958-1978 by 18% with significant increased amounts of precipitation in from June through August (Fredrick 2018). Declines in spring harvests and summer production have occurred during the last decade throughout the eastern United States (Eriksen 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).

The substantial increase in observer participation the last two years was certainly welcomed and likely increased the sensitivity of the survey that resulted in more accurate estimates of wild turkey production. Although overall participation has greatly improved, observations remain low in some counties and regions of the state (Figure 4). A reality that also affects public participation is that, in areas of low production, registrants cannot "participate" because they do not observe any broods. An assessment of survey registrants was conducted by the Division's outreach personnel determine potential barriers to participation to facilitate greater public involvement in future years. One interesting result suggests human nature or procrastination may have led to failures to report broods after they were observed (Figure 5). Other registrants reported issues with the web site or the registration process. One means to improve participation may be to simplify the reporting process, making it more direct, and incorporate a cellphone compatible application for immediate and convenient reporting of broods. Potential biases also include variable brood detection rates among regions due to differences in vegetation, road density, and topography. The objective is to obtain a minimum goal of 3,000 brood reports evenly distributed across the regions of the state, but this may be a formidable challenge given recent levels of brood production and public participation (e.g., 899 brood reports in 2019; 862 reports in 2020).

The use of driving routes to determine annual wild turkey productivity are generally used in the Plains and western states where more open habitats facilitate observations of broods (e.g., Erxleben et al. 2010) and with turkey subspecies that utilize more open or rangeland habitats, e. g. Rio Grande and Merriam's wild turkeys (e.g., *M. g. intermedia* and *M. g. merriami*). A pilot project was conducted in August 2020 to determine the utility of semi-systematic, roadside brood counts in rural areas to supplement the current survey protocol. Ten biologists each drove 10-35 miles in rural areas where the likelihood of observing a brood was high. A total of 451 miles were driven in 13 counties during which 15 hens, 23 poults (representing five broods), and 12 gobblers were observed. Based on these results and comments from the participating biologists, the feasibility of using roadside brood surveys in Indiana is extremely limited and ineffective technique to acquire additional brood observations.

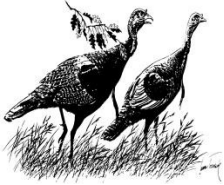
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**Table 1. Indiana wild turkey brood production - Summer 2020.**

Jul-20	Adult Hens	No. of Poults	Brood Size *	Poults/Hen **	
<b>Total</b>	1,434	3,363		<b>2.3</b>	Percent hens with broods 68%
<b>No. Observations</b>	709	521	521		Mean No. "barren" hens in a group 2.4
<b>Mean</b>	2.0	6.5	8.3		Observations of "barrens" hens 188
<b>SE</b>	0.05	0.19	0.21		

Aug-20	Adult Hens	No. of Poults	Brood Size *	Poults/Hen **	
<b>Total</b>	978	2,232		<b>2.3</b>	Percent hens with broods 75%
<b>No. Observations</b>	434	341	341		Mean No. "barren" hens in a group 2.6
<b>Mean</b>	2.3	6.5	8.7		Observations of "barrens" hens 93
<b>SE</b>	0.07	0.22	0.26		

July & August Combined	Adult Hens	No. of Poults	Brood Size *	Poults/Hen **	
<b>Total</b>	2,412	5,595		<b>2.3</b>	Percent hens with broods 71%
<b>No. Observations</b>	1,143	862	862		Mean No. "barren" hens in a group 2.5
<b>Mean</b>	2.1	6.5	8.5		Observations of "barrens" hens 281
<b>SE</b>	0.41	0.14	0.16		

\* 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 combined = annual Production Index (PI).

