INTERIM PERFORMANCE REPORT

Federal Aid Grant No. F19AF00796 (W-190-R-2)

Game Harvest Survey

Oklahoma Department of Wildlife Conservation

Report Period: July 1, 2019 – June 30, 2020

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State: Oklahoma   **Grant Number:** F19AF00796 (W-190-R-2)

Grant Program: Wildlife Restoration Program

Grant Title: Game Harvest Survey

Project Leader: Betsey York

Grant Period: July 1, 2019 – June 30, 2021

Project Description:
This grant allows the Oklahoma Department of Wildlife Conservation to monitor upland game harvest and hunter opinion.

Objective 1 – Data Collection and Analysis – Research, Survey of Monitoring - Utilization: Complete a harvest survey of 2,000 hunting license holders annually from July 1, 2019 through June 30, 2021.

Accomplishments:

Objective 1: A sample of 2,447 license holders was interviewed during February 2019. Seven hundred and nine individuals interviewed did not hunt during 2019. One thousand four hundred and two did hunt. Deer season was most popular with hunters. Statewide harvest estimates increased from 2018 estimates for crow, dove, pheasant, cottontail rabbits, swamp rabbits, fox squirrels, gray squirrels, fall turkey, woodcock, coyote, bobcat, raccoon, beaver, and otters. Harvest estimates decreased from 2018 estimates for jackrabbits, spring turkey gray fox, quail and red fox. Prairie chicken season remained closed during 2019. Harvest estimates for most species were calculated statewide and for all public lands open to hunting. The limitations of the harvest estimates were discussed in detail. Human dimensions questions pertained to controlled hunts participation, public land regulation preferences, ODWC spending preferences, recruitment activity and access to internet in the home.

Abstract:
The Oklahoma Department of Wildlife Conservation (ODWC) has conducted telephone surveys since 1986 to estimate the number of hunters and game harvest statewide and regionally. A sample of hunting license holders (*n* = 2,447) was interviewed during February 2019. Sixty-six percent of individuals interviewed hunted during 2019. Hunter and game harvest estimates and statistics were calculated statewide. Deer (*Odocoileus virginianus* and *O. hemionus*) season was most popular with hunters. Statewide harvest estimates for 2019 increased from 2018 estimates for pheasant (*Phasianus colchicus*), dove (*Zenaida macroura*), swamp rabbit (*S. aquaticus*), fall turkey (*Meleagris gallopavo silvestris* and *M. g. intermedia*), woodcock (*Scolopax minor*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), beaver (*Castor canadensis*), river otter (*Lutra canadensis*), crow (*Corvus brachyrhynchos*), cottontail (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), gray squirrel (*S. carolinensis*), , and coyote (*Canis latrans*). Harvest estimates

decreased from 2018 estimates for red fox (*Vulpes fulva,* quail (*Colinus virginianus* and *Callipepla s. quamata*), spring turkey, gray fox *(Urocyon cinereoargenteus),* and jackrabbit (*Lepus californicus*). Prairie chicken (*Tympanuchus cupido* and *T. pallidicinctus*) season remained closed during 2019. A series of human dimensions questions were asked to learn about controlled hunts participation, hunter recruitment, satisfaction with hunted public land, desired ODWC regulation setting and desired management focus and spending on wildlife management areas.

Procedures:
The 2019-season Game Harvest Survey (hereafter referred to as the survey or the Game Harvest Survey) was administered using a mixed-mode methodology (mail and telephone). The methodology for this project was developed as a result of methodological research conducted during the 2014-season survey (Jager 2014), and is a hybrid version of past methodologies. Results are considered comparable from 1986 to present.

A random sample of license holders, stratified by license category, was drawn from the resident database of annual, lifetime, senior and tribal license holders (Table A1). Five-year license holders were sampled with annual license holders. The 2019 survey was the first to analyze tribal license holders. Within annual, lifetime and senior license categories, the sample was further stratified by county of residence. The specific license types included in each general category included "hunting only" and "combination hunting and fishing." The tribal license was split 50/50 between Cherokee and Choctaw license holders.

