2021 Kentucky Wild Turkey Brood Survey Report

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photo credit: Joe Lacefield

INTRODUCTION

This report summarizes results of the 2021 Kentucky Wild Turkey Brood Survey. This survey has been conducted by the Kentucky Department of Fish and Wildlife Resources (KDFWR) each summer since 1984. Its purpose is to provide statewide and regional indications of annual wild turkey reproductive success, including nesting success and brood survival. This information helps us track changes in turkey populations and subsequent hunter harvest over time. A dual benefit is public involvement, as hunters and wildlife watchers provide data to augment data collected by KDFWR staff. Results reported here provide general and somewhat technical information for a wide audience.

METHODS

The turkey brood survey involves volunteers and KDFWR staff reporting turkeys they see during routine travels across the state in July and August. For each observation, these cooperators report the

number of all turkeys seen, including hens (adult females), poults (young turkeys), gobblers (adult males), and jakes (juvenile males). Cooperators also report the location of the observation (by county or from their mobile phone's GPS) and whether they have previously seen and reported those turkeys. Cooperators can report turkey observations using a mobile phone app, website, or paper forms that can be printed and submitted by mail or e-mail. For more information, such as instructions or past-year reports, visit *https://fw.ky.gov/Hunt/Pages/TurkeyBroodSurvey.aspx*.

The primary objective for brood survey data is to indicate annual turkey reproductive success based on observations of hens with and without poults. From these observations we calculate a poults-per-hen ratio (PPH) as our primary indicator of reproductive success. Historically, we calculated PPH simply by dividing the total number of poults by the total number of hens; we continue to calculate PPH this way for tracking long-term trends in PPH. Since 2017, we have also calculated PPH for each individual observation of hens with poults; this adjustment allows us to estimate the statistical uncertainty of the PPH averages we estimate (confidence intervals). Although PPH figures may differ slightly between calculation methods, trends over time should be similar.

The new PPH calculation method follows a standardized survey protocol developed by agency biologists to foster consistency and comparability of results across states and regions. In addition, the protocol specifies quality control criteria for observations, meaning some observations get filtered out before analysis. This includes observations in which sex or age are not recorded for 25% or more of the turkeys seen, 8 or more hens but no poults are seen, poults but no hens are seen, more than 16 poults per hen are seen, or turkeys were seen before.

In addition to PPH, we calculate a poults-per-brood ratio (PPB) to indicate poult survival, the proportion of hens observed with a brood to indicate nesting success, and the ratio of male to female turkeys to indicate summer sex ratio or gobbler carryover after the spring hunting season). We also report the total number of turkey observations, the number of observations used for analysis, and the number of turkeys observed in each observation (hens, poults, males, unidentified sex or age).

RESULTS AND DISCUSSION

Survey cooperators recorded a statewide total of 517 turkey observations (Table 1). Most of the observations were reported using the survey phone app and website (91%) and were of turkeys not previously seen by cooperators (77%). Most observations were reported from the Central Region (46%), followed by the Western Region (23%) and the Eastern Region (22%; Figure 1). The total number of observations and of turkeys seen in those observations declined by 35% and 27%, respectively, compared to 2020. Those totals depend on levels of public participation and turkey program outreach efforts, which have varied among years. However, the proportion of observations with poults increased by 29%.

Estimated PPH was 3.2 statewide (Table 2). This was a substantial increase compared to recent years: 45% higher than 2020, 33% higher than 2019, 60% higher than 2018, and 146% higher than 2017. Similarly, PPH for each survey region increased: Western Kentucky's PPH of 3.1 was 24%, 19%, 72%, and 107% higher than in 2020, 2019, 2018, and 2017, respectively; Central Kentucky's PPH of 3.6 was 74%, 57%, 71%, and 177% higher; and Eastern Kentucky's PPH of 2.6 was 23%, 4%, 24%, and 117% higher. Comparisons going back to 2017 are insightful considering that the turkey program has received an increasing number of anecdotal reports from hunters of lower turkey populations. Lower reproductive success in 2017 and 2018 has probably influenced turkey numbers and hunter

harvest, but better reproduction in 2021 should help maintain strong spring turkey harvest in coming years.

