

**ANNUAL REPORT OF THE DEPARTMENT OF NATURAL RESOURCES ON
ACT 51 123rd SESSION OF THE SOUTH CAROLINA
GENERAL ASSEMBLY (2019)**



Wild Turkey Resources in South Carolina 2021



November 2022

EXECUTIVE SUMMARY

Act 51 of the 123rd Session of the South Carolina General Assembly largely rewrote wild turkey hunting laws in South Carolina. It established new turkey season frameworks, imposed a limit of one gobbler during the first 10 days of the season, a daily limit of one gobbler, and it imposed a first-time fee on turkey tags. Act 51 also requires that “The department shall provide an annual report on the wild turkey resources in South Carolina to the Chairman of the Senate Fish, Game and Forestry Committee and the Chairman of the House Agriculture and Natural Resources Committee.” The following is offered by the department to fulfill that requirement.

The popularity and status of the Eastern wild turkey in South Carolina drives the South Carolina Department of Natural Resources (SCDNR) Wildlife Section's ongoing commitment to conduct pertinent research, surveys and monitoring related to the state's wild turkey population. Due to the importance of turkeys as a state resource, SCDNR believes that accurately assessing the productivity, harvest, as well as hunter participation in turkey hunting, is key to the management of this species.

Agencies and legislators are faced with the daunting task of designing and recommending regulatory frameworks that maximize hunter satisfaction while ensuring that populations are sustainable. Proposed changes in turkey-related laws and regulations should have foundations in biology, therefore, the population dynamics associated with annual reproduction and hunting mortality must be monitored and reported. Similarly, when issues arise that do not involve biological parameters, it is important to have information related to turkey hunter activities afield because they also form an important basis for managing wild turkeys.

The objectives of annual survey and monitoring are to obtain valid estimates of; (1) the statewide spring gobbler harvest, (2) the harvest of gobblers in the constituent counties, (3) hunting effort related to turkeys, (4) information on hunters’ opinions of the turkey resource and other aspects of turkey hunting, and (5) annual reproduction and recruitment of wild turkeys in South Carolina.

Additionally, wildlife biologists and managers in South Carolina and throughout the range of the Eastern wild turkey have observed and reported declines in productivity, likely attributable to large-scale declines in nest success and brood survival. Likewise, declines in turkey abundance, and corresponding declines in spring harvest of males have been noted. Collectively, these findings are of considerable concern to state wildlife agencies, like SCDNR, charged with ensuring sustainable populations of wild turkeys.

To quantify, South Carolina has experienced declines in turkey productivity since 1988. Average recruitment prior to 1988 was 3.5 poults per hen. Average recruitment since then has been 2.1, representing a 40 percent decrease in average recruitment. Coincidentally, the turkey harvest has decreased over 40 percent since it peaked in 2002.

The declines, here and in other states, have precipitated numerous research projects over the last decade. This research has been conducted by several universities across the Southeast, with assistance and primary funding from state wildlife agencies. SCDNR has and continues to support and participate in

these studies. Over time, the agency hopes to gain a better understanding of the factors influencing turkey declines, and methods, techniques, and management strategies to slow or reverse this trend.

This research entails a comprehensive assessment of reproductive ecology and chronology of male and female wild turkeys. This includes studies of timing, location and success of nesting and brood rearing activity. Projects also investigate survival, behavioral and movement data, demographic parameters, gobbling activity, and descriptions of mate selection and parentage for populations of wild turkeys. Summaries of current research can be found within this report.

Turkey harvest, hunter participation and hunter effort are estimated by means of an annual mail survey that involves a single mail-out. Hunters are surveyed randomly by selecting 30,000 individuals who received a set of 2021 Turkey Transportation Tags which are required to hunt turkeys in South Carolina.

During the 2021 spring season it is estimated that a total of 13,032 adult gobblers and 1,033 jakes were harvested for a statewide total of 14,065 turkeys (Table 1). This figure represents little change from the estimated harvest in 2020 (14,044). Although harvest estimates for 2020 and 2021 are virtually identical there are significant differences in how this occurred. Turkey hunter numbers and effort are discussed later in this report, however, certain details bear mentioning that may help explain how similar figures are quite different. For example, far fewer hunters participated in the 2020 season compared to 2021, however, man-days of effort per hunter was greater in 2020 than in 2021. It is believed that the effects of COVID-19 decreased hunter numbers in 2020 but increased hunter effort for those hunters who participated. Hunter numbers were much greater (19%) in 2021 as was total effort (15%). Thus, although the harvest estimates are similar it required more hunters and total effort to arrive at the same number of harvested turkeys in 2021.

Wild turkey productivity is assessed by observations of reproduction and associated survival of offspring being recruited into the population. This measure of young entering the population based on the number of hens in the population is the Total Recruitment Ratio (TRR). This annual index is the most practical measure of productivity because it considers successful hens, unsuccessful hens, and poult survival. Recruitment of four or more poults per hen is considered excellent, three is good, two is fair and considered a break-even point, and one or less poults per hen is poor.

During 2021 statewide Total Recruitment Ratio was 2.0, and for the last five years has averaged 1.6. For hens that successfully raised a brood, average brood size was 4.1 poults, a number that has remained consistent over time. However, the driving factor in the low productivity is the high percentage of hens with no poults at all by late summer. Fifty percent of hens observed during the 2021 survey had no poults and that figure has averaged 56% the last five years.

The current estimated population of wild turkeys in South Carolina is approximately 101,000. This is based on a hen to gobbler ratio of 1.86:1 derived from the 2021 Summer Turkey Survey, the estimated harvest of 14,065 gobblers during spring 2021 and a 40 percent male harvest rate. Male harvest rate is based on long-term average disparity in hen to gobbler ratio which can only be explained by differential mortality between the sexes, in this case attributed to hunter harvest.

Additional details and discussion on the annual harvest and productivity surveys are found within this report.

2021 SC WILD TURKEY HARVEST REPORT

Introduction

Ranking only behind white-tailed deer in popularity among hunters, the Eastern wild turkey is an important natural resource in South Carolina. The 2021 Turkey Hunter Survey represents the South Carolina Department of Natural Resources (SCDNR), Wildlife Section's ongoing commitment to conduct pertinent research related to the state's wild turkey population. The primary objectives of this survey research were to obtain valid estimates of; (1) the statewide spring gobbler harvest in 2021, (2) the harvest of gobblers in the constituent counties of the state, and (3) hunting effort related to turkeys. Information on hunter's opinions of the turkey resource and other aspects of turkey hunting are also presented.

Due to the importance of turkeys as a state resource, SCDNR believes that accurately assessing the harvest of turkeys, as well as hunter participation in turkey hunting, is key to the management of this species. Proposed changes in turkey-related laws and regulations should have foundations in biology, therefore, the population dynamics associated with annual hunting mortality cannot be ignored. Similarly, when issues arise that do not involve biological parameters, it is important to have information related to turkey hunter activities afield because they too form an important basis for managing wild turkeys.

Since the inception of the Statewide Turkey Restoration and Research Project (Turkey Project) the methods used to document the turkey harvest have changed. Historically, turkey harvest figures were developed using a system of mandatory turkey check stations across the state. This system yielded an actual count of harvested turkeys and was, therefore, an absolute minimum harvest figure. Shortcomings in this system included deterioration in compliance, complaints from hunters regarding the inconvenience of check stations, etc. The requirement to physically check harvested turkeys in South Carolina was eliminated following the 2005 season at which time post season hunter surveys were implemented. The 2021 spring season marked the inaugural year of SC Game Check and electronic harvest reporting for turkeys. With this, SCDNR has two sources of harvest data for comparison. It should be noted that although reporting is mandatory, noncompliance by some hunters should be expected. Rates of noncompliance will be estimated using the post season survey and due to noncompliance, figures obtained from the survey will likely be higher than those from electronic harvest reporting.

Survey Methodology

The 2021 Turkey Hunter Survey represented a random mail survey that involved a single mail-out. The questionnaire for the 2021 Turkey Hunter Survey was developed by Wildlife Section personnel (Figure 1). The mailing list database was constructed by randomly selecting 30,000 individuals who received a set of 2021 Turkey Transportation Tags which are required to hunt turkeys in South Carolina. Data entry was completed by Data Dash, Inc., Farmington, Missouri.