Based on the sampling scheme above, a sample of 6,000 license holders (1,437 annual/five-year, 1,746 lifetime, and 1,461 senior citizen and 500 Choctaw and 500 Cherokee) was selected for interviewing. A goal of more than 3,000 completed interviews was set for this project. License holders were over-sampled to compensate for declining response rates found in the past few seasons of the Game Harvest Survey.

Contact to sampled hunting license holders was first established in the form of a mail-in survey (Appendix B). The survey was mailed on January 17, 2020. The mailed survey packet included a self-addressed, postage-paid envelope for respondents to use to send in their completed survey.

License holders who did not respond by mail and had telephone numbers listed on their license application were contacted by telephone beginning February 3, 2020. All license holders who had not responded were sent a reminder postcard on February 7, 2020. License holders without telephone numbers were mailed a second survey on February 26, 2020. An analysis was conducted by sending half of the sample a survey with yellow envelopes and the other half a plain white envelope to see if the color made the survey more noticeable. There was a significant difference between the two envelopes with significantly more respondents responding via mail when they received a yellow envelope compared to a white envelope ($p=0.005$)

The ODWC hired 10 contract laborers to collect telephone interview data and data-enter mail surveys. The interviewers were trained to collect data systematically. A computer assisted telephone interview (CATI) system was used. If participants completed the survey by both telephone and mail, telephone interview data were used.

Interviews were conducted Monday through Thursdays between 5:30 p.m. and 9:00 p.m. with some day shifts (between 9:00 a.m. to 4:00 p.m.) on various days each week to catch those respondents not available during evening hours or by appointment. Saturday shifts lasted from 9:00 a.m. to 1:00 p.m. Before a phone number was retired as "over quota," it was attempted at least 6 different times.

Survey participants answered questions regarding their hunting activities during 2019. Individuals that hunted were asked which species they hunted, the number of days they hunted each species, the number of each species harvested, the county which they hunted each species most, and whether they hunted each species on private or public land. Individuals that hunted on public land were asked the number of days they hunted on public land for each species and the number of each species harvested on public land. The harvest portion of the questionnaire was similar to previous years. Information regarding license holder opinion about current wildlife-related issues was also collected. The survey instrument was reviewed by wildlife division regional supervisors, the wildlife division assistant chief and chief. Modifications were incorporated as needed.

Statewide (Figure A1) harvest estimates and public land use were calculated. Hunter and harvest estimates were determined by calculating the proportion of license holders hunting each species and their mean bag for that season. These estimates were extrapolated for all license holders. Differences between categorical variables were detected using the chi-square test. Multiple means were compared using a one-way ANOVA. All tests were considered significant at $P \leq 0.05$.

Results:
Interviews were completed for 41% ($n = 2,447$) of the 5,954 individuals we attempted to contact. The remaining license holders were not interviewed for a variety of reasons:
- Wrong or disconnected number ($n = 1,211$)
- No phone number available (n=1,386)
- "Over quota" after six attempts ($n = 702$)
- Refused to complete the interview ($n = 347$)
- Health issues or deceased ($n = 47$)
- Unavailable during the survey period ($n = 81$)
- Language barrier or hearing impaired ($n = 4$)

The final adjusted response rate was calculated by dividing the number of completed interviews by the number of all eligible individuals. "Eligible individuals" were individuals that could potentially have resulted in completed interviews. After eliminating phone numbers that could not possibly have resulted in completed interviews (deceased license holders, fax numbers, and wrong or disconnected numbers; $n = 1,339$), the final, adjusted survey response rate was 53%.

Fifty-nine percent of the completed surveys were conducted by telephone and 41% by mail. This is in contrast to previous years where mail has typically garnered more responses. To examine the impact of mixed methodology, survey responses were compared between mail and telephone respondents for seven variables. There were no statistically significant differences found between mail and telephone respondents for 2019 deer season participation and dove season participation

($P > 0.05$). Overall hunting participation, public land use, participation in quail season, spring turkey season and licenses held were significantly different ($P<0.05$).

Because the survey methodology included multiple contacts, regardless of invitation method, response-mode and invitation-mode biases were not considered a significant problem in data validity; results were not weighted. The average length of the telephone interviews was 9.9 minutes, with a median time of 6.6 minutes (for complete calls only).