Among the other survey statistics tabulated, estimated PPB was 4.2 statewide, which was 4% above 2020. Regionally, PPB was 11% and 4% above 2020 for Central and Western Kentucky, respectively, but was 18% below 2020 in Eastern Kentucky. PPB is less variable year to year than PPH. The proportion of hens observed in association with a brood increased statewide (18%, 8%, 9%, and 52%), in Central Kentucky (40%, 28%, 24%, 99%), and in Eastern Kentucky (16%, 96%, -6%, and 33%), but dipped slightly in Western Kentucky except compared to 2018 and 2017 (-8%, -11%, +8%, and +17%). The male-to-female ratio was 0.40 statewide, which was considerably lower than the previous 4 years (-43%, -43%, -50%, -60%), and regional changes in male-to-female ratios were very similar. The male-to-female ratio has been interpreted as an indicator of potential over-harvest of male turkeys, but if interpreted as an indicator of the population's sex ratio, it reflects the increasingly improved reproductive success over the past few years.

Table 1. Total number of turkey observations reported and the number of hens, poults, males, and unknown sex-age turkeys in those observations during the 2021 Wild Turkey Brood Survey.

Region	Observations	Hens	Poults	Males	Unknown	Total Turkeys
Western	121	201	488	32	2	723
Central	240	291	966	72	6	1,335
Eastern	113	141	328	47	4	520
Unknown	43	54	144	6	0	204
Statewide	517	687	1,926	157	12	2,782

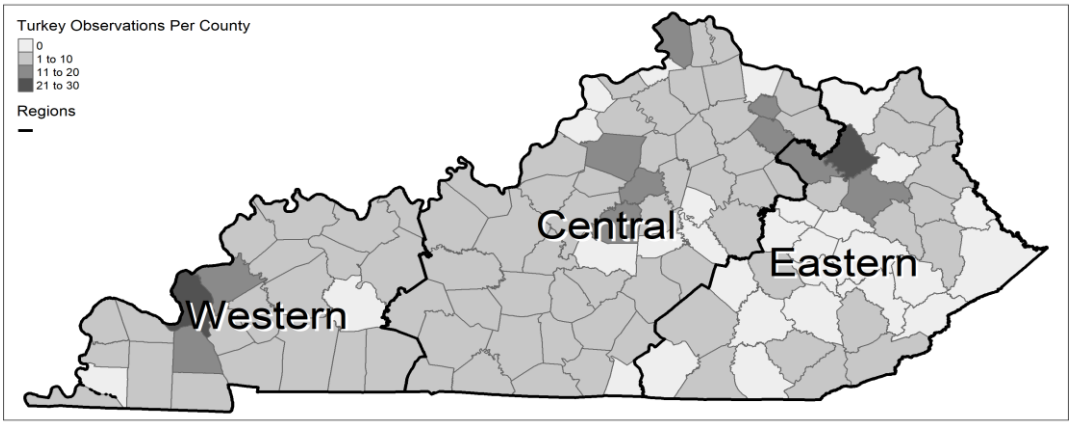

Figure 1. Total turkey observations per county for the 2021 Wild Turkey Brood Survey. Counties are grouped regionally.

Table 2. Summary statistics for the 2021 Wild Turkey Brood Survey. Poults per hen = PPH, poults per brood = PPB. Calculations based on NWTF Technical Committee standardized protocol.

Region	PPH (95% CIs, n)[a]	PPB (95% CIs, n)[a]	% Hens With Brood (n)[b]	Male:Female (n)[c]
Western	3.1 (2.5-3.7, 82)	4.5 (4-5.1, 56)	67.7 (82)	0.16 (90)
Central	3.6 (3.2-4.1, 150)	4.3 (3.9-4.8, 127)	88.0 (150)	0.25 (164)
Eastern	2.6 (2.1-3.2, 74)	3.4 (2.9-4, 57)	77.3 (74)	0.33 (89)
Unknown	3.3 (2.2-4.6, 25)	5.1 (4-6.3, 16)	63.0 (25)	0.11 (25)
Statewide	3.2 (3-3.5, 331)	4.2 (3.9-4.5, 256)	77.9 (331)	0.23 (368)

[a] 95% confidence intervals calculated by bootstrapping; n = number of observations used in calculation