Results from the mail survey were corrected for nonresponse bias using data collected by

Southwick Associates, Fernandina Beach, Florida using a Computer Assisted Telephone Interview program (CATI). Statistical analysis was conducted using Statistix 10 (Analytical Software, Tallahassee, FL). Missouri. Results from the mail survey were corrected for nonresponse bias using data collected by Southwick Associates, Fernandina Beach, Florida using a Computer Assisted Telephone Interview program (CATI). Statistical analysis was conducted using Statistix 10 (Analytical Software, Tallahassee, FL).

Results and Discussion

Turkey Harvest

During the 2021 spring season it is estimated that a total of 13,032 adult gobblers and 1,033 jakes were harvested for a statewide total of 14,065 turkeys (Table 1). This figure represents little change from the estimated harvest in 2020 (14,044). Although harvest estimates for 2020 and 2021 are virtually identical there are significant differences in how this occurred. Turkey hunter numbers and effort are discussed later in this report, however, certain details bear mentioning that may help explain how similar figures are quite different. For example, far fewer hunters participated in the 2020 season compared to 2021, however, man-days of effort per hunter was greater in 2020 than in 2021. It is believed that the effects of COVID-19 decreased hunter numbers in 2020 but increased hunter effort for those hunters who participated. Hunter numbers were much greater (19%) in 2021 as was total effort (15%). Thus, although the harvest estimates are similar it required more hunters and total effort to arrive at the same number of harvested turkeys in 2021.

The 2021 spring season was the inaugural year of SC Game Check and electronic harvest reporting for wild turkeys. Therefore, SCDNR now has two sources of harvest data for comparison. There were 9,797 turkeys reported through SC Game Check with an additional 82 birds that were attempted but unsuccessfully reported via the telephone method bringing the total to 9,879. Although reporting is mandatory there will always be lack of compliance by some proportion of hunters. To estimate noncompliance a question was included on the hunter survey asking hunters who indicated they killed a turkey(s) “Did you report your harvest to SC Game Check?”. Results indicate that 34 percent of hunters did not report their harvest. Using this as a correction factor increases the figure that should have been reported through SC Game Check to approximately 13,300 turkeys, only about 5 percent below the harvest estimate of 14,065 birds from the post season survey.

Finally, with respect to the preseason youth turkey hunting weekends, by law youth hunters are not required to possess turkey tags. Reporting through SC Game Check is dependent on reporting the use of a tag; therefore, reporting was impossible for youth hunters who did not have tags. Reporting data indicates that about 50 youth hunters who had tags reported their harvest, however, it is expected that 300 to 500 turkeys were harvested during the preseason youth turkey hunting weekends. If this is the case, then what should be the “reported harvest” compared to the harvest estimated by the survey is less than a 5 percent difference. This analysis provides strong support for the accuracy of the traditional post season survey in estimating the number of turkeys taken annually in South Carolina.

In any event, recent turkey harvest figures remain well below levels from the past reflecting decreased numbers of turkeys likely due to ongoing poor recruitment of poults into the population. This trend appears to be a regional situation and has been called the “southeast turkey decline” by biologists and managers. The percentage of jakes in the 2021 harvest was 7 percent based on reports through SC Game

Check and the post season survey as well. This is an extremely low percentage of jakes in the harvest and was the second lowest on record only behind that from 2020 (5%). Low jake harvests are usually indicative of poor recruitment the previous year. This lends credence to the notion that the ongoing negative trends in harvest are related to poor annual recruitment.

Harvest Per Unit Area County Rankings

Comparisons can be made between turkey harvests from the various counties in South Carolina if a harvest per unit area is established. Harvest per unit area standardizes the harvest among counties regardless of the size of individual counties. One measure of harvest rate is the number of turkeys taken per square mile (640ac. = 1 mile²). When considering the estimated turkey habitat that is available in South Carolina, the turkey harvest rate in 2021 was 0.6 gobblers per square mile statewide (Table 2). Although this harvest rate is not as high as it once was, it should be considered good and is like other Southeastern states. The top 5 counties for harvest per unit area were Spartanburg (1.5 turkeys/mile²), Fairfield (1.3 turkeys/mile²), Pickens (1.3 turkeys/mile²), Cherokee (1.0 turkeys/mile²), and Abbeville (0.9 turkeys/mile²) (Table 2).

Turkey Harvest Rankings by County

Total turkey harvest is not comparable among counties because there is no standard unit of comparison, i.e., counties vary in size and are, therefore, not directly comparable. However, some readers may be interested in this type of ranking. The top 5 counties during 2021 were, Fairfield, Williamsburg, Spartanburg, Florence, and Horry (Table 3).

Number of Turkey Hunters

Even though all individuals receiving a set of Turkey Transportation Tags were eligible to hunt turkeys, only 64 percent indicated that they actually hunted turkeys. Based on this figure, approximately 51,492 hunters participated in the 2021 spring turkey season, a 19 percent increase from 2020 (43,164). It is important to note that the 2021 hunter number figure is more in line with figures prior to 2020 which were down substantially, likely due to travel restrictions and other issues associated with COVID-19 last year. Additionally, 2020 was year one of the new fee for turkey tags and there may have been some initial “pushback” from hunters. Counties with the highest estimates for individual hunters include Fairfield, Newberry, Laurens, Spartanburg, and Union (Table 4) which were all in the top 5 counties in 2020.

Hunter Effort

For the purposes of this survey hunter effort was measured in days with one day being defined as any portion of the day spent afield. Turkey hunters averaged approximately 7.3 days afield during the 2021 season (Table 4). Successful hunters averaged significantly more days afield (10.5 days) than unsuccessful hunters (6.1 days). Extrapolating to the entire population of turkey hunters yields a figure of 308,551 total days of spring gobbler hunting, a 15 percent increase from 2020 (269,154 days). As previously mentioned, in 2020 hunter numbers were down likely attributable to issues surrounding COVID-19, however, 2020 saw an increase in total hunter effort because there was increased effort by those who did hunt. Again, this may be attributable to COVID-19 and the notion that individuals who chose to hunt had more flexibility and time to hunt due to the “shutdown.” During 2021 average days hunted were down slightly but hunter numbers were up substantially leading to the overall increase in

effort. The top 5 South Carolina counties for overall days of turkey hunting during 2021 were Fairfield, Spartanburg, Newberry, Laurens, and Union counties (Table 4).

Turkey Harvest by Period of Season

Gobbling by male wild turkeys occurs primarily in the spring and is for the purpose of attracting hens for mating. Therefore, spring turkey hunting is characterized by hunters attempting to locate and call gobbling male turkeys using simulated hen calls. With respect to both biology and quality hunting, the timing of the spring gobbler season should consider three primary factors: peak breeding, peak gobbling, and peak nest initiation. Considering these factors, seasons can be set to afford hunters the best opportunity to hunt during the best time (i.e., peak gobbling) without inhibiting reproductive success of hens.

A recent multi-year nesting study conducted in the lower coastal plain indicates that on average, hens do not initiate nesting until April 9. Gobbling studies conducted simultaneously to the nesting studies indicate peak gobbling occurs the first 10 days of April. The peak in gobbling is believed to coincide with nest initiation by hens because gobbling increases in response to decreased hen availability due to commencement of nesting activities.

The 2021 season marked the second year of a return to two spring turkey season frameworks in South Carolina. In Game Zones 1 and 2 which encompass the piedmont and mountains the season is now April 1 to May 10, whereas, in Game Zones 3 and 4 located in the coastal plain the season is March 22 to April 30. Based on the research, the April 1 season start date coincides more closely with the onset of nesting and peak gobbling. This should provide for improved reproductive success by hens because gobblers are not harvested too early, and it should also lead to improved hunting success because gobblers are not accompanied by as many hens due to onset of nesting. On the other hand, the March 22 season start date is nearly 3 weeks prior to peak nest initiation and prior to peak gobbling as well. That being the case, considerations should be given to potential effects on reproduction due to excessive early removal of males and decreased hunter success due to decreased gobbling and hunters competing with hens.

