WILD TURKEY POULT PRODUCTION SURVEY
2020

Wild turkey brood surveys are valuable for examining population trends in various forest habitat regions of the state. These brood surveys are used to monitor poults per hen (PPH) which serves as an index to annual production. Prior to 1994, there were no statewide organized observations or recordings of wild turkey recruitment. As a result, there were only educated guesses based on weather patterns and casual observations. Beginning in 1994, the first standardized statewide survey was developed and implemented by Louisiana Department of Wildlife and Fisheries (LDWF), Wildlife Division personnel.

METHODS

Survey Procedure

In Louisiana, the primary breeding and egg laying period occurs from late March to mid-April. Most mortality among turkey poults occurs during the first 3 weeks of their lives. With this in mind, 1 July - 31 August was selected for the poult survey (a period when poults should be four weeks or older in age). As such, most poults that are observed during the survey should be alive during the spring hunting season. During July and August, Wildlife Division personnel and other selected individuals record the number of hens, poults, and gobblers observed. Date, parish, and/or Wildlife Management Area where the observation is made are also recorded. Observations are usually made incidentally to the routine activities of the observer.

Study Area

The state is divided along parish lines into 5 regions based largely on historic habitat/geological regions (Figure 1).

Northwest Loblolly/Shortleaf/Hardwood

Bienville, Bossier, Caddo, Caldwell, Claiborne, DeSoto, Jackson, LaSalle, Lincoln, Red River, Union, and Webster parishes are included in this region. Wild turkeys are found throughout this region with the highest populations located in Bienville, Claiborne, Jackson, Lincoln, Union, and Webster parishes. Coastal Plain, Flatwoods, and Recent Alluvium soil areas are found in this region. These include soils with permeable and moderately permeable subsoils in the rolling hills area of the Coastal Plain, poorly drained forested soils in the Flatwoods areas, and alluvial soils derived from the Red and Mississippi rivers in the recent alluvium forest habitat. There are 4,000,000 acres of forested habitat in this region, and 270,000 (6.8%) are publicly owned. General forest habitats consist of Loblolly/Shortleaf pine and Oak-Hickory. Loblolly pine is the dominant commercial tree species in this region.

North Mississippi Delta

Catahoula, Concordia, East Carroll, Franklin, Madison, Morehouse, Ouachita, Richland, Tensas and West Carroll parishes comprise this region. Soil types found in this area are of the Recent Alluvium group which consists of silty and sandy soils of the Mississippi River in the better drained areas, clayey recent alluvial soils of the Mississippi River in the poorly drained areas, and alluvial soils derived from older sediments of the Arkansas and Ouachita rivers. Timber types consist mainly of bottomland hardwood and cypress and 199,000 (16.4%) of the 1,211,000 acres are publicly owned. Management of the remaining timber varies from select

cutting to clear cutting. Much of the turkey habitat in this region was lost during the 1960s - 1980s due to conversion to agriculture. Turkey populations are highest in the wooded habitat portions of Concordia, Madison and Tensas parishes.

Western Longleaf Pine

Allen, Beauregard, Calcasieu, Evangeline, Grant, Jefferson Davis, Natchitoches, Rapides, Sabine, Vernon and Winn parishes are included in this region. Soils located in this region are of the Coastal Plains, Mississippi Terrace and Loessial Hills, Flatwoods, Coastal Prairies, and Recent Alluvium types. The Coastal Plains soils have permeable to moderately permeable subsoils in gently rolling areas. The Flatwoods consist of the poorly drained forested soils, while the Coastal Prairie areas consist of prairie soils with very slowly permeable subsoils. The Recent Alluvium soil area was derived from the older and recent sediments of the Mississippi and Red rivers. Historically, the major timber type was longleaf pine, but more recent timber practices have converted this area to loblolly pine plantations. Approximately 600,000 acres (13.0%) of the 4,593,000 of forested habitat are publicly owned. The U. S. Forest Service owns about 500,000 acres, and its long-range plans are to convert 50% of their acreage to longleaf pine. Bottomland hardwoods and cypress are found in the Recent Alluvium soils areas. Wild turkey populations have done very well in all parishes in this region except in the parishes of Jefferson Davis and Evangeline. Lack of a suitable habitat is believed to be the main reason for lack of or low populations in these parishes.

Atchafalaya and South Mississippi Delta

Ascension, Assumption, Avoyelles, Cameron, Iberia, Iberville, Jefferson, Lafayette, Lafourche, Orleans, Plaquemines, Pointe Coupee, St. Bernard, St. Charles, St. James, St. Landry, St. Martin, St. Mary, Terrebonne, Vermilion and West Baton Rouge parishes are included in this region; however, coastal parishes do not provide turkey habitat. Soils in this area are mainly in the Recent Alluvium group. These include areas of silty and sandy recent alluvial soils of the Mississippi River which occur in the better drained areas and alluvial soils derived from older and recent sediments of the Mississippi and Red rivers. Forest types include bottomland hardwoods and cypress. Forested habitat totals 2,056,000 acres of which 128,000 acres (6.2%) are publicly owned. Clear cutting and select cutting are the harvest procedures usually used. Parishes with best turkey populations include Avoyelles, Iberville, Pointe Coupee, St. Landry and West Baton Rouge.

Southeast Loblolly Pine

East Baton Rouge, East Feliciana, Livingston, St. Helena, St. Tammany, Tangipahoa, Washington and West Feliciana parishes comprise this region. Soils found in this area are of the Coastal Plains, Flatwoods, and Mississippi Terrace and Loessial Hills groups. Dominant forest types include loblolly pine and both upland and bottomland hardwoods. This region has the smallest public ownership of the 5 habitat regions. Only 59,000 (3.1%) of the 1,932,000 acres are publicly owned. The majority of the forested habitats are managed for pine production. All parishes in the Southeast Loblolly region have turkey, but the number of birds varies greatly, even within a parish, due to habitat conditions.

Production Assessment

All Wildlife Management Area data were recorded by parish and included in the regional

analysis. Poults per hen (PPH) were calculated as the number of poults divided by the number of hens observed for analysis unit. If an observer recorded poults but no hens, 1 hen was assigned to that observation. If more than one hen was observed in a group with no poults, then each hen in the group was assigned a value of zero poults. An analysis of covariance was conducted using PROC MIXED to determine differences among habitats and using Contrast statements in SAS. PROC GLM in SAS was used to determine differences among years and within habitat using Waller-Duncan K-ratio. Regression analysis (PROC REG) was used to test for trends in PPH production and percentage of hens with poults among years. Graphics use simple SE calculations for determination of confidence intervals. Observations with neither poults nor hens were not included in the PPH calculations. For our purposes, we ranked production into 5 categories: 1) excellent-4.0 PPH or higher, 2) very good- 3.3 - 3.9 PPH, 3) good- 2.6 - 3.2 PPH , 4) fair - 2.0- 2.5 PPH, or 5) poor- below 2.0 PPH (adapted from pers. comm. Southeast Wild Turkey Technical Committee). No statewide values are reported because of differences in acreage, number of observations, and production among habitat types.

RESULTS AND DISCUSSION

2020 Production

During 1 July – 31 August 2020, 291 observations were recorded and used to determine PPH ratios. The Atchafalaya South Mississippi Delta, North Mississippi Delta, and Western Longleaf regions had fewer poults per hen ($P < 0.0001$) than did the Northwest Loblolly/Shortleaf/Hardwood and SE Loblolly Pine regions (Table 1). It is important to note the the overall number of observations in 2020 (291) was decreased by approximately 42% from that of 2019 (508). This reduction could be related to a decline in survey effort due to the COVID 19 pandemic.

Table 1. Poults per hen (PPH) by habitat region, 2020.

Habitat Region	No. Observations	PPH Ratio	Ranking[a]	1994 -2018 PPH Average
NW Lob/Sh/Hdwood	57	2.5	A	2.1
SE Loblolly Pine	15	2.1	A	1.5
W Longleaf Pine	35	1.2	B	1.8
N Mississippi Delta	173	0.4	D	1.6
Atch /S L Miss Delta	11	0.7	BC	1.1

[a] PPH Ratios with the same letter are not different ($P \leq 0.10$) among habitats in 2020.

The 2020 Summer Wild Turkey Survey indicates a slight increase in average poult production for the NW Loblolly/Shortleaf/Hardwood and SE Loblolly Pine regions and a slight decrease for the North Mississippi Delta region over last year's index (Table1; Figure 2). The remaining habitat regions had poult production estimates similar to last year's estimate. Long-term (27-year) declines ($P \leq 0.0001$) have been occurring in turkey PPH production for four of five habitat regions (Figures 3 – 6); these regions are producing fewer poults each year. The only habitat region not experiencing a long-term decline in PPH production is the Southeast Loblolly Pine region (Figure 7) ($P = 0.90$). There was a negative 10-year trend in turkey PPH production for the North Mississippi Delta ($P < 0.0001$) Northwest Loblolly/Shortleaf/Hardwood ($P = 0.0004$) and Western Longleaf ($P = 0.03$) regions. The 10-year trend in turkey PPH production for the Atchafalaya ($P = 0.99$) and Southeast Loblolly Pine ($P = 0.11$) regions were not significant.

We also examined poults per hen for only hens that had poults. This tells us if production is changing for those hens that do reproduce. In all of the habitat regions there was a negative 10-year trend, indicating that hens are producing fewer poults in these regions (Figures

8 - 12) than they have in the past ($P \leq 0.02$).

Lastly, we examined the percent of hens not producing poults within each habitat region over the last 10 years. The only habitat region with a greater percentage of hens not producing poults each year was the North Mississippi Delta region ($P = 0.04$), suggesting that declining PPH production within this region may be due to low recruitment of poults; fewer hens are producing poults each year (Figures 13-17).

It is likely that many factors are impacting turkey reproduction in Louisiana, the loss of suitable habitat not being the least of these. Survey results indicate that reproducing hens are producing fewer poults. This may indicate that both quality nesting and quality brood rearing habitats are a limiting factor throughout Louisiana.