**Figure 1. Wild Turkey Brood Production, 1993-2020**

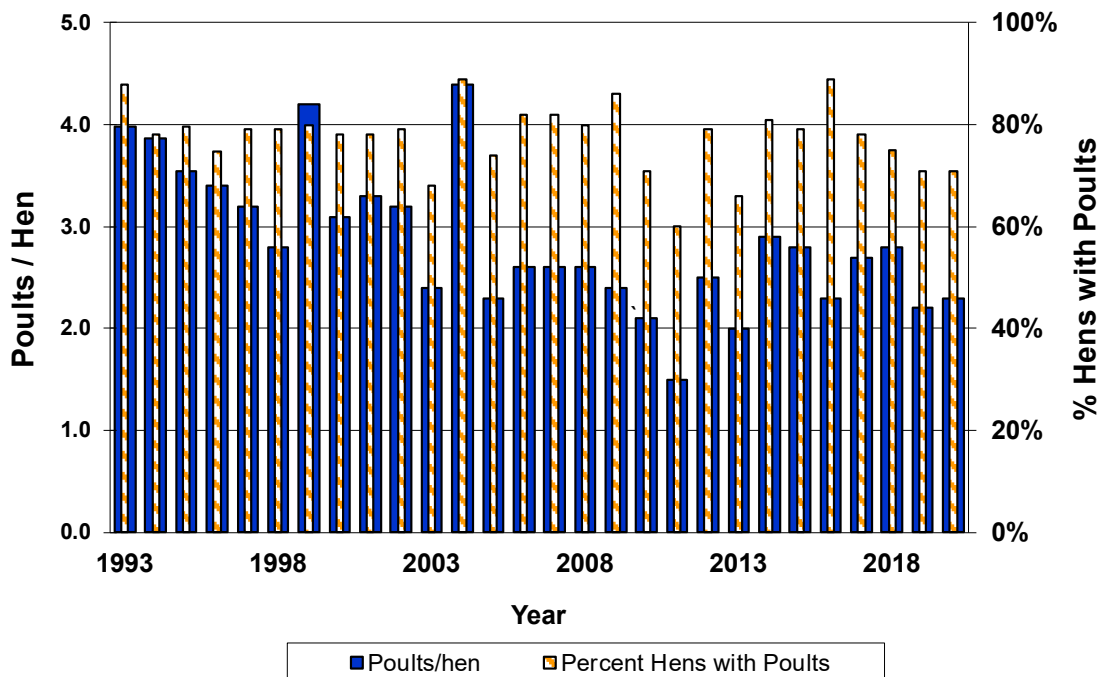


Table 2. Wild turkey production indices in Indiana, 1993-2020.

Year	Poults/Hen <sup>a</sup> (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
2019	2.2	71%	899
2015-2019 Mean (SE)	2.6 (0.14)	78% (2.9%)	515 (107.2)
2020	2.3	71% <sup>b</sup>	862 <sup>b</sup>

<sup>a</sup> Production index (PI) is the total poults/total hens observed in July and August.

<sup>b</sup> 2020 PI, % hens with broods, and total brood observations significant departures from means of the previous 5 years ( $P < 0.05$ ).

Figure 2. Annual Wild Turkey Production in Indiana, 1993-2020.