If seasons are set appropriately, the greatest proportion of turkeys should be harvested during the first week or 10 days of the season because increasing numbers of hens should be egg-laying or incubating resulting in gobblers that are naïve and more responsive to hunters' calls. Harvest by period of season demonstrates that the timing of the April 1 opening date affords higher turkey harvests as most turkeys are harvested during the 10 days following the April 1 opening date (Figure 4).

When broken-out by specific season frameworks the results are similar. In areas where the season begins March 22, only 34 percent of the total harvest was accounted for during the first 10 days of the season (Figure 5). This is likely because late March is the time of peak breeding and males respond to hunters' calls less because hens are available. Hunters refer to this as gobblers being "henned-up." On the other hand, 46 percent of the harvest occurred during the first 10 days of the season in areas where the season begins April 1 (Figure 6). This is because by April 10 a significant number of hens are involved in nesting activities leaving gobblers "lonely" and more receptive to hunters' calls. These same trends were apparent prior to 2016 when there were split season in South Carolina with one framework beginning March 15 and the other April 1.

Hunting Success

For determination of hunting success only those individuals who hunted turkeys were included in the analysis and similarly, success was defined as harvesting at least one turkey. Overall hunting success in 2021 was 28 percent (Figure 7). Unlike deer hunting which typically has high success, turkey hunting can be an inherently unsuccessful endeavor, relatively speaking.

The statewide bag limit in South Carolina is 3 gobblers. Obviously, most successful hunters harvest only one or two birds. However, it is interesting to note the relative contribution to the total harvest of turkeys by the few hunters who harvest 3 birds. Ironically, the percentage of hunters taking 3 birds was only 2 percent, however, this small percentage of hunters harvested an estimated 23 percent of the total birds taken in the state (Figure 8). Finally, based on reports to SC Game Check, hunters from 36 states reported a turkey harvest. However, nonresidents comprised only 9 percent of the overall harvest in 2021.

Hunter Opinion Regarding Turkey Numbers

As has become customary, the 2021 Turkey Hunter Survey asked participants to compare the number of turkeys in the area they hunt most often with the number of turkeys in past years. Participants were given 3 choices: increasing, about the same, or decreasing. Approximately 45 percent of hunters indicated that the number of turkeys in the area they hunted most often was about the same as in past years. A higher percentage of hunters (43 percent) believed that the turkey population was decreasing than increasing (12 percent). On a scale of 1 to 3 with 1 being increasing, 2 being the same, and 3 being decreasing, the overall mean rating of 2.3 suggests that hunters viewed the turkey population as decreasing. The opinion among hunters that the turkey population is decreasing has been consistent the last few years and this opinion reached an all-time high in 2021.

Turkeys Shot but not Recovered

Harvesting game signals the end of a successful hunt and although most hunters do a good job of preparing their equipment and mental state, it goes without saying that a certain percentage of game is shot or shot at and not killed or recovered. This point is no different when turkey hunting.

To estimate the prevalence of errant shots at turkeys, the 2021 Turkey Hunter Survey asked hunters to indicate the number of turkeys that they “shot but did not kill or recover during the 2021 season in South Carolina.” Approximately 5 percent of hunters indicated that they shot but did not kill or recover at least one turkey in 2021 (9.7 percent in 2020). There were approximately 51,492 turkey hunters in 2021 meaning that approximately 2,563 turkeys were shot or shot at and not killed or recovered. Therefore, approximately 15 percent of the total turkeys shot at were not killed or recovered. These results have been consistent since this type of data have been available although this year’s data was somewhat lower in terms of percent of birds “shot at but not killed or recovered” compared to previous years which have averaged about 22 percent for the last decade.

This data is certainly not indicative of “dead and unrecovered turkeys,” however, some percentage of the 2,500 turkeys that were shot at did eventually die. Although shot shells for turkeys have become increasingly sophisticated, accurate, and lethal it is a fact that the pattern of a shotgun is relatively broad and contains hundreds of pellets. Therefore, a “clean miss” is not as clear-cut for turkeys compared to

other big game like deer where there is typically a single projectile. Additional research is needed on this topic.

Turkey Harvest in the Morning vs. Afternoon

The typical spring turkey hunt is characterized by attempting to locate a gobbling bird prior to or just after sunrise. Once a gobbler is located most hunters position themselves as close as they can to the gobbler without scaring it away. Various types of callers that mimic the sounds of wild turkeys are then used to attempt to call the gobbler into gun range. This technique of locating a gobbling bird, setting up, and calling is repeated as necessary.

Traditionally, spring turkey hunting was primarily carried out during the first few hours of the day. As the popularity of turkey hunting has increased, many hunters now hunt in the afternoon as well. Gobblers are generally not as vocal in the afternoon, but can be stimulated to gobble using the various turkey calls, particularly late in the afternoon near areas where turkeys frequently roost. Additionally, it is now common for hunters to set up on food plots, often in blinds, using decoys in areas that turkeys frequent for feeding and loafing in the afternoon.

To gain a better understanding of the distribution of harvest with respect to time of day, the 2021 Turkey Hunter Survey asked hunters to identify the number of birds harvested in the morning compared to the afternoon. Results indicate that approximately 79 percent of gobblers were harvested in the morning compared to 21 percent in the afternoon. This coincides with data reported through SC Game Check. These data may be useful if discussions arise concerning the relative importance of morning compared to afternoon harvest of gobblers in the spring. These results have been consistent since this type of data have been available although this year's data was somewhat lower in terms of afternoon harvest which has averaged about 24 percent for the last decade.

Turkey Harvest on Private vs. Public (WMA) Land

To gain an understanding of the relative importance of the turkey harvest on private versus public (WMA) land, the 2021 Turkey Hunter Survey asked hunters how many birds they took on the respective types of land. Data from both the survey and reports through SC Game Check indicate that approximately 91 percent of birds are taken on private land and 9 percent on public (WMA) land. Interestingly, public land comprises only about 7 percent of the turkey habitat in the state. Therefore, although a relatively small proportion of the total harvest occurred on public land, it slightly outperformed what would be expected based on available habitat.

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Table 1. Estimated statewide turkey harvest in South Carolina in 2021.

County	Acres*	Square Miles	Gobbler Harvest	Jake Harvest	Total Harvest	Percent Jakes	Harvest Rates	
							Ac/Turkey	Turkey/Mi. ²
Fairfield	384,607	601	758	40	798	5.0	482	1.3
Williamsburg	513,851	803	661	20	681	2.9	755	0.8
Spartanburg	265,939	416	583	30	613	4.9	434	1.5
Florence	397,888	622	525	10	535	1.9	744	0.9
Horry	533,336	833	437	40	477	8.4	1,118	0.6
Orangeburg	504,516	788	447	29	476	6.1	1,060	0.6
Colleton	502,666	785	428	22	450	4.9	1,117	0.6
Pickens	219,926	344	408	40	448	8.9	491	1.3
Laurens	317,916	497	428	10	438	2.3	726	0.9
Charleston	288,732	451	398	30	428	7.0	675	0.9
Georgetown	399,638	624	418	10	428	2.3	934	0.7
Greenville	294,257	460	350	60	410	14.6	718	0.9
Chester	300,589	470	311	80	391	20.5	769	0.8
Lancaster	266,382	416	330	60	390	15.4	683	0.9
Sumter	338,968	530	340	30	370	8.1	916	0.7
Berkeley	567,530	887	330	30	360	8.3	1,576	0.4
Abbeville	223,113	349	301	30	331	9.1	674	0.9
Jasper	309,889	484	301	13	314	4.1	987	0.6
York	276,650	432	262	50	312	16.0	887	0.7
Newberry	317,761	497	291	20	311	6.4	1,022	0.6
Hampton	324,840	508	282	19	301	6.3	1,079	0.6
Union	258,111	403	272	20	292	6.8	884	0.7
Allendale	216,455	338	262	20	282	7.1	768	0.8
Lee	220,106	344	262	20	282	7.1	781	0.8
Oconee	284,348	444	252	30	282	10.6	1,008	0.6
Anderson	219,068	342	243	30	273	11.0	802	0.8
Cherokee	156,664	245	243	10	253	4.0	619	1.0
Clarendon	298,087	466	233	20	253	7.9	1,178	0.5
Richland	340,121	531	243	10	253	4.0	1,344	0.5
Chesterfield	372,478	582	223	30	253	11.9	1,472	0.4
Bamberg	196,573	307	233	10	243	4.1	809	0.8
Edgefield	246,543	385	223	20	243	8.2	1,015	0.6
Kershaw	360,485	563	213	20	233	8.6	1,547	0.4
Marion	216,907	339	204	9	213	4.2	1,018	0.6
Dorchester	302,717	473	165	10	175	5.7	1,730	0.4
Aiken	500,546	782	145	10	155	6.5	3,229	0.2
Calhoun	190,584	298	136	10	146	6.8	1,305	0.5
Saluda	192,173	300	136	10	146	6.8	1,316	0.5
Greenwood	204,400	319	126	10	136	7.4	1,503	0.4
McCormick	212,021	331	116	18	134	13.4	1,582	0.4
Marlboro	281,271	439	116	10	126	7.9	2,232	0.3
Barnwell	281,764	440	116	8	124	6.5	2,272	0.3
Dillon	214,069	334	97	4	101	4.0	2,119	0.3
Darlington	286,228	447	68	7	75	9.3	3,816	0.2
Beaufort	147,441	230	68	4	72	5.6	2,048	0.3
Lexington	280,742	439	48	10	58	17.2	4,840	0.1
Total	14,028,896	21,920	13,032	1,033	14,065	7.3	997	0.6