Many interacting variables determine nesting success and poult survival each year. Among the most important are weather, habitat quality, and predator population. Of these, only the weather can be quantified and accurately compared from year to year.

Wild turkey production in Louisiana is thought to be influenced by weather conditions during two critical phases of the reproductive cycle -- nest incubation and brood rearing. Hens incubate eggs from mid-April to early-June. Below normal spring rainfall produces favorable conditions for successful hatching. Conversely, wet weather during incubation seems to be associated with low productivity. Good brood rearing conditions occur when rainfall is normal or above normal during mid-June through August. Wet conditions promote lush ground-level vegetation that provides escape cover for poults and fosters development of high insect populations. Protein-rich insects are the primary food of developing poults.

Table 2. Rainfall totals, expressed as a percentage of normal for habitat regions, April – August 2020 (Data from National Oceanic and Atmospheric Administration website: www.ncdc.noaa.gov)

Month	SE Loblolly Pine	Atch /S Miss Delta[a]	W Longleaf Pine[a]	NW Lob/Sh/Hdwood[a]	N Mississippi Delta[a]
April	92%	94-128%	120-172%	160-161%	120-139%
May	130%	95-139%	101-110%	99-124%	62-118%
June	162%	101-117%	82-69%	76-108%	148-157%
July	153%	108-110%	88-162%	106-158%	84-148%
August	83%	118-182%	126-202%	162-182%	96-125%

For the most part, above normal rainfall averages in all habitat regions from April to July in all regions likely had a negative impact on nest incubation, hatching success, and poult survival. Rainfall was variable (slightly below normal to significantly above normal) in July and August for all regions. All management regions can be ranked as “poor” in terms of poult production. The Northwest Loblolly/Shortleaf/Hardwood and Southeast Loblolly Pine management regions can be ranked as “fair” for poult production. All other management regions can be ranked as “poor” in terms of poult production.

Note: PPH values represent an average across a broad region. There will be areas within a region that had higher or lower production than the regional average. Factors such as habitat quality and local weather events may influence production in a specific area.

Figure 1

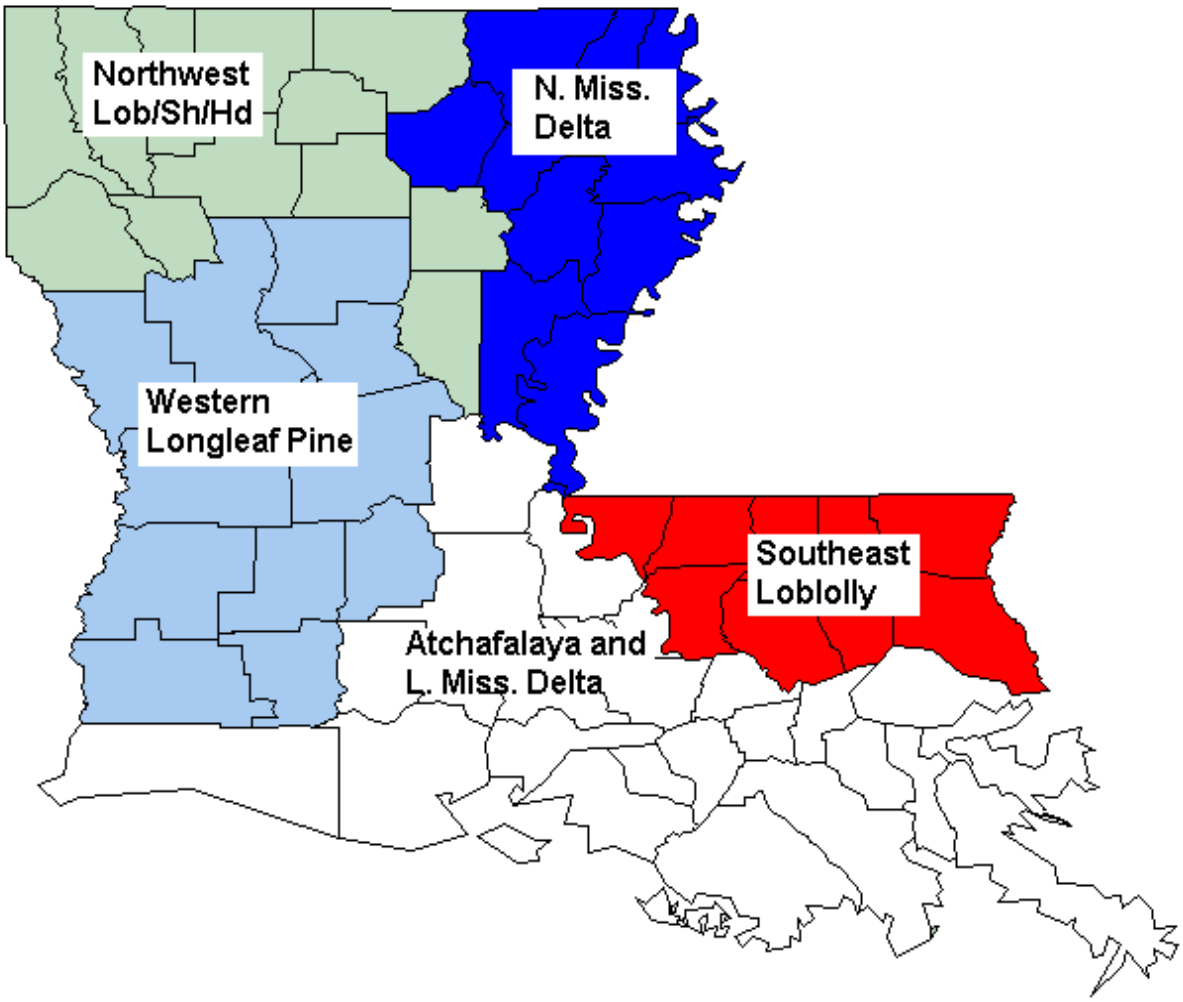
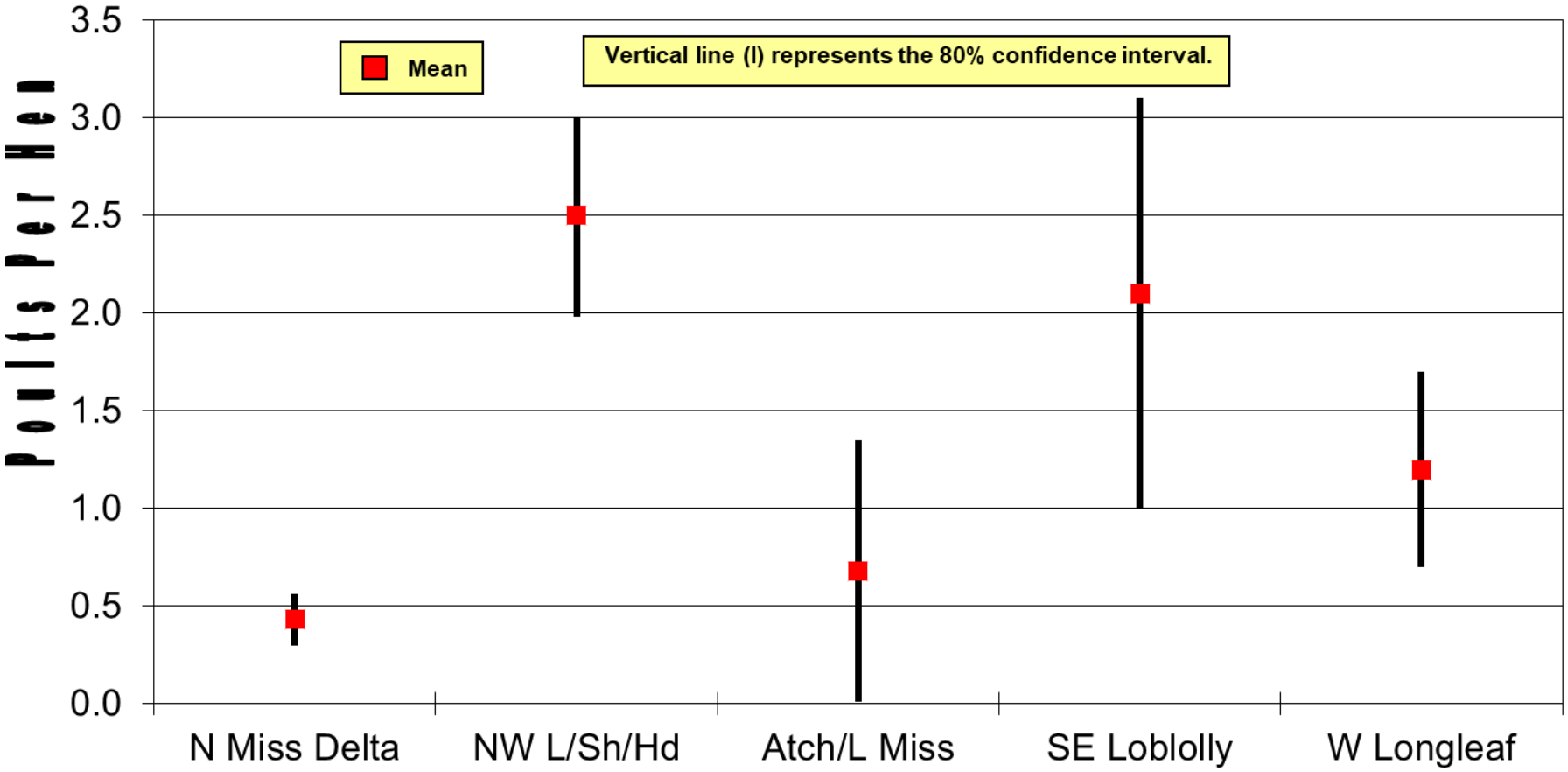

Northwest
Lob/Sh/Hd
N. Miss.
Delta
Western
Longleaf Pine
Southeast
Loblolly
Atchafalaya and
L. Miss. Delta

Figure 2.

Turkey Production Index
2020



Turkey Production Index

Figure 3.