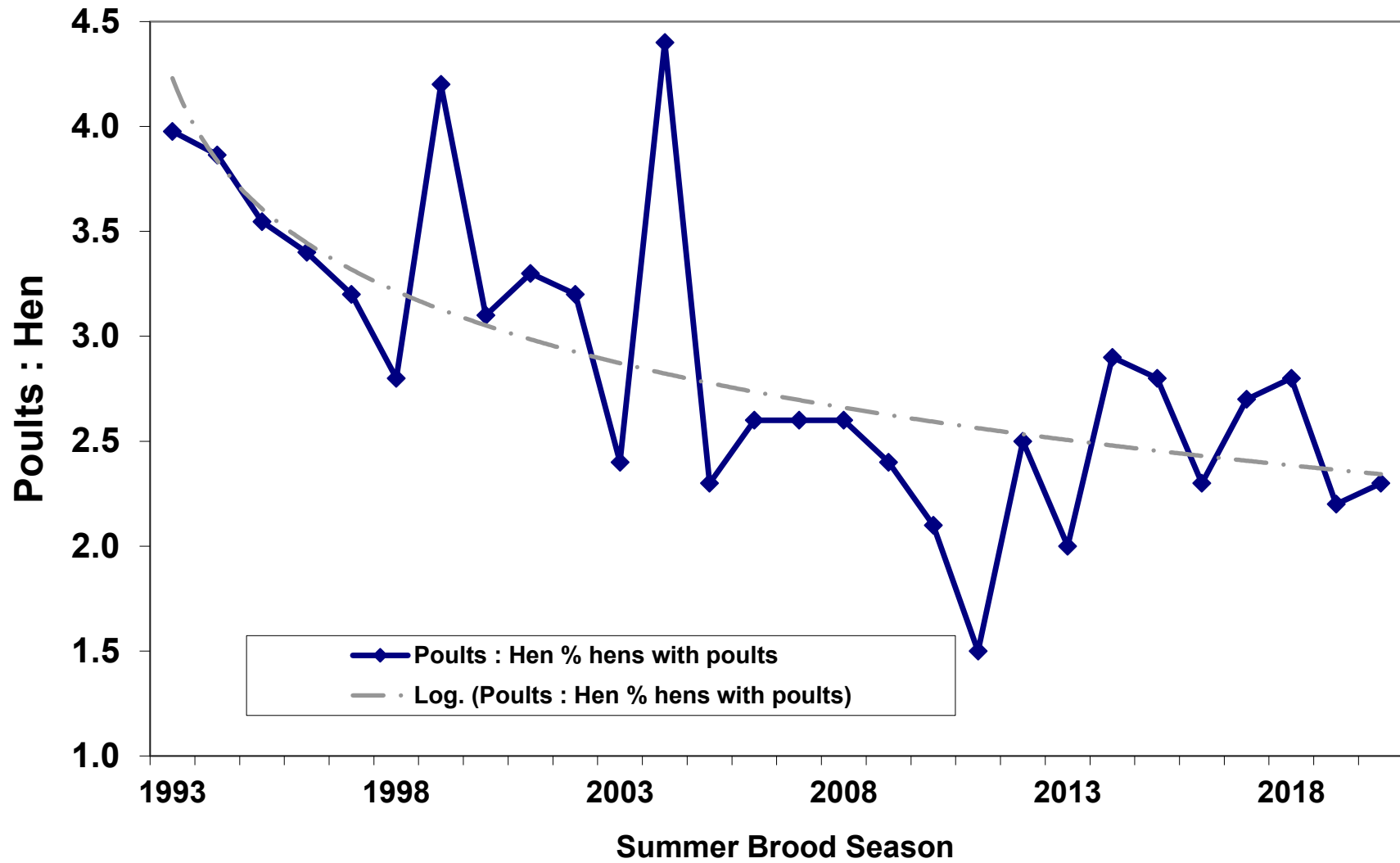


Figure 3. Regional wild turkey production for July and August, 2020.