95% Conf. Interval for harvest (+) 1,241 (+) 288 (+) 1,271

* Acreage shown represents the acreage of forested land and acreage of row crops considered to be significant turkey habitat within each county.

Table 2. County rankings based on turkey harvest per unit area in South Carolina in 2021.

County	Acres*	Square Miles	Gobbler Harvest	Jake Harvest	Total Harvest	Percent Jakes	Harvest Rates	
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Spartanburg	265,939	416	583	30	613	4.9	434	1.5
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Sumter	338,968	530	340	30	370	8.1	916	0.7
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Calhoun	190,584	298	136	10	146	6.8	1,305	0.5
Saluda	192,173	300	136	10	146	6.8	1,316	0.5
Richland	340,121	531	243	10	253	4.0	1,344	0.5
Chesterfield	372,478	582	223	30	253	11.9	1,472	0.4
Greenwood	204,400	319	126	10	136	7.4	1,503	0.4
Kershaw	360,485	563	213	20	233	8.6	1,547	0.4
Berkeley	567,530	887	330	30	360	8.3	1,576	0.4
McCormick	212,021	331	116	18	134	13.4	1,582	0.4
Dorchester	302,717	473	165	10	175	5.7	1,730	0.4
Beaufort	147,441	230	68	4	72	5.6	2,048	0.3
Dillon	214,069	334	97	4	101	4.0	2,119	0.3
Marlboro	281,271	439	116	10	126	7.9	2,232	0.3
Barnwell	281,764	440	116	8	124	6.5	2,272	0.3
Aiken	500,546	782	145	10	155	6.5	3,229	0.2
Darlington	286,228	447	68	7	75	9.3	3,816	0.2
Lexington	280,742	439	48	10	58	17.2	4,840	0.1
Total	14,028,896	21,920	13,032	1,033	14,065	7.3	997	0.6

95% Conf. Interval for harvest

(+-) 1,241	(+-) 288	(+-) 1,271
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Table 3. County rankings based on total turkeys harvested in South Carolina in 2021.

County	Acres*	Square Miles	Gobbler Harvest	Jake Harvest	Total Harvest	Percent Jakes	Harvest Rates	
							Ac/Turkey	Turkey/Mi. ²
Fairfield	384,607	601	758	40	798	5.0	482	1.3
Williamsburg	513,851	803	661	20	681	2.9	755	0.8
Spartanburg	265,939	416	583	30	613	4.9	434	1.5
Florence	397,888	622	525	10	535	1.9	744	0.9
Horry	533,336	833	437	40	477	8.4	1,118	0.6
Orangeburg	504,516	788	447	29	476	6.1	1,060	0.6
Colleton	502,666	785	428	22	450	4.9	1,117	0.6
Pickens	219,926	344	408	40	448	8.9	491	1.3
Laurens	317,916	497	428	10	438	2.3	726	0.9
Charleston	288,732	451	398	30	428	7.0	675	0.9
Georgetown	399,638	624	418	10	428	2.3	934	0.7
Greenville	294,257	460	350	60	410	14.6	718	0.9
Chester	300,589	470	311	80	391	20.5	769	0.8
Lancaster	266,382	416	330	60	390	15.4	683	0.9
Sumter	338,968	530	340	30	370	8.1	916	0.7
Berkeley	567,530	887	330	30	360	8.3	1,576	0.4
Abbeville	223,113	349	301	30	331	9.1	674	0.9
Jasper	309,889	484	301	13	314	4.1	987	0.6
York	276,650	432	262	50	312	16.0	887	0.7
Newberry	317,761	497	291	20	311	6.4	1,022	0.6
Hampton	324,840	508	282	19	301	6.3	1,079	0.6
Union	258,111	403	272	20	292	6.8	884	0.7
Allendale	216,455	338	262	20	282	7.1	768	0.8
Lee	220,106	344	262	20	282	7.1	781	0.8
Oconee	284,348	444	252	30	282	10.6	1,008	0.6
Anderson	219,068	342	243	30	273	11.0	802	0.8
Cherokee	156,664	245	243	10	253	4.0	619	1.0
Clarendon	298,087	466	233	20	253	7.9	1,178	0.5
Richland	340,121	531	243	10	253	4.0	1,344	0.5
Chesterfield	372,478	582	223	30	253	11.9	1,472	0.4
Bamberg	196,573	307	233	10	243	4.1	809	0.8
Edgefield	246,543	385	223	20	243	8.2	1,015	0.6
Kershaw	360,485	563	213	20	233	8.6	1,547	0.4
Marion	216,907	339	204	9	213	4.2	1,018	0.6
Dorchester	302,717	473	165	10	175	5.7	1,730	0.4
Aiken	500,546	782	145	10	155	6.5	3,229	0.2
Calhoun	190,584	298	136	10	146	6.8	1,305	0.5
Saluda	192,173	300	136	10	146	6.8	1,316	0.5
Greenwood	204,400	319	126	10	136	7.4	1,503	0.4
McCormick	212,021	331	116	18	134	13.4	1,582	0.4
Marlboro	281,271	439	116	10	126	7.9	2,232	0.3
Barnwell	281,764	440	116	8	124	6.5	2,272	0.3
Dillon	214,069	334	97	4	101	4.0	2,119	0.3
Darlington	286,228	447	68	7	75	9.3	3,816	0.2
Beaufort	147,441	230	68	4	72	5.6	2,048	0.3
Lexington	280,742	439	48	10	58	17.2	4,840	0.1
Total	14,028,896	21,920	13,032	1,033	14,065	7.3	997	0.6
95% Conf. Interval for harvest			(+-) 1,241	(+-) 288	(+-) 1,271			

Table 4. Estimated number of turkey hunters, average days hunted, and total hunting effort in SC in 2021.