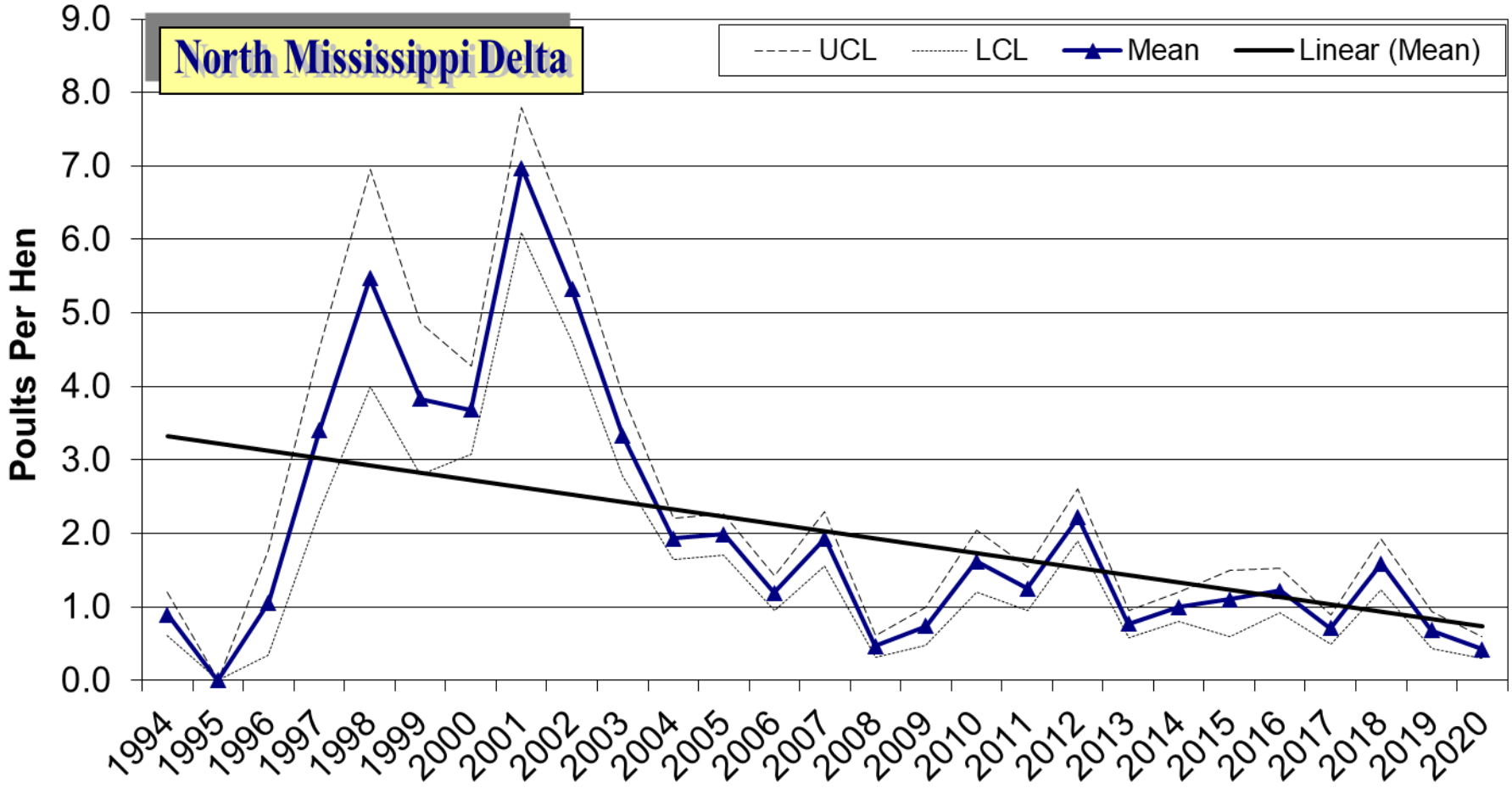
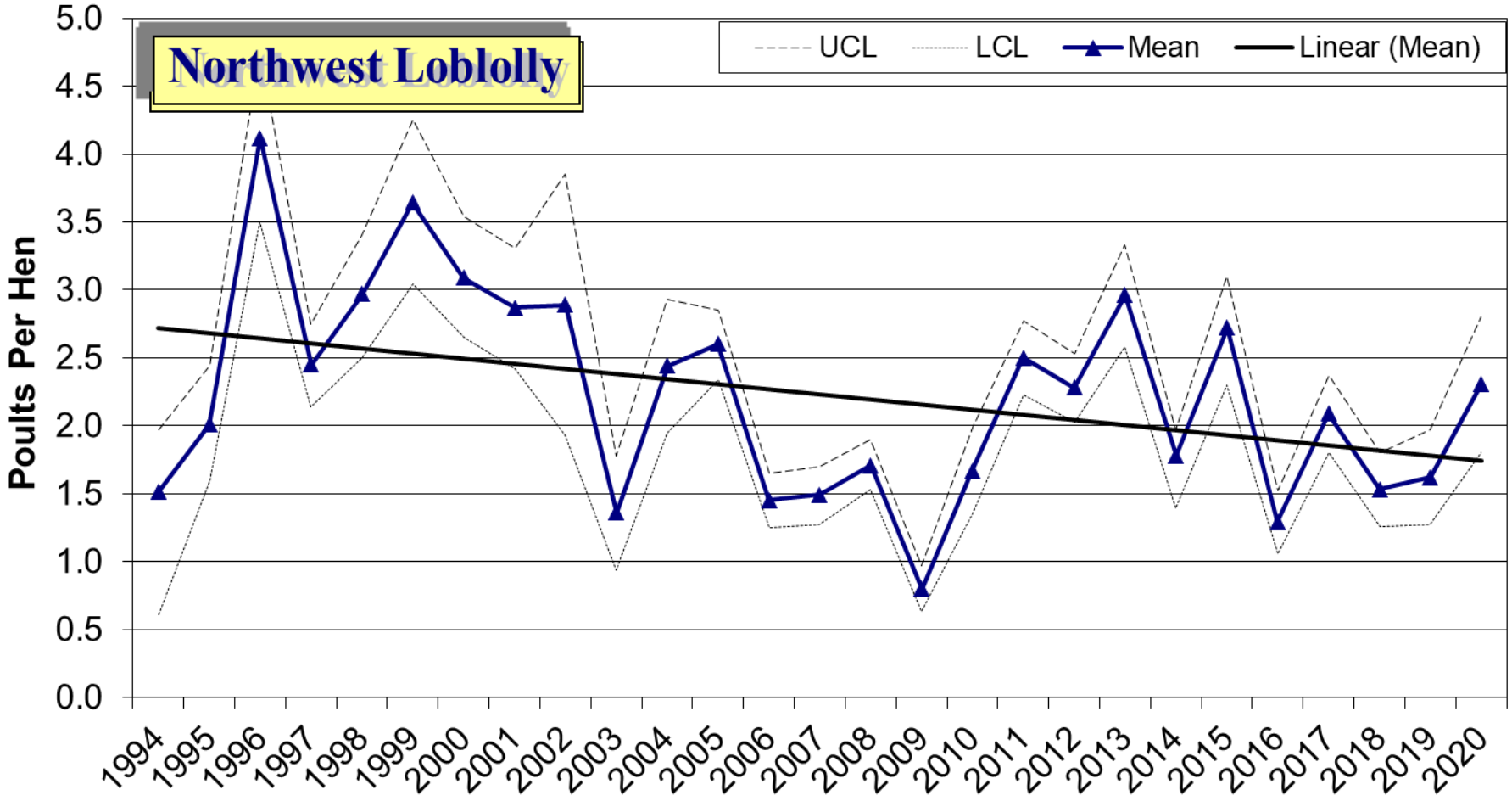


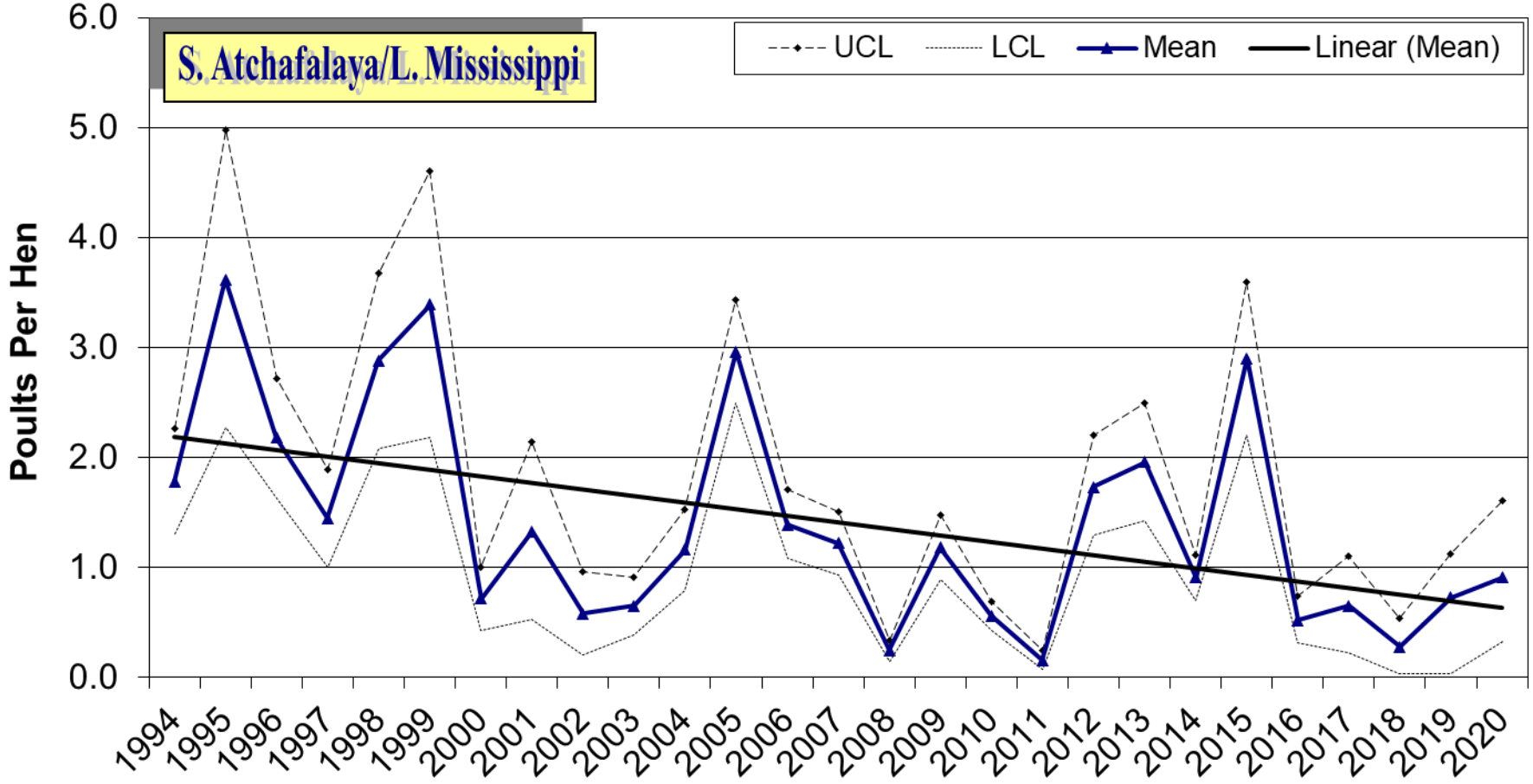
Figure 4.