The proportions of license types in the completed survey sample differed from the breakdown of license types in our license holder database. Annual license holders responded in a much higher percentage than they exist in the database (Table A1). We also sampled a higher percentage of annual license holders based on previous year response rates. This, coupled with our new online licensing system, made annual license holders more likely to be successfully contacted for a survey. Another aspect which affects the ability to compare this sample to previous years is the inclusion of tribal license holders. These license holders were included in sampling in years before 2016, but since 2016 have not been sampled and included in statewide estimates. By including them, this increases our overall license population but should give us a clearer picture of actual harvest and participation in individual species seasons across the state. In the future we will continue to sample tribal license holders, and we will adjust our sampling based on responses to this survey.

Harvest Estimates (Tables and Figures in Appendix A)
Number of hunters and game harvest estimates and statistics were calculated statewide (Table A2). Statewide harvest estimates for 2019 increased from 2018 estimates for pheasant (+2%), dove (+28%), swamp rabbit (+380%), fall turkey (+30%), woodcock (+380%), raccoon (+9%), bobcat (+35%), beaver (+735%), river otter (+132%), crow (+36%), cottontail (+80%), fox squirrel (+3%), gray squirrel (+45%), and coyote (+100%). Harvest estimates decreased from 2018 estimates for jackrabbit (-88%), gray fox (-55%), quail (-22%), spring turkey (-3%), and red fox (harvest decreased from 212 in 2018 to 0 in 2019). Prairie chicken season remained closed during 2019. Statewide trends in estimated harvest and number of hunters by species from 1986 to 2019 are presented in Table A4 and Figures A1 – A19.

Small samples sizes have traditionally been a problem for less-popular game seasons. Increasing the sample from previous years improved sub-samples for several species, yet it was still not enough to improve the reliability for certain species.

Game harvest estimates, statistics, and estimated number of hunters for each species were calculated for all public lands collectively (Table A3). The percentage of game harvested on public land ranged from 0% for woodcock to 41% for swamp rabbit. These estimates were limited by small sample sizes. A larger sample would be needed to obtain more reliable estimates of game harvest and hunter numbers on public hunting lands.

Deer hunter participation was assessed. On average, deer hunters spent 16.1 days in the field during the 2019 deer season (Std. Error = 0.33, Table A5). The average number of days spent hunting deer differed by license category ($P < 0.01$). Deer hunters with a lifetime license

averaged 18.5 deer hunting days, annual/five-year license holders averaged 14.9 days, tribal license holders averaged 14.6 days and senior citizen license holders averaged 11.5 days.

The average number of days archery hunters spent in pursuit of deer in 2019 was 8.8 days. Muzzleloader hunters averaged 4.4 days. Youth season hunters averaged 1.8 days. Gun hunters averaged 5.6 days and special antlerless (holiday) season hunters averaged 2.6 days. There was a significant difference found in the number of days hunted by license category during the regular gun season ($P = 0.024$), with lifetime license holders hunting on average 6.0 days, annual license holders 5.3 days, tribal license holders 5.8 days and senior license holders hunting 5.4 days. There was also a significant difference found in the number of days hunted by license category during the muzzleloader and the holiday season ($P = 0.006, 0.003$) with senior license holders hunting the most during muzzleloader (5.7 days) and the holidays season (4.9 days). No differences were found by license type for days spent hunting during archery ($P \geq 0.05$).

Deer hunter success was also examined. On average, deer hunters harvested 0.46 bucks and 0.32 does during all of the 2019 deer seasons, for a total average deer harvest of 0.78 per hunter (Table A6). Harvest differed by deer hunter license category ($P < 0.001$). Lifetime license holders on average harvested 0.97 deer, annual license holders harvested 0.68 deer, senior license holders harvested 0.65 deer and tribal license holders averaged 0.63 deer.

Human Dimensions Issues (Tables and Figures in Appendix B)
Human dimensions questions were designed to help ODWC become more familiar with hunting license holders and understand their hunting preferences. The rates of participation in different hunting seasons were analyzed for the various license holder categories (lifetime, annual/5-year and senior citizen license holders). Use of public land was examined. Several special management questions were also asked.