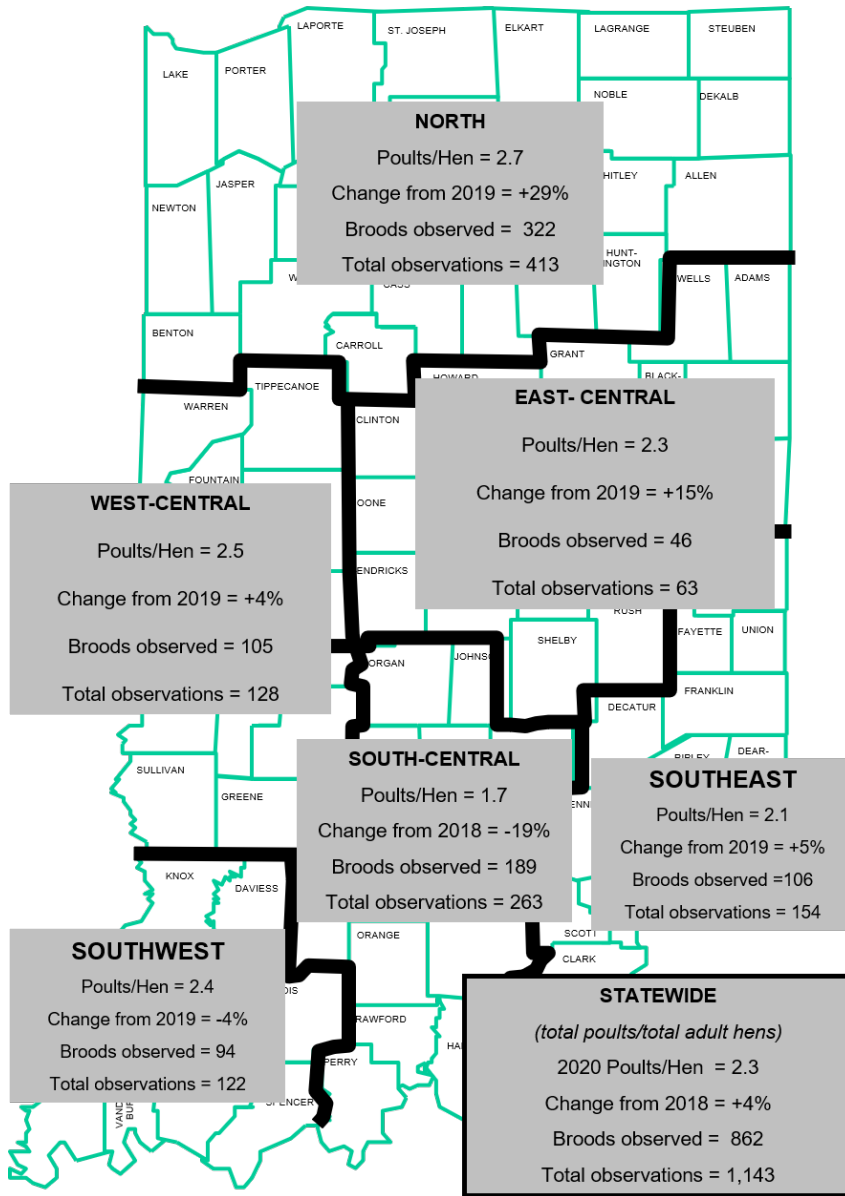
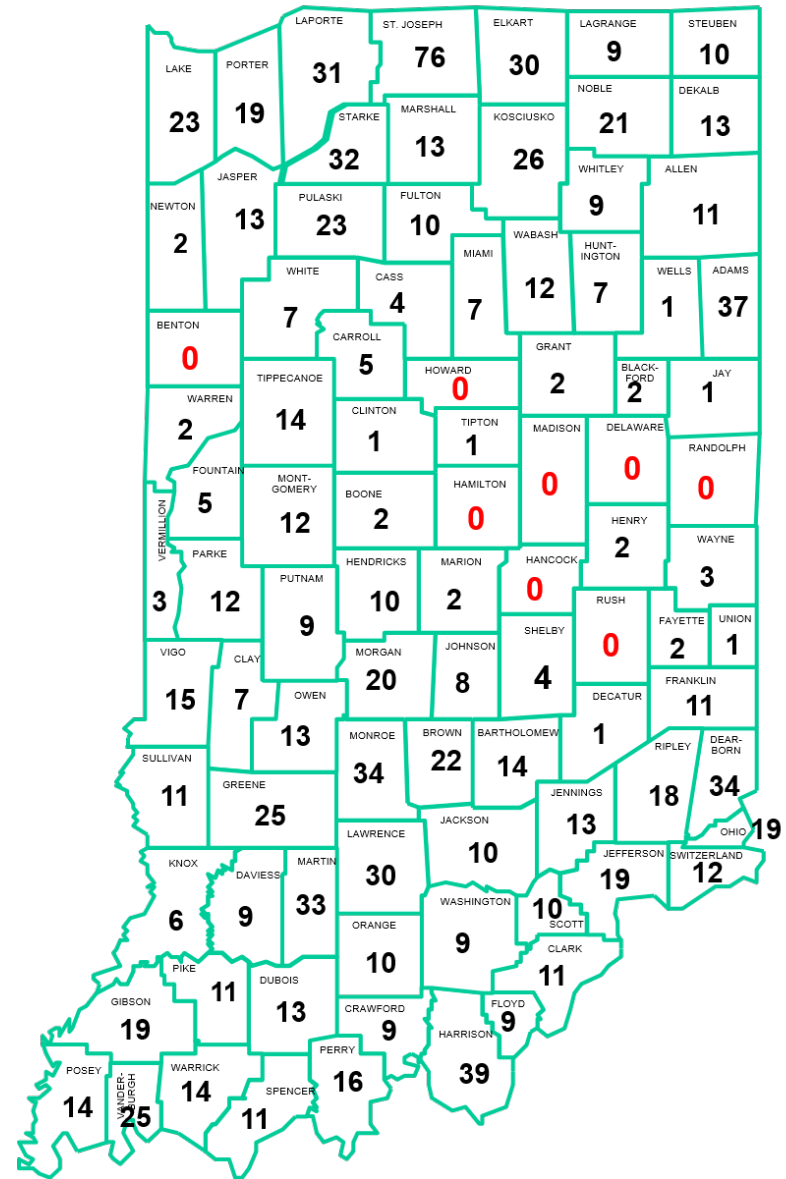


Figure 4. Distribution of wild turkey observation reports, (n = 1,143) for July and August, 2020.



**Figure 5.**

Percent of 107 respondents to the question: Please describe the answer that best fits the reason you did not report a turkey brood observation this summer?