Turkey Production Index



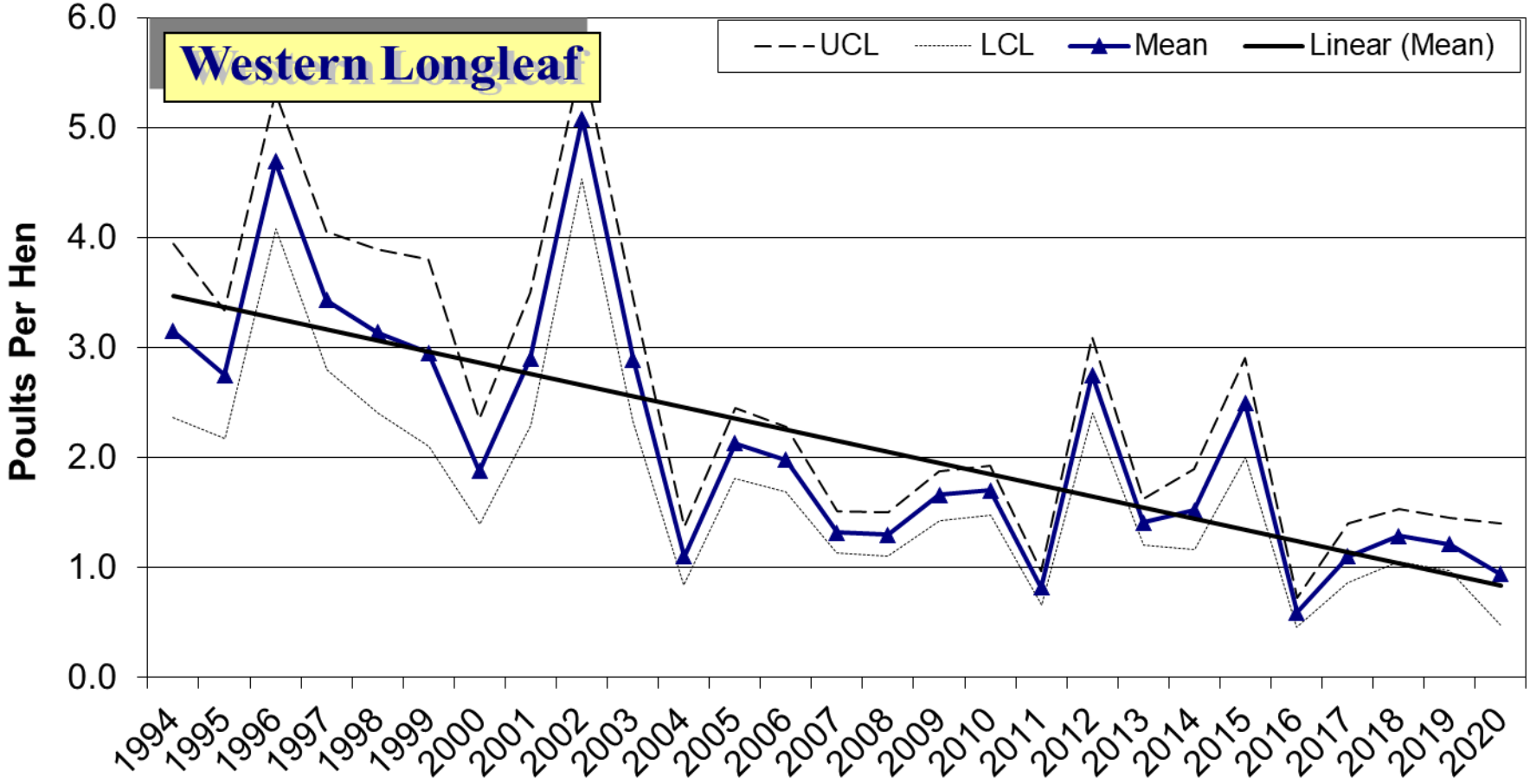
Turkey Production Index

Figure 5.



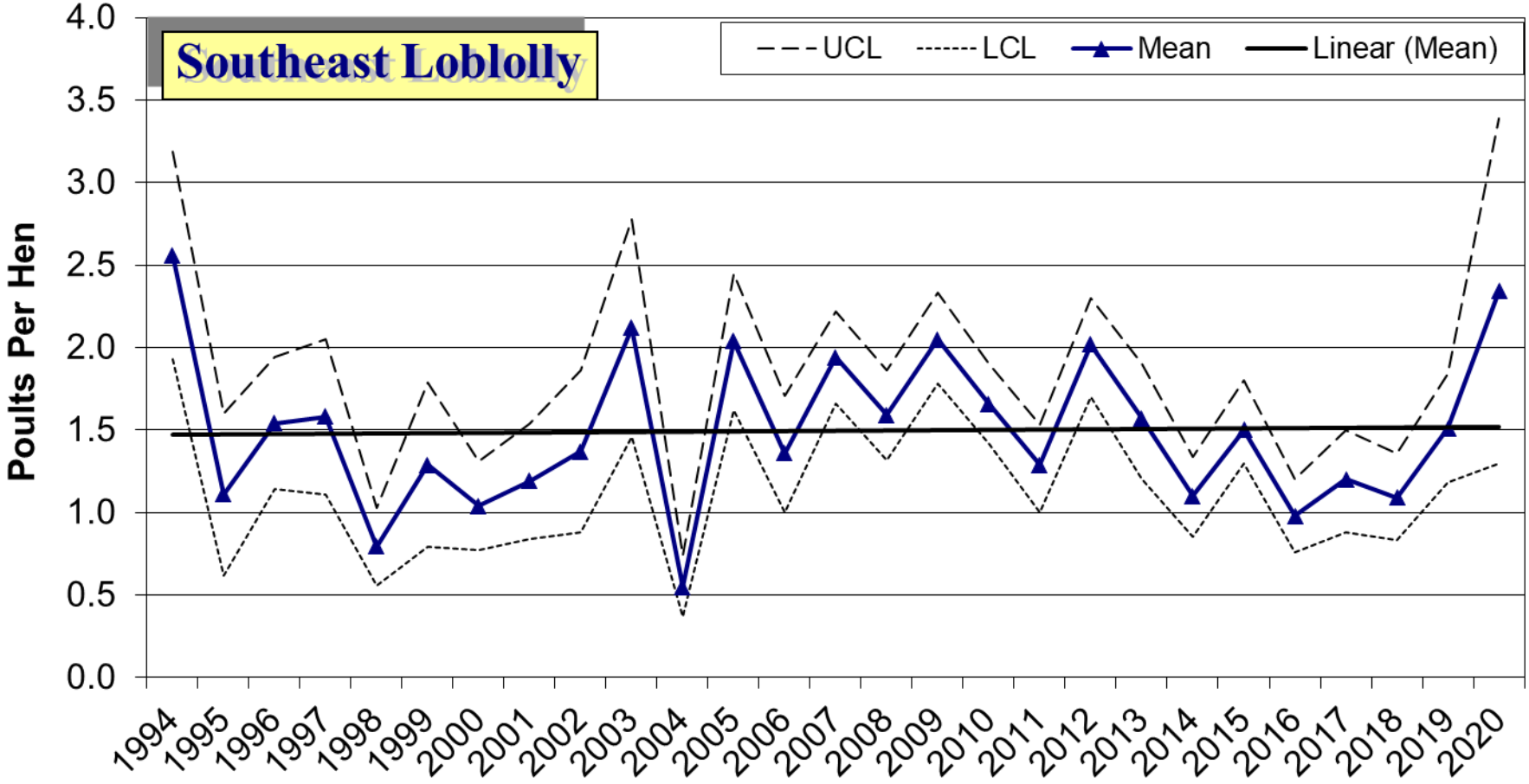
Turkey Production Index

Figure 6.



Turkey Production Index

Figure 7.



PPH - Only Hens Producing Poults

Figure 8.