Hunting Activity
Overall, 63% of participants indicated that they hunted in 2019, but the rate of participation varied significantly according to license type ($P < 0.001$; Figure B1). Senior citizen license holders used their hunting privileges far less often than annual/five-year or lifetime license holders, and tribal license holders were about evenly split between using or not using their hunting privileges. To estimate the number of license holders that actually hunted, the total number of license holders in Table A1 (497,330) was multiplied by the ratio of active hunters interviewed (1,557/2,447). The estimated number of resident license holders who hunted in Oklahoma during 2019 was 315,671.

Rates of participation in the different hunting seasons, overall and by license type, are presented in Table B1. Combining all types of hunting license holders, the most popular season was deer (enjoyed by 53.2% of hunting license holders), followed by dove and turkey (14.0% and 13.9% respectively). Although the ODWC does not manage feral swine (*Sus scrofa*), the ODWC has begun to collect information about feral swine shooting and trapping participation. Feral swine are now tied for third most pursued species by Oklahoma licensed hunters, with 13.9% having spent time shooting or trapping them in 2019.

Land Use
Participants used a variety of land types when hunting different game species. Excluding seasons with small sample sizes, the use of private land exclusively among active hunters was most common for pursuit of dove (82% of dove hunters used only private land), geese (78%) and deer (77%; Figure B2).

Twenty-one percent of survey participants used public land for some portion of their hunting during 2019. As can be seen from Figure B3, this statistic also reflects 36% of participants who did not hunt at all. Focusing only on *active* hunting license holders (those who hunted during 2019), 32% hunted on public land in 2019 and 68% did not. Use of public land by active hunters did not vary by license category ($P \geq .05$).

The problem with either of these approaches to measuring public land use is that they do not portray the *relative* importance of public land to Oklahoma's hunting license holders. A hunter who supplemented private land access with public land hunting once or twice during 2019 carried a weight equal to a hunter who relied on public land exclusively, although the relative importance of public land to those two hunters was probably much different. To more accurately capture the importance of public land, active hunters were asked to indicate how much of their hunting in 2019 occurred on public versus private land. Averaging across all active hunters, 19% of the hunting in 2019 occurred on public land (Figure B4). This measure of public land varied by license category ($P < 0.05$) with tribal license holders spending the most amount of time on public land (26% of hunting in 2019), followed by annual/5-year license holders with 21% of hunting on public land, seniors with 17% on public land and lifetime license holders with 14% on public land.

Looking at the issue from another angle, the majority of active license holders used private land for at least some of their hunting during 2019. Only 8% relied exclusively on public land for hunting.

In general, more public land is available for hunting in the eastern half of Oklahoma than the western half. Similarly, a greater proportion of active hunters said they used public land located in the eastern half of the state than in the western (Figure B6). Active hunters who used public land were asked how satisfied they were with the public land they hunted. Sixty-nine percent reported they were satisfied (Figure B7). Responses did not vary by license category ($P = 0.051$).

Deer Hunting
Deer season is the most popular hunting season in Oklahoma. Fifty-three percent of *all* survey participants and 84% of *active* hunters (those who hunted at all 2019) hunted deer during 2019. Participation in deer season by active hunters in 2019 varied according to license category ($P < 0.001$). Ninety-three percent of active lifetime license holders hunted deer, while 80% of active annual/five-year license holders, 67% of active senior citizen license holders, and 85% of active tribal license holders hunted deer during 2019.

The regular rifle season was the most popular among 2019 deer hunters (83% participating), followed by archery (56%), primitive firearms (37%), special antlerless (holiday) season (15%), and the youth rifle season (3% participating as a youth) (Figure B8). Deer hunter participation in

the individual seasons was analyzed by license type. Archery season participation was most likely for lifetime license holders (62%), followed by tribal license holders (53%), annual license holders (38%) and senior citizen license holders (43%) ($P < 0.05$). Muzzleloader season participation was more likely for lifetime license holders (54%) than tribal license holders (40%), senior citizen license holders (37%) or annual/five-year license holders (22%) ($P < 0.001$). Rifle season participation was equally likely for senior license holders and lifetime license holders (87%), followed by tribal license holders (86%) and annual/five-year license holders (77%) ($P < 0.001$). Special antlerless (holiday) season participation was most likely for lifetime license holders (20%), followed by senior license holders (19%), tribal license holders (12%) and annual/five year license holders (11%) ($P < 0.001$). Youth season participation only varied for tribal license holders as no surveyed tribal license holders participated in the youth season (p=0.04), other license categories did not significantly differ. Tribal licenses are only necessary for those hunters over 16 so it makes sense that tribal license holders would not have participated in a youth season.