County	Total Harvest	Number Hunters	Avg. Days Hunted	Total Man/Days
Abbeville	331	1,522	5.5	8,422
Aiken	155	1,081	5.8	6,290
Allendale	282	937	5.9	5,547
Anderson	273	1,533	5.4	8,326
Bamberg	243	750	5.7	4,277
Barnwell	124	507	6.4	3,223
Beaufort	72	243	4.2	1,030
Berkeley	360	1,676	5.8	9,764
Calhoun	146	717	5.0	3,618
Charleston	428	1,279	5.8	7,404
Cherokee	253	871	7.6	6,613
Chester	391	1,566	6.8	10,650
Chesterfield	253	750	6.0	4,529
Clarendon	253	805	5.1	4,097
Colleton	450	1,268	5.2	6,601
Darlington	75	441	6.7	2,959
Dillon	101	254	8.5	2,168
Dorchester	175	816	5.7	4,636
Edgefield	243	1,323	5.9	7,859
Fairfield	798	2,548	6.9	17,551
Florence	535	1,081	6.9	7,440
Georgetown	428	1,059	6.3	6,721
Greenville	410	1,511	5.1	7,715
Greenwood	136	1,092	5.3	5,739
Hampton	301	1,136	5.8	6,625
Horry	477	1,235	6.6	8,206
Jasper	314	783	5.9	4,600
Kershaw	233	1,301	5.6	7,332
Lancaster	390	1,081	8.3	8,961
Laurens	438	1,897	5.7	10,890
Lee	282	695	5.8	4,001
Lexington	58	507	5.0	2,552
McCormick	134	1,026	5.4	5,523
Marion	213	540	6.3	3,414
Marlboro	126	353	5.4	1,917
Newberry	311	1,974	6.2	12,328
Oconee	282	1,081	7.0	7,548
Orangeburg	476	1,676	5.9	9,848
Pickens	448	1,445	5.8	8,374
Richland	253	1,070	4.9	5,259
Saluda	146	750	5.7	4,253
Spartanburg	613	1,897	6.7	12,723
Sumter	370	816	5.7	4,672
Union	292	1,842	5.8	10,698
Williamsburg	681	1,445	5.5	7,895
York	312	1,312	5.9	7,751
Total	14,065	51,492	6.0*	308,551

*Note - Since individuals hunt multiple counties the average number of days hunted per county varies from the average number of days individuals hunt (7.3 days).

Figure 1. South Carolina Department of Natural Resources 2021 Turkey Hunter Survey.

2021 South Carolina Turkey Hunter Survey

1. Did you turkey hunt in SC this past season (2021)? 1. Yes 2. No
If you answered No to this question please go to question # 10.

2. Did you harvest any turkeys in SC this past season? 1. Yes 2. No

3. Even if you did not harvest a turkey, please record the SC counties you turkey hunted and the number of days hunted in each county this past season (2020). If you harvested turkeys please record the number of adult gobblers and jakes taken in each county. A day of hunting is defined as any portion of the day spent afield. Please do not give ranges (i.e. 5-10), rather provide absolute numbers (i.e. 5). Provide information only for yourself - not friends, relatives, or other people you may have called or guided for or hunted with. (*Jakes typically have beards less than 6", spurs less than 1/2" and longer feathers in the center of their tail fan.*)

SC Counties You Turkey Hunted	# Days Hunted	Number Turkeys Harvested
1		Adult gobblers _____ Jakes _____
2		Adult gobblers _____ Jakes _____
3		Adult gobblers _____ Jakes _____
4		Adult gobblers _____ Jakes _____

If you did not harvest any turkeys in SC this past season please go to question 8.

4. If you harvested turkeys in SC this past season, please indicate as best you can the number of turkeys killed by County and 10-day period of the season.

County of Harvest	Number of Turkeys Harvested by Time Period				
	March 22-31	April 1-10	April 11-20	April 21-30	May 1-10
1.					
2.					
3.					

5. How many turkeys did you kill in the morning _____ after 12:00 noon _____?

6. How many turkeys did you kill on Private Land _____ and Public (WMA) Land _____?

7. Did you report your harvest to SC Game Check? 1. Yes 2. No

8. How many turkeys did you shoot but not kill or recover in SC this past season? _____

9. Compared to past years, how would you describe the number of turkeys in the area that you hunted most often this spring?
Circle one 1. Increasing 2. About the same 3. Decreasing


10. How many years have you been turkey hunting? _____

11. Are you a resident of SC? 1. Yes 2. No

12. If yes, which county _____

Separate and return this portion of the survey. Postage is prepaid. Please do not staple this form.

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Figure 1. continued

May, 2021

Dear SC Turkey Hunter:

Eastern wild turkeys are one of the most important game species in South Carolina. Therefore, it is important that this species be monitored for population status and harvesting activities. Wildlife resource managers require current and accurate information about wild turkey harvests to aid in successfully managing this important natural resource and to optimize future hunting potential. To obtain this needed data, the South Carolina Department of Natural Resources (SCDNR) is conducting a survey of hunters who received a set of turkey tags during spring 2021.

Although electronic reporting of harvested turkeys is now required, SCDNR will continue to survey hunters to maintain consistency, determine hunter effort, and measure other aspects of turkey hunting. You are one of a group of randomly selected hunters asked to participate in this survey. To draw accurate conclusions it is very important that you complete the survey and return it. Please take time to read each question. Even if you did not hunt or harvest wild turkeys this spring please indicate this by answering the appropriate questions and moving on to the next set of questions.

Please note that complete confidentiality will be given to you. Keep in mind that the purpose of the survey is to determine the wild turkey harvest in South Carolina and not to determine whether game laws are observed. By accurately answering the survey questions you will enable SCDNR biologists to better manage the Eastern wild turkey resource for you and other citizens of the state. Therefore, it is very important that you take a few minutes to complete this survey and mail it. Return postage is prepaid.

Results of this survey will be posted on the SCDNR web site once completed. The results from the 2020 survey can be found at: www.dnr.sc.gov/wildlife/turkey/2020TurkeyHarvest.html

Thank you for your assistance.

Charles Ruth
Wildlife Biologist
Big Game Program Coordinator

PLEASE MAIL YOUR SURVEY AFTER SEPARATING THIS HALF FROM THE SIDE ON WHICH YOUR ANSWERS HAVE BEEN ENTERED. NO POSTAGE IS NECESSARY.

If you have questions regarding this survey, please call 803-734-3886

The South Carolina Department of Natural Resources prohibits discrimination on the basis of race, color, sex, national origin, disability, religion or age. Direct all inquiries to the Office of Human Resources, P.O. Box 167, Columbia, SC 29202

21-12853



**TURKEY HUNTER SURVEY
SC DEPARTMENT OF NATURAL RESOURCES
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Figure 2. Spring wild turkey harvest in South Carolina 1982-2021. Harvest increased ($R^2 = 0.92$) between 1982 and 2002 because of increasing turkey population during restoration efforts. Since 2002 harvest has generally declined likely due to less than desirable annual recruitment.

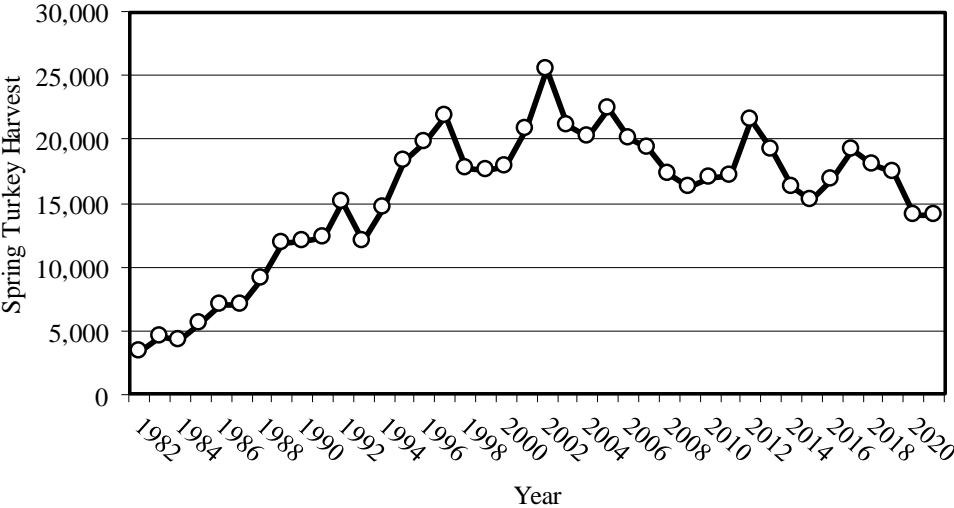


Figure 3. Summer wild turkey recruitment ratio in South Carolina 1982-2020. Note declining trend since 1988. Average recruitment prior to 1988 = 3.5. Average recruitment since 1988 = 2.1. This represents a 40 percent decrease in average recruitment.