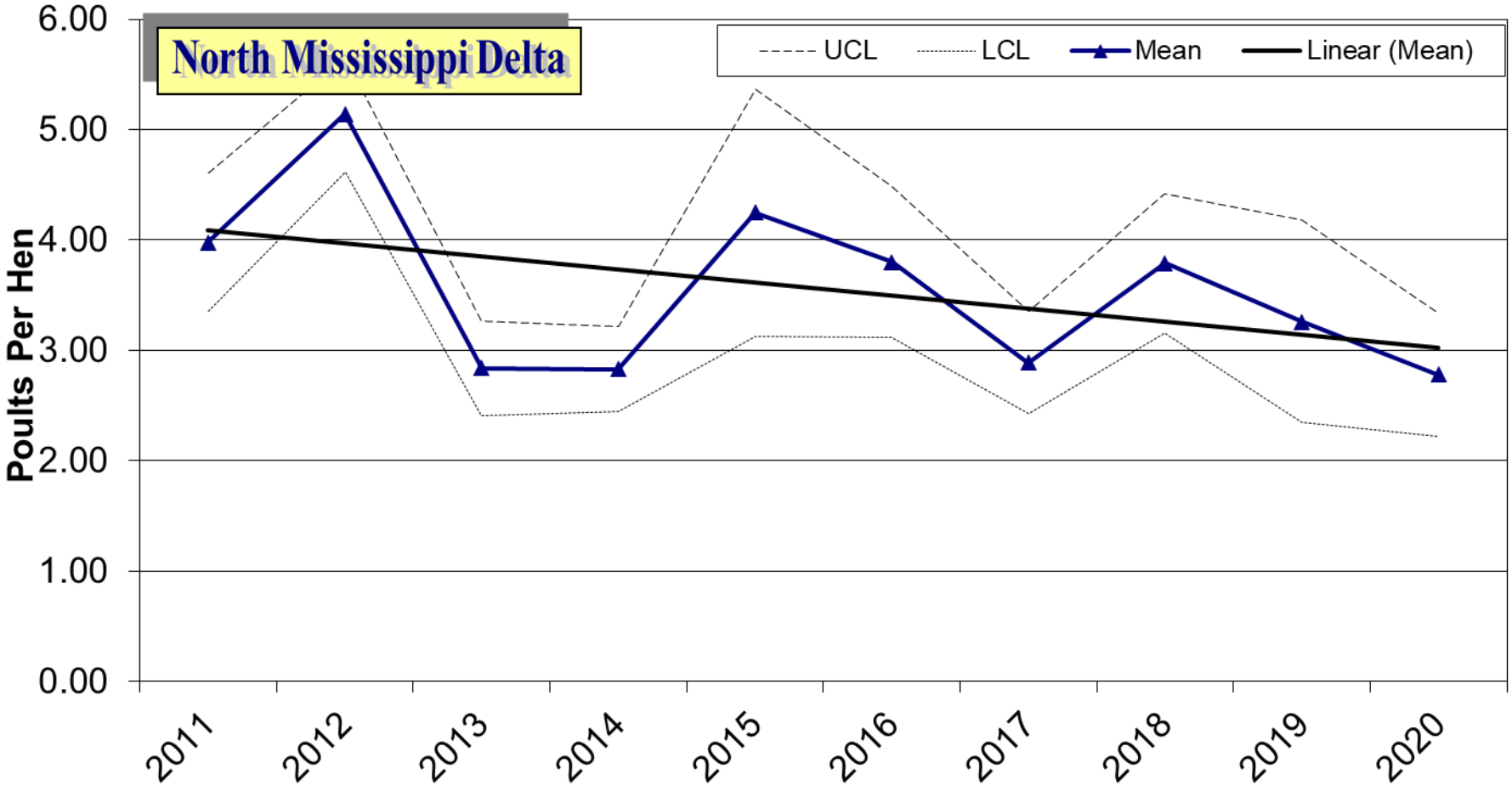


Figure 9.

PPH - Only Hens Producing Poults

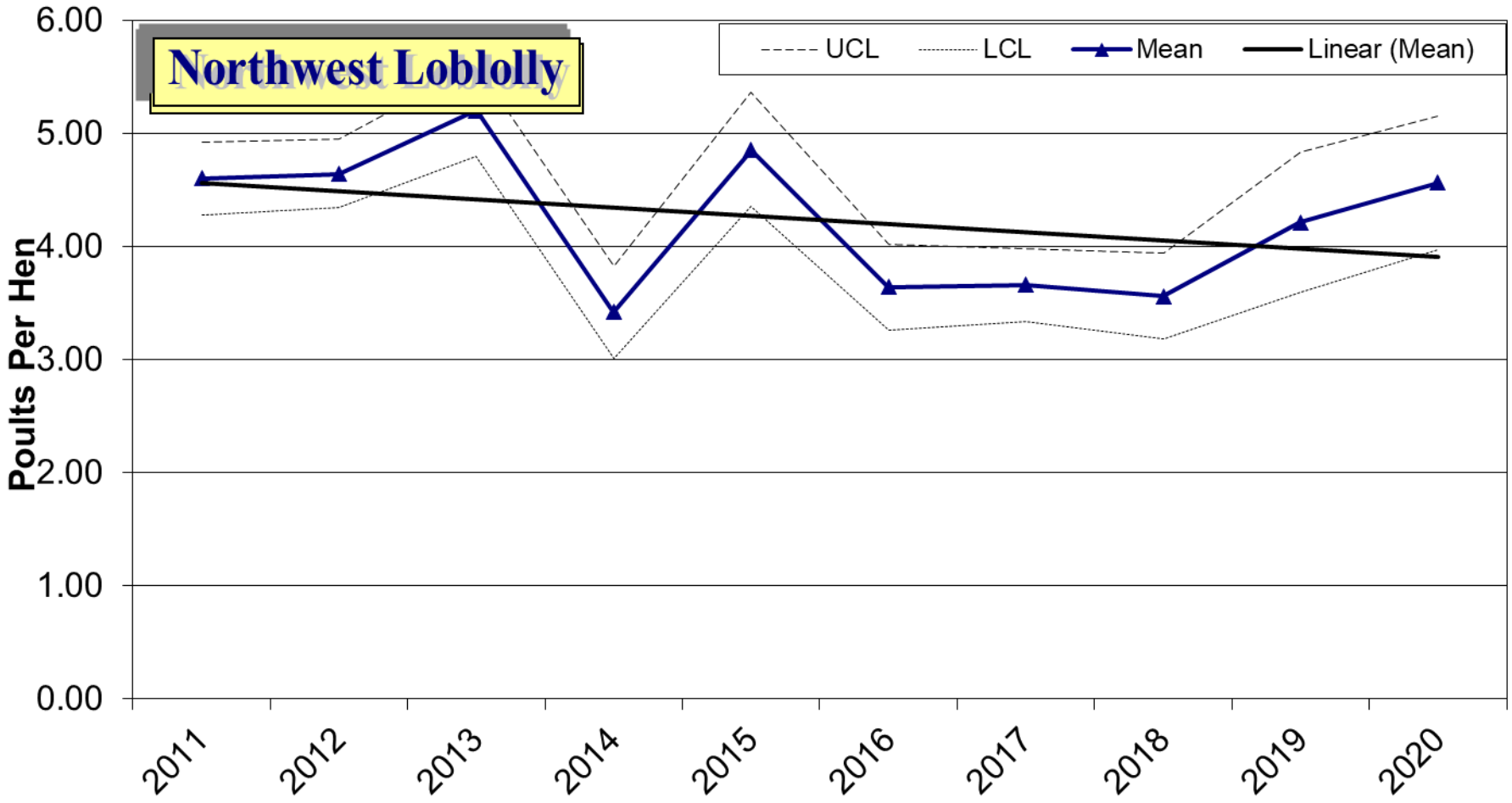
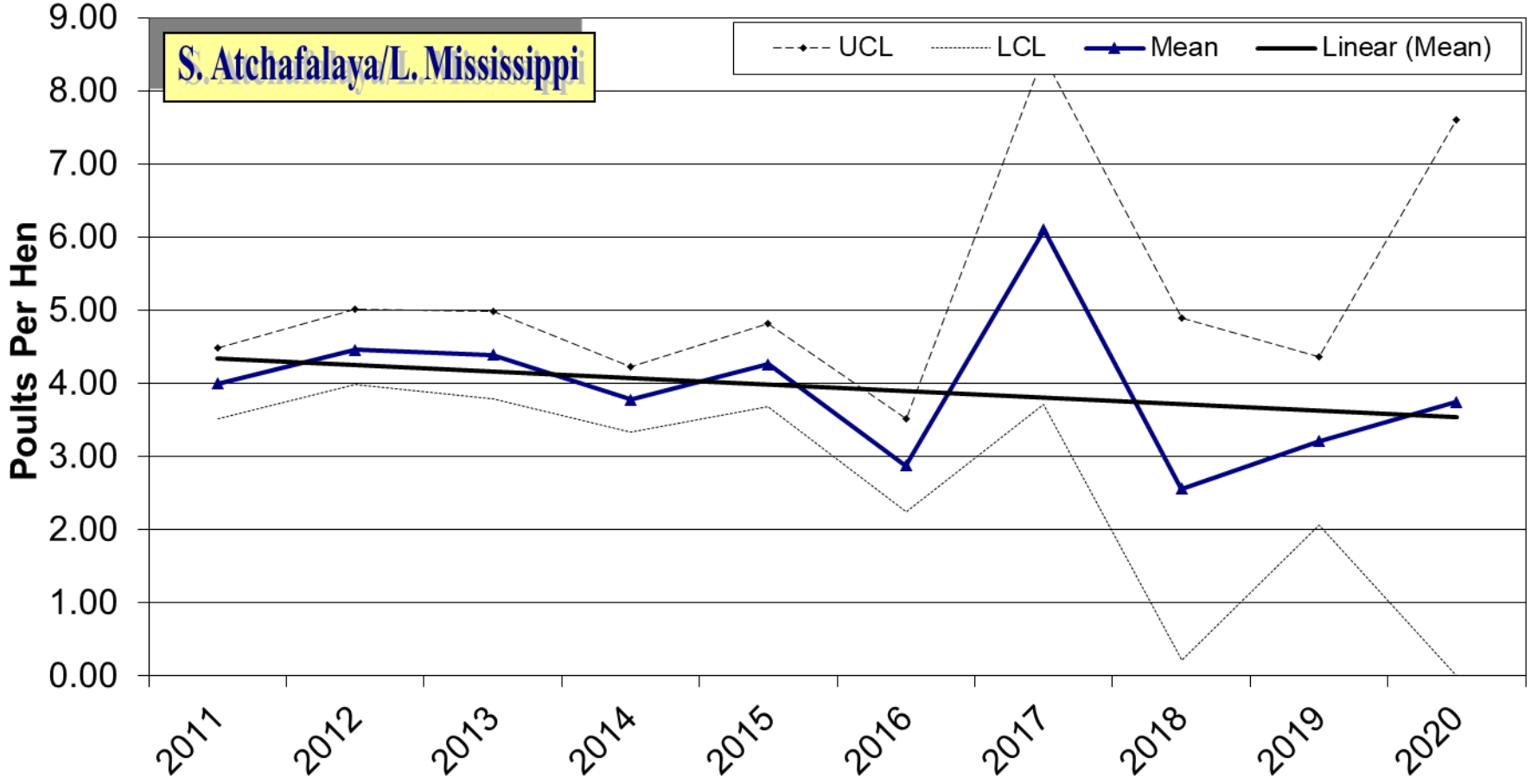