Patterns in deer season participation were also examined. Most deer hunters participated in more than one season (58%), and some hunted all four (5%; Figure B8). The most common patterns were participation in gun season only (26%) and participation in the three regular seasons – archery, muzzleloader and gun (17%; Figure B8). Youth deer season participation was not included in this analysis because it only applied to a small portion of surveyed hunters. Examined separately, 89% of youth season participants also hunted deer during other seasons: 73% hunted during rifle season, 54% hunted during archery, 27% hunted during muzzleloader, and 8% hunted during the special antlerless (holiday) deer gun season (Figure B9).

Half (50%) of all deer hunters successfully harvested a deer during the 2019 season (Figure B10). More hunters shot a buck (62.1%) than a doe (37.8%). Less than 1% of hunters filled the annual bag limit of deer for 2019 (six total during archery, youth, muzzleloader and gun seasons, plus one bonus doe allowable during the special antlerless (holiday) season; seven maximum).

An increasing proportion of archery hunters are using crossbows for their hunting. In 2015, 33% of archery hunters used crossbows for all of their archery hunting. That number increased to 40% in 2016, 42% in 2017, 42% in 2018 and went down to 41% in 2019 (Figure B11).

Barriers to Participation
ODWC continues to assess barriers to hunting participation. Thirty-six percent ($n = 881$) of hunting license holders did not hunt in 2019 and were asked to identify the main reason why they did not hunt. Twenty-four percent identified health issues, and another 35% indicated other priorities. Thirteen percent were simply not interested in hunting (Figure B12). The finding of "health concerns" was unsurprising, given that 40% of the inactive hunting license holders were senior citizen license holders. Similarly, the finding of "not interested" was expected, as over the years it has become apparent that many senior citizen license holders purchased the combination hunting and fishing license with no intent to hunt. Tribal licenses are also given as a combination so they may also only be interested in fishing but receive both hunting and fishing privileges. Historically, the cost of a combination license was only slightly greater than the hunting-only or fishing-only license, leading many seniors to buy the combination "just in case" or in the interest

of making a donation to ODWC. ODWC continues to face limitations in the things the agency can directly influence in order to remove barriers to hunting.

Special Management Issues

Controlled Hunts Participation
We asked license holders (both those that hunted and those that did not in 2019) whether or not they had applied for a controlled hunt in the last three years. The vast majority of all license types had not applied in the last three years (Figure B15). Lifetime license holders were more likely than all other license types to apply, possibly because opportunities presented and afforded by controlled hunts are more appealing to avid hunters. This highlights an opportunity to better advertise controlled hunts to less avid hunters.

Of those that said they applied for controlled hunts we asked why they applied. The most popular answer was having the opportunity to hunt in a unique location, followed by a unique species opportunity, and the opportunity to harvest a bonus deer. Fewer hunters applied as a place to take kids to hunt and for the reason of having nowhere else to hunt.

The last question we asked about controlled hunts was for those that had successfully been drawn for a hunt. If they said they had been selected and participated in a controlled hunt, we asked how satisfied they were with their hunt experience (Figure B16). The majority of respondents denoted they were very satisfied with their controlled hunt hunting experience.

Wildlife Management Areas Regulations and Spending
The Wildlife Department's strategic plan highlights one area of need as improving public access to our Wildlife Management Areas (WMAs). As such, we want to know how our current hunters use, or would prefer to use, our WMAs. Some WMAs have different regulations than the rest of the state. We wanted to know if hunters appreciate this or if they see it as a barrier to using WMAs. We asked if they prefer WMAs be managed the same as the rest of the state, if they prefer adjusted seasons and limits depending on characteristics of the WMA or if they have no preference (Figure B17). Currently, most WMAs have adjusted seasons and limits and this doesn't seem to bother current hunters. The majority of license holders said they have no preference on how WMAs are managed. The least selected answer in all license categories was having seasons that follow the rest of the state's dates and limits.