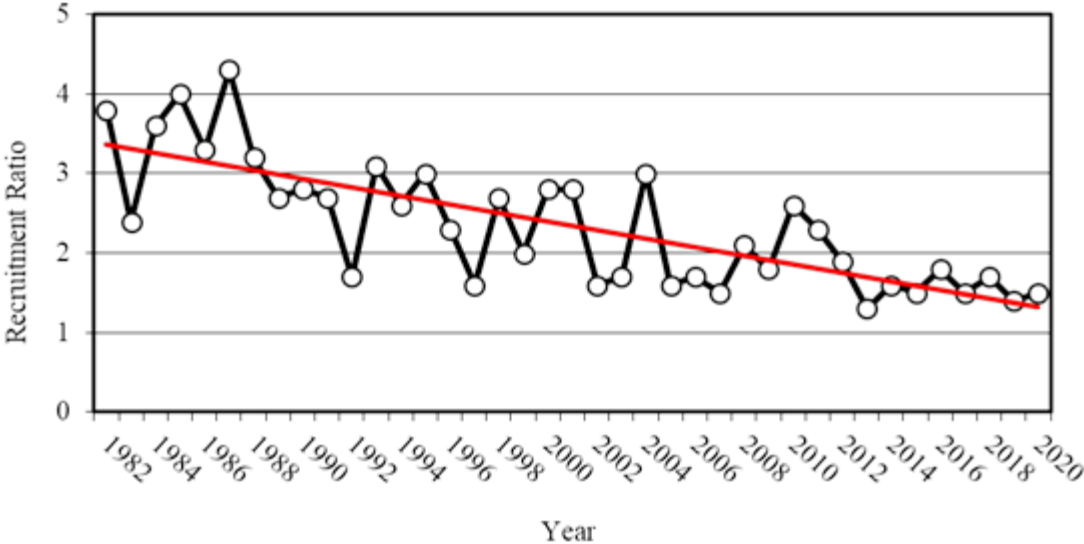


Figure 4. Percentage of gobblers harvested by period of season in South Carolina in 2021.

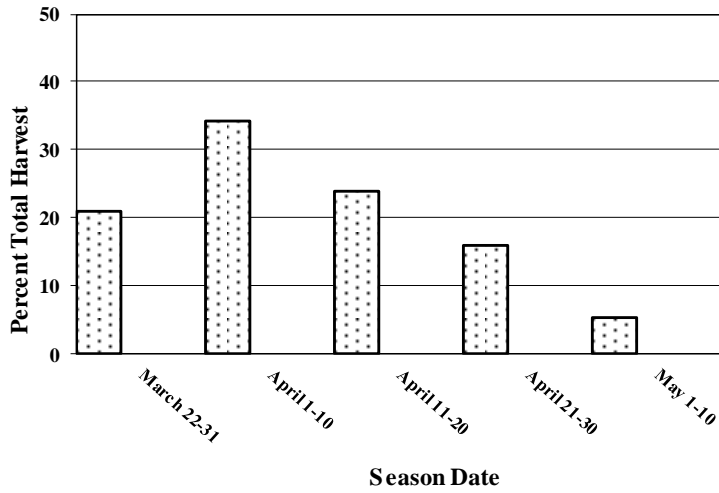


Figure 5. Percentage of gobblers harvested by period of season with March 22-April 30 framework in Game Zones 3 & 4 (coastal plain) in South Carolina in 2021.

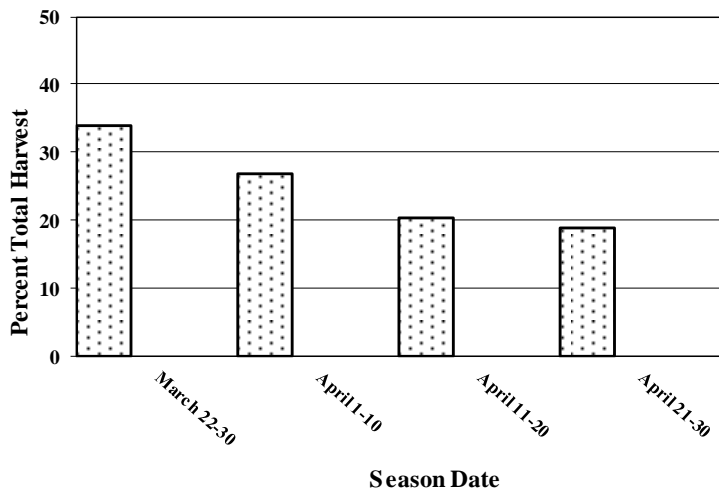


Figure 6. Percentage of gobblers harvested by period of season with April 1-May 10 framework in Game Zones 1 & 2 (piedmont and mountains) in South Carolina in 2021.

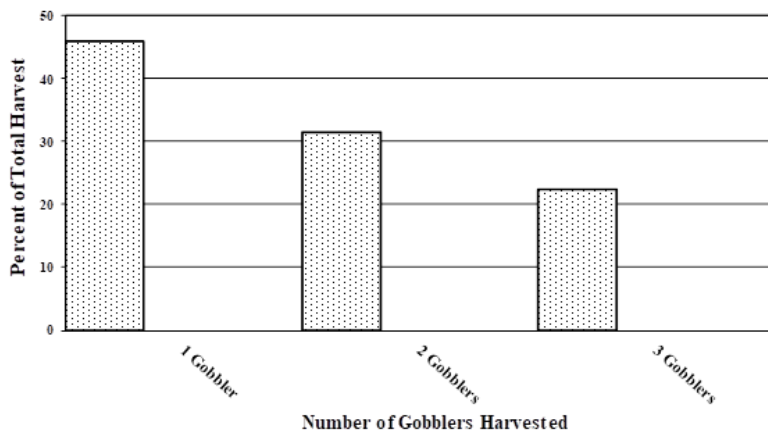


Figure 7. Hunter success during the spring turkey season in South Carolina in 2021. Overall success was 27 percent at harvesting at least one gobbler.