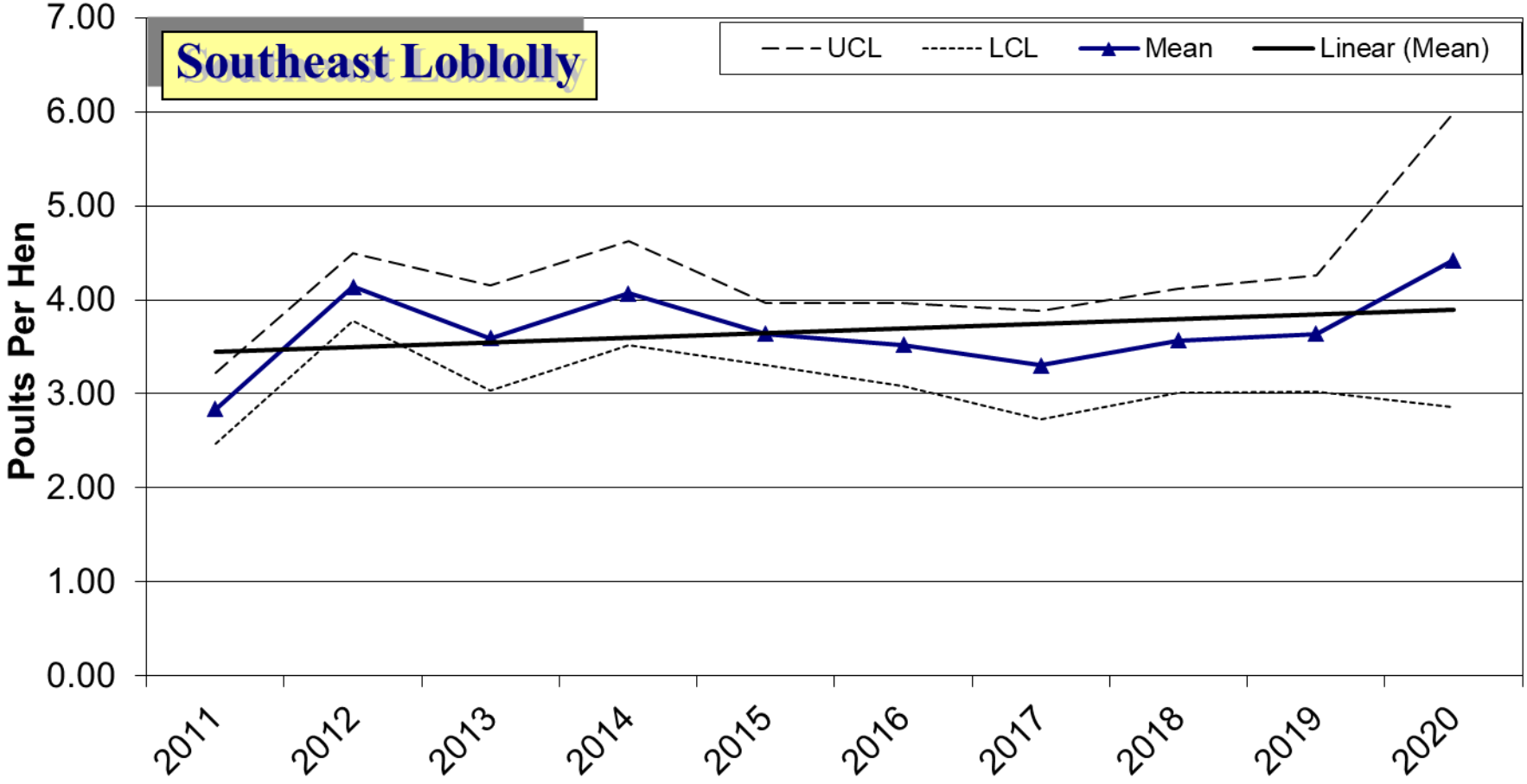
Figure 10.

PPH - Only Hens Producing Poults



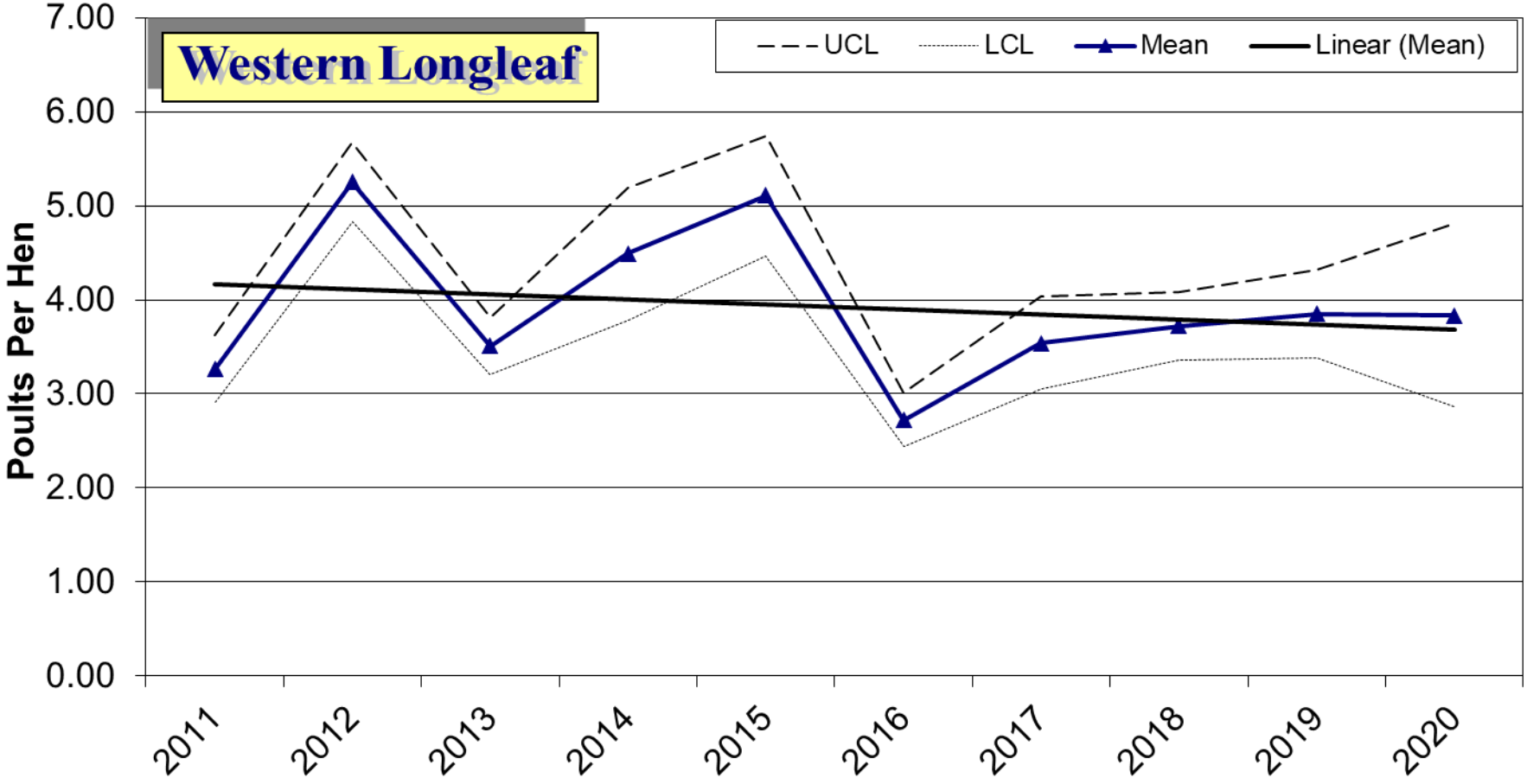
PPH - Only Hens Producing Poults

Figure 11.