The survey also asked about ODWC spending for WMAs. This question was first asked in 1997. We copied the phrasing of this question so that we could compare responses. We presented hunters with $10 and asked them to allocate that money to either improving land for fish and wildlife or improving the area's infrastructure. The differences between 1997 and 2019 are presented in this report (Figure B18). In 2019, hunters on average wanted to allocate $1.07 more to infrastructure in 2019 compared to 1997 rather than wildlife management.

Finally, with the increasing priority set on improving area infrastructure, we asked hunters what pieces of infrastructure they would prefer we prioritize (Figure B19). Different license types preferred different improvements. First, senior license holders selected the fewest improvements presented. This could be because they are less active, or have less expectations overall for

infrastructure. Annual license holders selected the most often in four out of the six types of infrastructures presented. Notably signage and shooting ranges had comparatively higher levels of annual license holders selecting. This makes sense as less avid hunters would like a place to practice their marksmanship and also would need more signs to be confident in orienting themselves of where to go on our public land. Tribal license holders were higher than other license categories on desiring camping areas and all license categories preferred money be spent on improving roads.

Regulation Setting Priorities
There have been conflicting regulatory proposals aimed at either benefitting nonresidents or reducing opportunities for nonresidents. Although this survey is only sent to resident license holders, we wanted to know hunters' thoughts regarding how much future legislation and hunting regulations should benefit residents compared to non-residents (Figure B20). Forty percent said residents should completely be favored. A combined 46% said that residents should *somewhat* be favored or that there should be an equal focus between residents and non-residents.

Hunter Recruitment
Another focus of the ODWC strategic plan is on hunter recruitment, retention, and reactivation (R3). A campaign by wildlife departments across the country is to encourage current hunters with carrying on the heritage of hunting by taking a new hunter. To see how this is happening in Oklahoma we asked current hunters if they took a new hunter out in 2019 (Figure B21). Out of those that hunted in 2019, 71% did not take a new hunter. When asked why they did not take a new hunter, the most common answer was that they do not know any new hunters (Figure B22). The majority of those that did take a new hunter said that they asked the new hunter to go with them versus the new hunter reaching out to them. Sixty-three percent of those taking a new hunter targeted deer.

The theory of the six stages of hunter development hypothesizes that hunters progress through pretty standard steps: typically younger/newer hunters begin with small game working on their shot and eventually progress to larger game and trophy hunting unique species. Researchers have found that this theory is changing with different preferences for hunting now. We wanted to test this with Oklahoma resident hunters by asking what the first species they recall ever hunting was (Figure B23). We looked at this question by generation classifications (baby boomer (over 56), generation x (41-55), millennials (26-40) and generation z (0-25)). By grouping the species hunted by type of game, there is a clear preference in younger generations to skip over smaller game and start out hunting big game and deer in particular. We also asked about feral pig but the amount of hunters that began with this species in all age groups was insignificant.

Access to Internet
Another question that was asked in 2002 and again in 2020 (we sent the survey in 2020 so the question was asked in 2020 compared to the rest of the questions in this survey which refer to hunting seasons in the previous year) was if our hunters are able to access information from the Wildlife Department online. In both 2002 and 2019 the majority stated they have access to the internet (Figure B24). The percent with access increased significantly from 68% in 2002 to 88% in 2020.

Discussion:

The Game Harvest Survey has been conducted for over 30 years and has provided valuable data for ODWC programs. However, the survey is not without its limitations. For years, ODWC managers and biologists have had reservations about the point estimates resulting from the Game Harvest Survey because the numbers of hunters and harvest estimates were inflated beyond what they felt was realistic. Over-estimation of hunter numbers and game harvest may have stemmed from several sources.

Recall Bias

Another significant source of estimation error was probably recall bias. Participants were asked questions about hunting seasons that may have begun 11 months prior to the interview (e.g., spring turkey). The majority of participants probably did not keep written records of the number of field days and harvest, and responded to questions based on memory. A 1998 mail survey found that participants in a one-day controlled quail hunt over-estimated their quail harvest almost a year after the event (Crews 1999). If hunters had trouble recalling an isolated one-day event, the problems of recall bias were surely magnified when hunters were asked to recall hunting activities for seasons spanning several months, as occurred during the Game Harvest Survey. Recall bias during the Game Harvest Survey might only be addressed by breaking the survey into smaller segments to be conducted throughout the year, immediately following the close of each season. At this time, such a change in methodology is cost prohibitive.