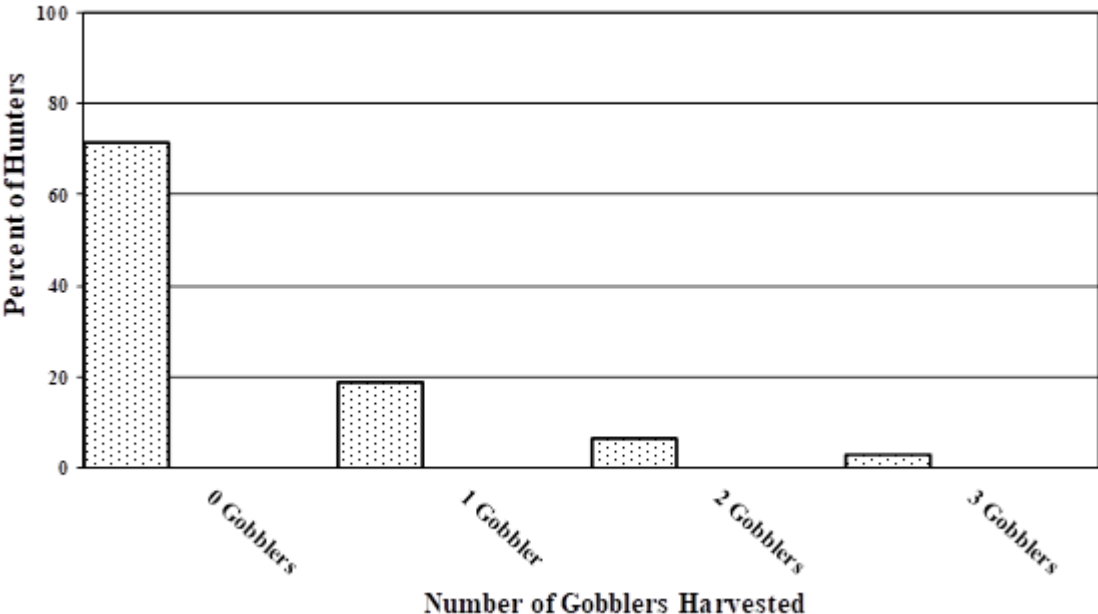
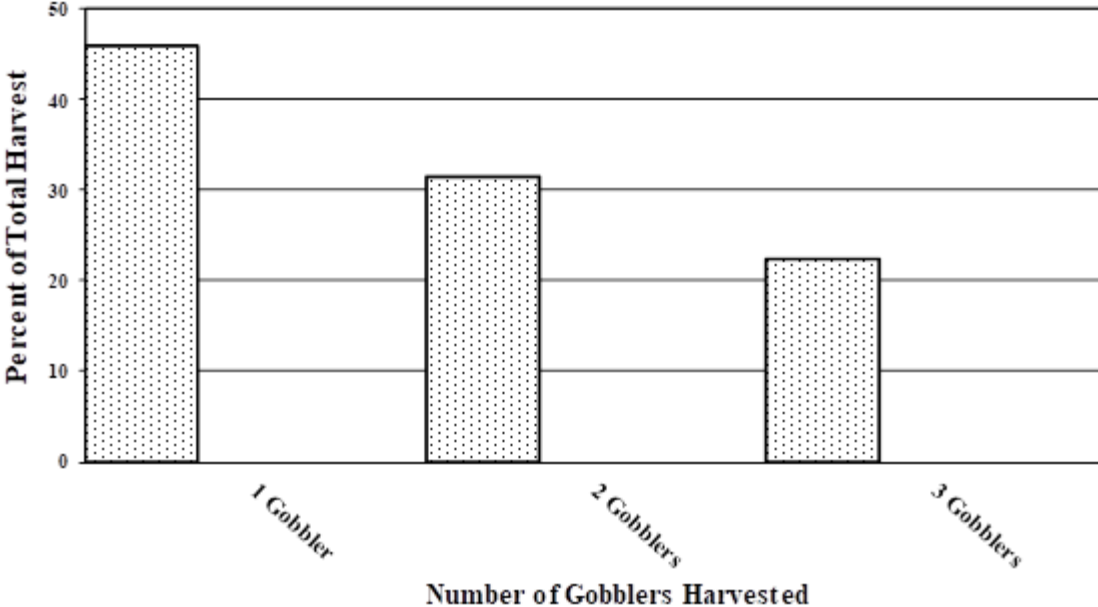


Figure 8. Relative contribution to the total turkey harvest by hunters taking between 1 and 3 gobblers in South Carolina in 2021.



2021 SC WILD TURKEY SUMMER SURVEY

Annually since the early 1980's, the S.C. Department of Natural Resources (SCDNR) has conducted a Summer Turkey Survey to estimate reproduction and recruitment of wild turkeys in South Carolina. The survey involves agency wildlife biologists, technicians, and game wardens, as well as many volunteers from other natural resource agencies and the general public. This year approximately 210 participants recorded 1,126 unique observations, seeing approximately 7,300 turkeys across the state in July and August. Although wild turkeys nest primarily in April and May in South Carolina, the survey does not take place until late summer. Therefore, the survey statistics document poults (young turkeys) that survived and entered the fall population (Table 1).

Wild turkey productivity is assessed by observations of reproduction and associated survival of offspring being recruited into the population. This measure of young entering the population based on the number of hens in the population is the Total Recruitment Ratio (TRR). This annual index is the most practical measure of productivity because it considers successful hens, unsuccessful hens, and poult survival. Recruitment of four or more poults per hen is considered excellent, three is good, two is fair and considered a break-even point, and one or less poults per hen is poor. If hens are successful at some level, a turkey population can be maintained. However, the goal is to optimize conditions through management applications to promote optimal reproductive success and turkey populations that provide sustainable, quality turkey hunting opportunities into the future. Unlike deer, wild turkeys are much more susceptible to significant fluctuations in reproduction and recruitment. Lack of reproductive success is often associated with bad weather (cold and wet) during nesting and brood rearing season. However, there are a host of predators that take advantage of turkey nests and broods including: raccoons, opossums, skunks, armadillos, snakes, foxes, coyotes, bobcats, feral hogs, and numerous avian predators including hawks, owls, and crows.

South Carolina has experienced declines in turkey productivity since 1988. Average recruitment prior to 1988 was 3.5 poults per hen. Average recruitment since 1988 has been 2.1, representing a 40 percent decrease in average recruitment. Coincidentally, the turkey harvest has decreased over 40 percent since it peaked in 2002. This has been a slow and steady decline with TRR numbers in the 1990's averaging 2.5, but since 2005 numbers below 2.0 have been the norm with an average TRR the last 15 years of 1.8 (Figure 2). This year's statewide TRR was 2.0, the highest it has been since 2011. For hens that successfully raise a brood, average brood sizes of 3.5 to 4 poults have remained consistent over time. However, the driving factor in the low productivity is the high percentage of hens that have no poults at all by late summer. Fifty (50) percent of hens observed this summer had no poults and that figure has averaged 56% the last five years (Table 2). Hens without poults are considered unsuccessful and either did not attempt to nest, abandoned their nest, lost their nest to predation or human disturbance, or had no poults survive due to predation, exposure, starvation, disease, or flooding. Fifty percent unsuccessful hens this year is also the lowest percentage observed since 2011 (46%).

Survey results this year are encouraging, and a bright spot given recent trends, but it is important to note that the statewide average TRR of 2.0 is considered a break-even point where reproduction is likely only replacing losses to hunting and non-hunting mortality and the population is not growing. The Piedmont-Mountain region had the best reproduction in the state this year (2.3 TRR) and the greatest improvement over dismal numbers in 2020 (1.2 TRR). The Northern Coastal Plain region of the state was also noteworthy, with a recruitment ratio of 2.1 and significant improvement over the 1.3 figure of 2020 (Table 1).

While 2021 results are an improvement, TRR figures consistently below 2.0 over the last decade have led to a decreasing population as reflected by decreasing harvest trends. It is worth noting that turkeys have high reproductive potential and are normally able to maintain populations despite predation and weather-related factors. Predators and periodic poor weather conditions existed prior to the year 2000 so this more recent and prolonged poor success may be tied to a high number of hens that did not breed successfully or poor fitness, vigor, and survival of poults due to genetics, disease, other environmental factors, or large-scale changes in habitat.

The intent of legislative changes which took effect in 2020 that adjusted starting dates, season length, bag limits and limited the gobbler harvest during the first 10 days of the season, was to increase turkey populations by improving reproductive success. Although reproduction in 2021 was the best in a decade, at this point it is not indicative of a cause-and-effect relationship with the changes. However, it was the intent of the legislation and continued improvement over the next few years will lend credence to drawing that conclusion. Continued research, survey and attention to season timing, bag limits and other potential contributing factors is warranted.

It is also worth noting that both short and long-term fluctuations in numbers are not unexpected given the reproductive strategy of turkeys and the multiple factors that influence their success and survival. This inherent instability is the reason annual monitoring is critical for this species.

Anyone interested in participating in the annual Summer Turkey Survey is encouraged to sign-up. The survey period is July 1-August 29 annually and those who participate typically spend a reasonable amount of time outdoors during that period. Cooperators obviously must be able to identify wild turkeys and must be comfortable in telling the difference between hens, poults, and gobblers. If you would like to participate in the survey, contact Jay Cantrell at cantrellj@dnr.sc.gov. You will be added to the cooperator list and receive materials at the end of June annually. Those interested in the survey can also download instructions and survey forms at the following website: <http://www.dnr.sc.gov/wildlife/turkey/volunbroodsurvey.html>

Figure 1. Map of physiographic regions for 2021 Summer Turkey Survey.