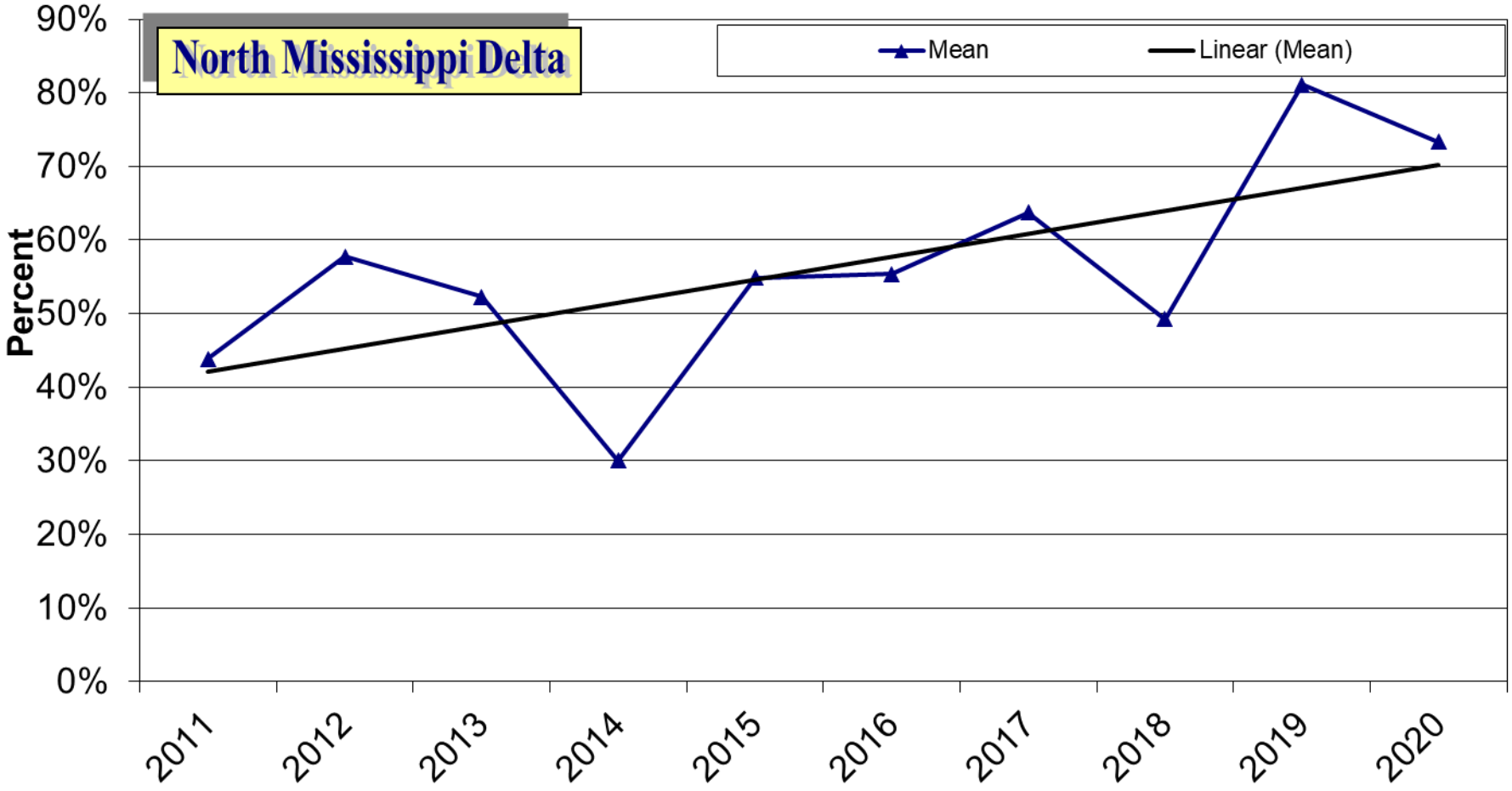
PPH - Only Hens Producing Poults

Figure 12.



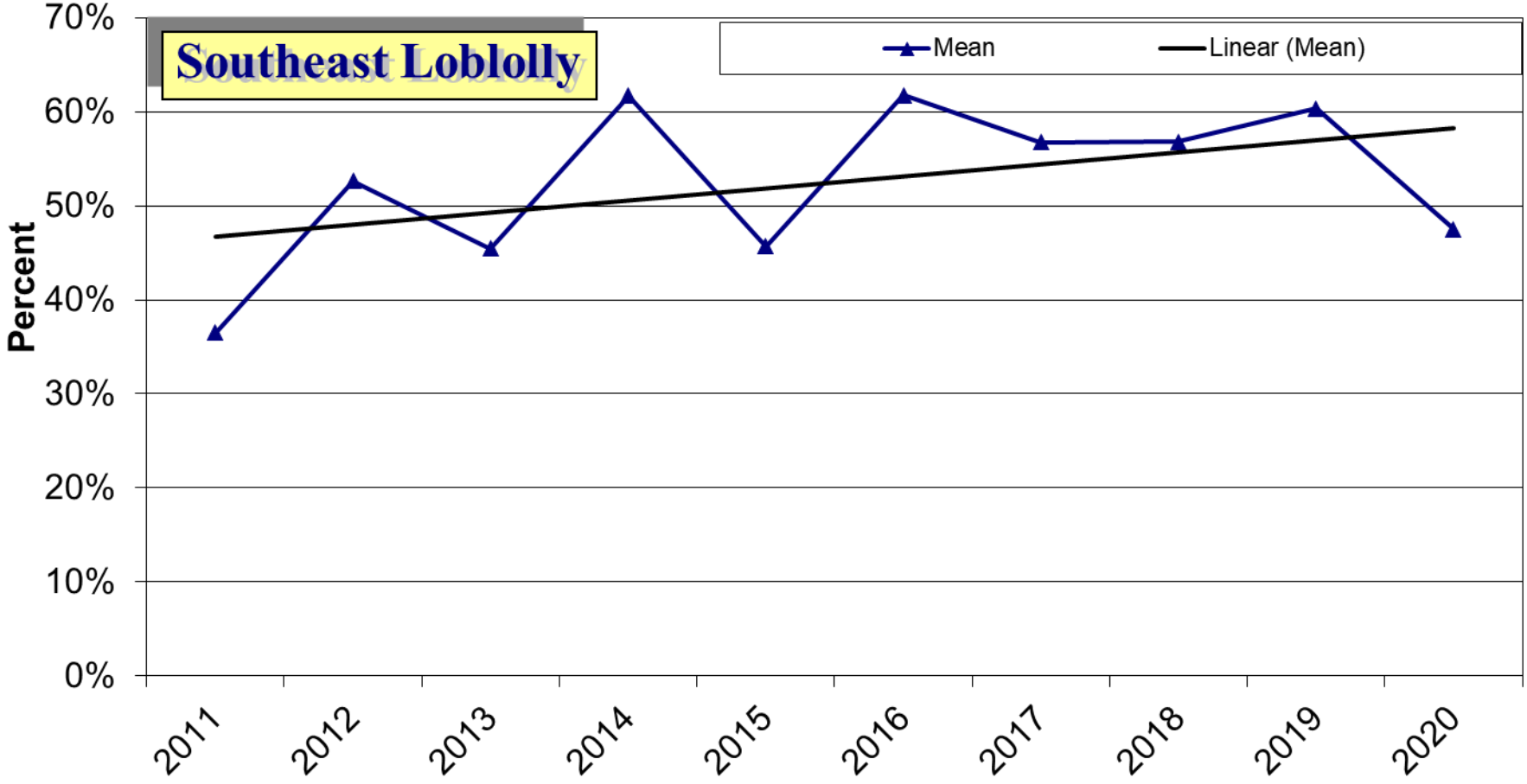
Percent of Hens Without Poults

Figure 13.



Percent of Hens Without Poults

Figure 14.



Percent of Hens Without Poults

Figure 15.

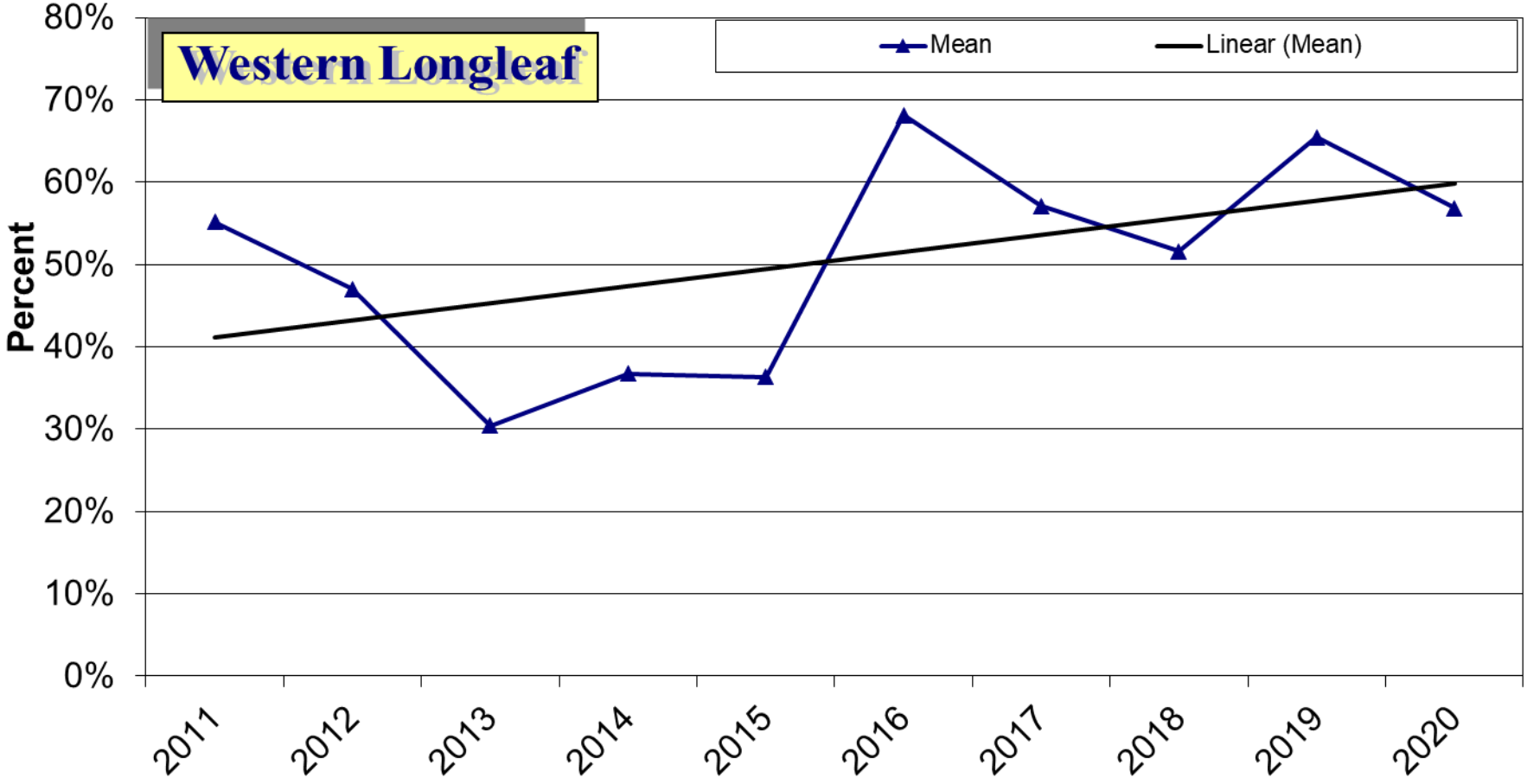


Figure 16.