[b] Percentage of hens observed with at least 1 poult

[c] Total number of males observed divided by total number of hens observed

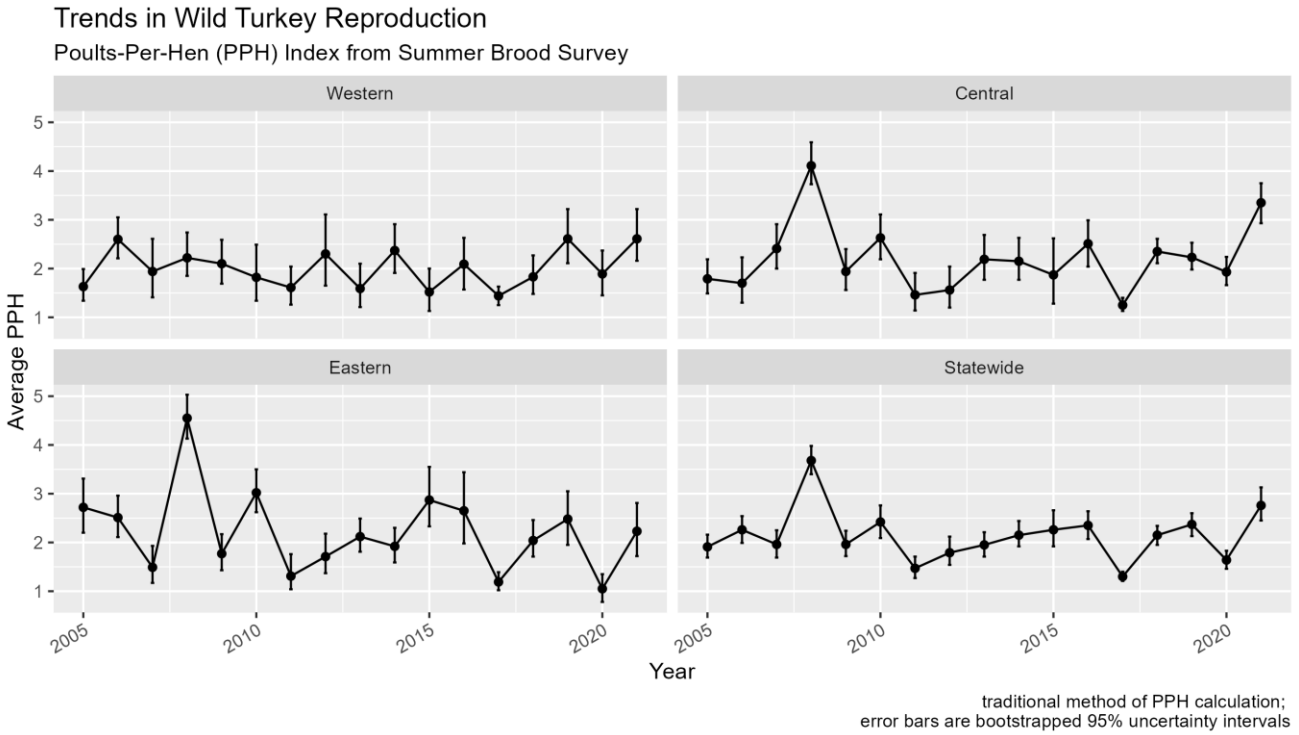

Figure 2. Trends in poults per hen (PPH) from Kentucky's Wild Turkey Brood Survey since 2005. For consistency, PPH was calculated by the traditional method (total poults divided by total hens overall) rather than the method used since 2018 (total poults divided by total hens per observation).

In conclusion, wild turkey reproductive success appears to have improved in summer 2021. Leading up to spring, we received several questions about the expected emergence of periodical cicadas. This year's emergence was of Brood X, which was expected to influence only parts of Kentucky along the Ohio River west of Cincinnati and along the Tennessee state line (*https://entomology.ca.uky.edu/ef446*). The emergence appeared to be localized, so any benefits to turkeys likewise would have been local. The cicada emergence that has real potential to impact turkeys, as it did in 2008, is the Brood XIV.

This summer weather may have been a more important factor. The National Weather Service in Louisville reported little severe weather in April and May when turkey hens were nesting, temperatures were between 2.3 and 4.3 degrees F below normal, and precipitation was between 0.23 and 2.55 below normal (*https://www.weather.gov/lmk/may_2021_summary*). They reported that, "The one warm spell took place from the 19th to the 27th, peaking from the 23rd to the 25th when Louisville hit exactly 90 each day. However, dew points were low so it wasn't very humid, and morning lows were in the 60s." Hens are may be more susceptible to predation while sitting on the nest during humid conditions, which improve scenting conditions for predators. That warmer, drier period in late May encompassed much of the hatching period, so conditions were ideal, at least in central Kentucky. This was good considering rainfall picked up in early June as hatching continued (*https://www.weather.gov/lmk/june_2021_summary*). Conversely, above-average rain in July would have fueled vegetation growth, providing cover and insects for poults.

Thus, despite the typical hurdles our wild turkeys face (generally high predator densities and poor nesting and brood-rearing habitat throughout the state), weather conditions may have improved nest success and brood survival enough to overcome limitations. Hunters and landowners interested in wild turkeys should consider improving nesting and brood-rearing habitat to maintain strong turkey numbers in their area. Contact KDFWR for information on turkey habitat improvement (*fw.ky.gov*).

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