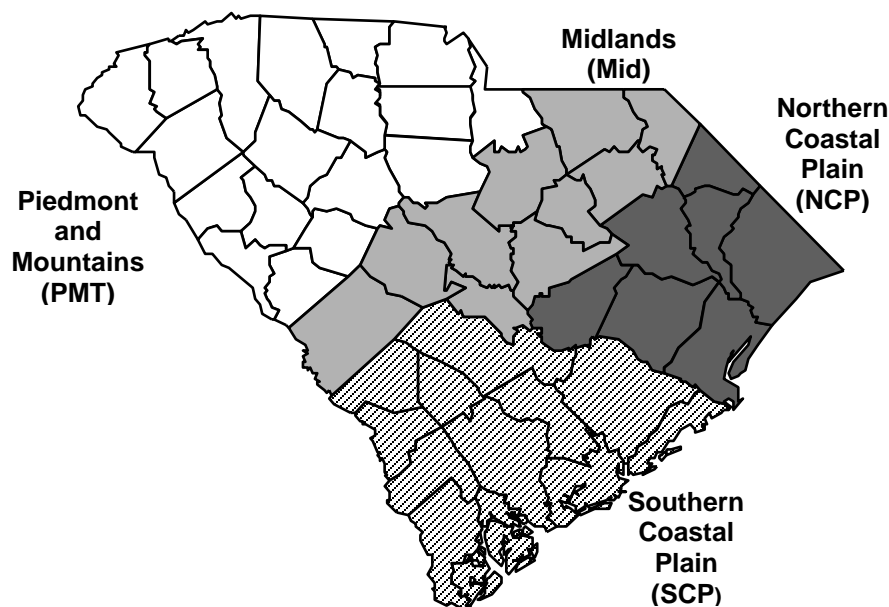


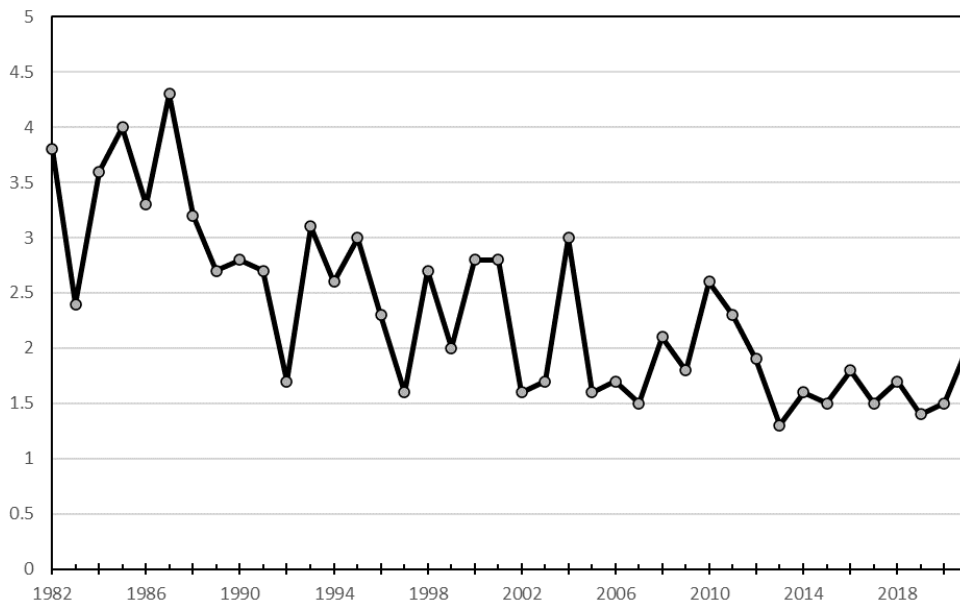
Table 1. Summary of reproductive data for 2021 Summer Turkey Survey by region.

Region	Gobbler Hen Ratio	No. Hens w/Poults	No. Hens w/o Poults (%)	No. Poults	Avg. Brood Size	Total Recruitment Ratio
Piedmont & Mtns	0.42	409	325 (44)	1692	4.1	2.3
Midlands	0.73	159	233 (59)	706	4.4	1.8
Northern Coastal	0.50	191	168 (47)	746	3.9	2.1
Southern Coastal	0.59	217	252 (54)	822	3.8	1.8
Statewide	0.54	976	978 (50)	3966	4.1	2.0

Table 2. Statewide Summer Turkey Survey reproductive data 2017-2021.

Year	Gobbler Hen Ratio	No. Hens w/Poults	No. Hens w/o Poults (%)	No. Poults	Avg. Brood Size	Total Recruitment Ratio
2017	0.58	1,409	1,737 (55)	4,832	3.4	1.5
2018	0.62	1,076	1,206 (53)	3,948	3.7	1.7
2019	0.62	728	1,173 (62)	2,670	3.7	1.4
2020	0.54	807	1,225 (60)	2,971	3.7	1.5
2021	0.54	976	978 (50)	3,966	4.1	2.0
Average	0.58	999	1,264 (56)	3,677	3.72	1.6

Figure 2. Summer wild turkey recruitment ratio in South Carolina 1982-2021.



Note the declining trend since 1988. Average recruitment prior to 1988 = 3.5. Average recruitment since 1988 = 2.1. This represents a 40 percent decrease in average recruitment.

SUMMARY OF CURRENT WILD TURKEY RESEARCH IN SOUTH CAROLINA

SCDNR is contributing funding and cooperating on a study entitled “Reproductive Ecology of Wild Turkeys in an Unhunted Population.” This is a joint project between SCDNR, USDA Forest Service-Southern Research Station, University of Georgia, Louisiana State University, and University of Missouri. This research is occurring on the Savannah River Site (SRS) and is focused on evaluating reproductive ecology of a population of wild turkeys not exposed to hunting. Specific objectives include:

1. Determining space use, habitat selection, and survival of male and female wild turkeys
2. Assessing nesting and brooding ecology of female wild turkeys, with a focus on thoroughly describing nesting chronology and behavior of females during laying, incubating, and brooding.
3. Describing vegetative and habitat characteristics associated with nest sites and areas used by brooding females.
4. Spatially and temporally describing gobbling activity and relating gobbling activity to nesting chronology of females and movement ecology of males.
5. Evaluating the genetic mating system of wild turkeys and describe patterns of parentage in clutches of females.

These research objectives have been studied on several other study sites across the Southeast in recent years on populations subjected to hunting (i.e. the recent SCDNR funded project at the Webb Wildlife Center). By conducting parallel research on an unhunted population, we will be able to better assess the impacts of hunting on wild turkeys.

To date, 116 birds (62 females, 54 males) have been captured and banded. 80 of these birds were marked with GPS transmitters. During the 2021 nesting season 88 percent of hens initiated a nest with 35 percent initial nest success and 63 percent brood survival. All of these measures are greater than the 2014-2018 Webb Center study in South Carolina and a number of other hunted study sites in the southeast. This project will continue until 2024 and findings will be provided as they become available.

A 3-year cooperative study is nearing completion with Clemson University. The project is assessing variation of chronology of wild turkey gobbling in the Upstate of South Carolina using 38 autonomous recording units (ARUs) on public and private lands in the foothills/mountains. The goal is to quantify turkey gobbling chronology and occupancy in relation to latitude, elevation, and habitat within the Upstate of South Carolina. The results of this project combined with gobbling chronology data from coastal plain study areas which include SRS, Crackerneck WMA and the Webb Wildlife Center will provide quantifiable differences in the timing and amount of gobbling activity across different latitudes, elevations, and hunting regimes in the state. Preliminary results indicate the 2019, 2020, and 2021 upstate hunting seasons encompassed some but not all seasonal gobbling peaks. The highest peaks across the three years

occurred in May after the hunting season. Additionally, gobbling activity was relatively low during peak incubation, which aligned with the opening of the regional hunting season in 2020 and 2021 and public land hunting in 2019

SCDNR is cooperating on a project to assess the diet of coyotes in South Carolina through non-invasive genetic sampling and DNA metabarcoding. This study is part of a larger coyote abundance estimation project underway with the University of Georgia and Savannah River Ecology Lab, using coyote fecal samples collected from sites across South Carolina. Results thus far indicate that wild turkey was present with a frequency of occurrence of 9%. However, this low presence of turkey in coyote scat and specialization in other prey species indicate that turkeys are likely not an important component of diet to coyotes.