Percent of Hens Without Poults

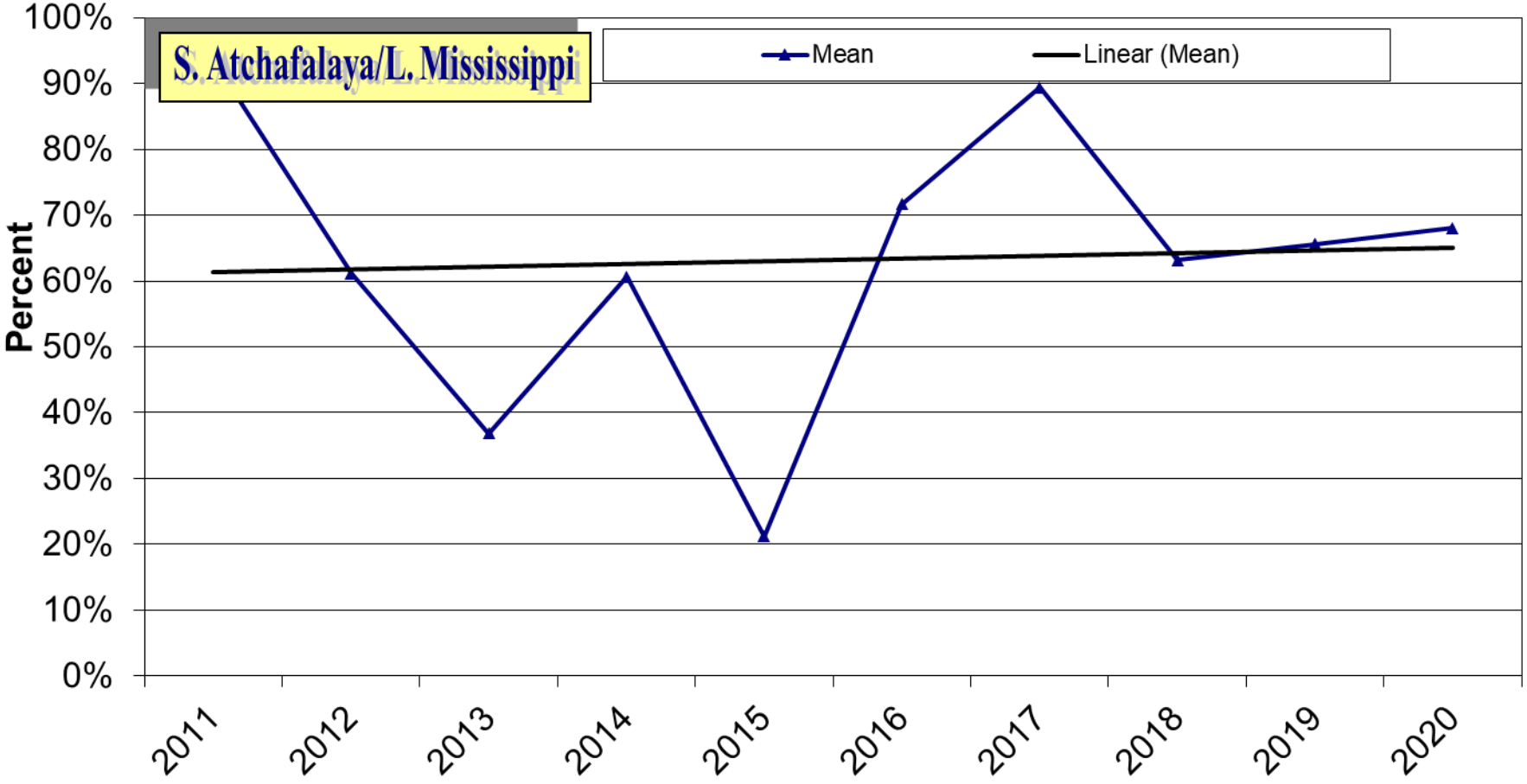
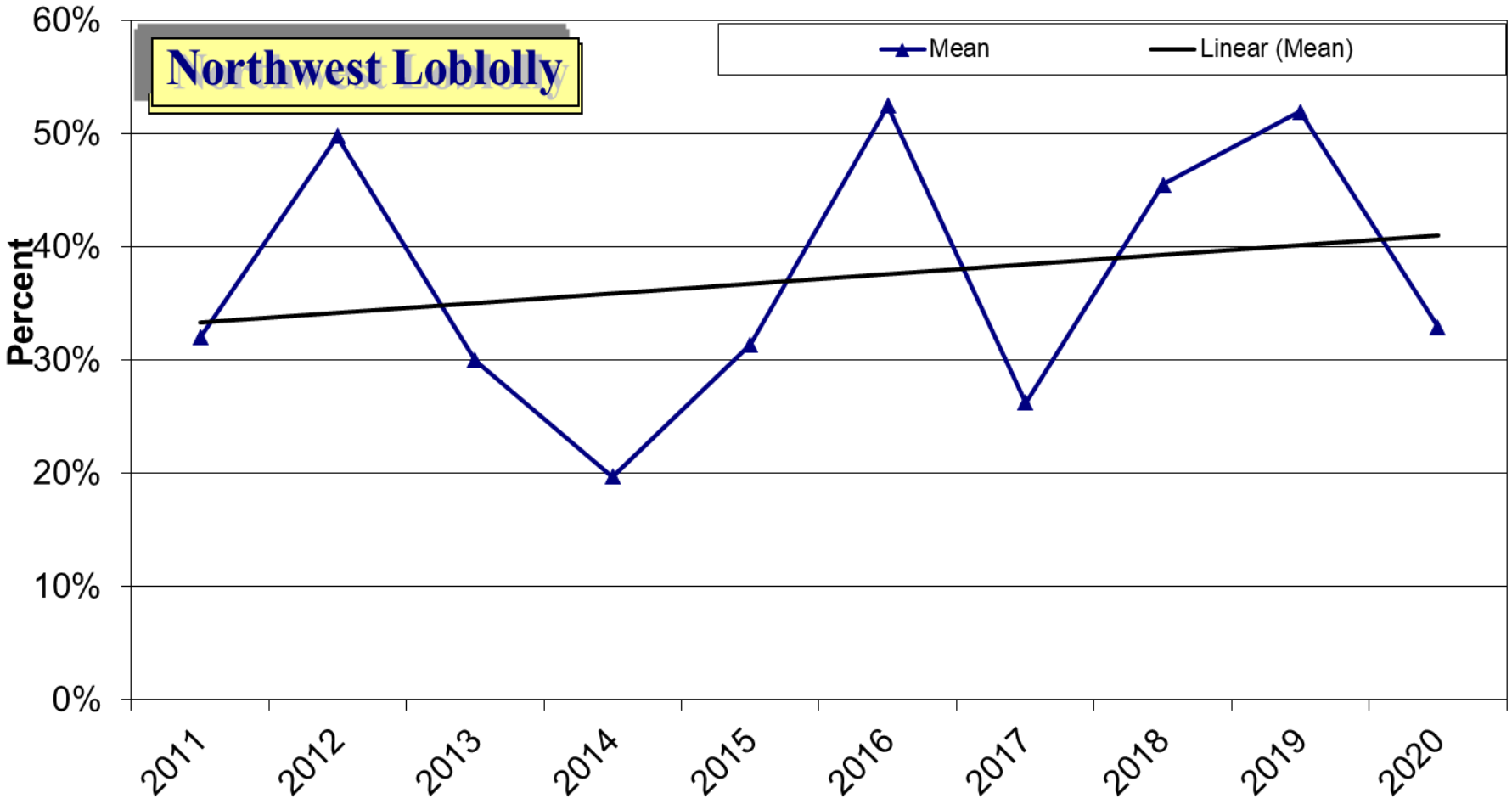


Figure 17.

Percent of Hens Without Poults



Appendix 1. Poults per hen (PPH) by year and habitat for the period 1994-2020.

Year	N Mississippi Delta	NW Lob/Sh/HdWood	S Atch/L Mississippi Delta	SE Loblolly Pine	W Longleaf Pine
1994	0.9	1.5	1.8	2.6	3.1
1995	0.0	2.0	3.6	1.1	2.8
1996	1.1	4.1	2.2	1.5	4.7
1997	3.4	2.4	1.4	1.6	3.4
1998	5.5	3.0	2.9	0.8	3.1
1999	3.8	3.6	3.4	1.3	3.0
2000	3.7	3.1	0.7	1.0	1.9
2001	7.0	2.9	1.3	1.2	2.9
2002	5.3	2.9	0.6	1.4	5.1
2003	3.3	1.4	0.6	2.1	2.9
2004	1.9	2.4	1.2	0.6	1.1
2005	2.0	2.6	3.0	2.0	2.1
2006	1.2	1.4	1.4	1.4	2.0
2007	1.9	1.5	1.2	1.9	1.3
2008	0.5	1.7	0.2	1.6	1.3
2009	0.7	0.8	1.2	2.1	1.7
2010	1.6	1.7	0.6	1.6	1.7
2011	1.3	2.5	0.2	1.3	0.8
2012	2.2	2.3	1.7	2.0	2.7
2013	0.8	3.0	2.0	1.6	1.4
2014	1.0	1.7	0.9	1.1	1.5
2015	1.1	2.7	2.9	1.5	2.5
2016	1.2	1.3	0.5	1.0	0.6
2017	0.7	2.1	0.6	1.2	1.1
2018	1.6	1.5	0.3	1.1	1.3
2019	0.7	1.6	0.7	1.5	1.2
2020	0.4	2.5	0.7	2.1	1.2
[a]**Mean**	**1.6 C**	**2.1 A**	**1.1 D**	**1.5 C**	**1.8 B**

[a]Long-term means with the same letter within a row do not differ significantly ($P < 0.001$).