Social Desirability Bias

Yet another source of estimation error could have been social pressure, or the participant's desire to give socially acceptable answers. Participants may have felt uncomfortable admitting that they did not harvest any game, did not hunt very many days, harvested more game than legally allowed, harvested game without a tag, etc.

To minimize bias from social pressure, interviewers are trained to read the questions the same way during each interview, avoid discussion about the question items, and not reveal personal opinions. Although the desire to give socially acceptable answers may significantly impact the results of opinion questions, it is presumed that the effect on harvest data should be consistent from year to year and should not impact the trend data, except perhaps in scale.

It is assumed that respondents participating in the survey over the phone may be more likely to provide socially desirable answers than those participating by mail. This was examined on the 2014-season survey by comparing the percentage of respondents reporting unsuccessful hunts by their mode of response. The percentages of respondents who reported not harvesting, deer, spring turkey and dove were nearly identical for mail and phone responses, suggesting phone surveys may not be any more likely to introduce social desirability bias.

Rounding Bias (Digit Preference)

The exact number of game harvested for species with long seasons and/or large bag limits may have been difficult for participants to remember. For example, when successful hunters reported the number of animals harvested, they often respond with numbers ending in 0 or 5 (Crews 1999, 1998). Rounding bias, or digit preference, may have some unknown influence on harvest estimates. This bias was assessed and confirmed to exist on previous Game Harvest Surveys

(Jager 2014). It is presumed that any bias introduced by the tendency toward rounded numbers is consistent from year to year and should not impact the trend data, except perhaps in scale.

Non-Response Bias
Non-response bias (resulting when the proportion of the sample interviewed does not represent the proportion which could not be interviewed) can be formally addressed by a follow-up study of non-respondents, comparative analysis, and subsequent weighting of the original data if differences are found. Another way to detect non-response bias is to compare the responses of early and late respondents on a few key variables. The presumption is that the people who could not be interviewed (non-respondents) would be more similar to those that were difficult to interview (success after repeated attempts) than those that were successfully interviewed within the first few attempts. This second approach is typically used to assess non-response bias in the Game Harvest Survey; however data were unavailable for this analysis on the 2019-season survey. Past results of the assessment suggested that non-response bias was present on occasion, but not a significant problem.

Sample Size Limitations
The current number of completed surveys ($n = 2{,}447$) is more than adequate to analyze results of questions asked of all respondents (e.g., participation in hunting). A standard sample size of 400 is generally used for populations over 1,000, as the results from a random sample can be reported with 95% confidence at a level of precision of plus or minus 5% (Dillman 2000). Further increasing the sample size does not yield a significant return on investment in reduced sampling error.

However, during the Game Harvest Survey, estimates of hunter numbers and harvest are often calculated from a much smaller sub-sample (e.g., active hunters or participants in a particular season). The overall sample size for the 2019-seasons GHS was doubled from previous years. This helped increase certain sub-sample sizes, however, participant samples of less than 400 were still used for nearly all of the seasons listed in Table A2. Variability in these small samples often yields wide confidence intervals.

The incidence of participation in some seasons is so low that an unrealistic number of completed surveys would be needed to yield a sub-sample size of 400 for estimating harvest. For example, based on 2017 season participation rates, over 10,000 completed surveys would be needed to identify 400 pheasant hunters (3.3% of completed 2017 surveys). For other seasons, almost an entire population census would be necessary (e.g., 1,048 woodcock hunters were estimated to exist statewide in 2017).

Recommendations:
The value of this project in collecting trend data on species harvest outweighs the cost, despite concerns about biases. Within the constraint of budget and time, ODWC should continue to sample at the rate necessary to complete more than 3,000 completed surveys, in order to yield the greatest amount of data possible from active hunters.

Objective 2 - Data Collection and Analysis – Database Development and Management: Construct 1 database of historic hunter information from all existing game harvest survey records and additional relevant data by June 30, 2020.

Accomplishments:

Objective 2: An OSU student hired by ODWC created an online database viewer. The goal was to visualize and share with the public the many years of data ODWC has on wildlife trends and hunter participation. In Fall 2019, ODWC worked with a student to create the platform in Tableau and in May 2020 the database viewer was uploaded to the Wildlife Department website to share with the public. Data will be added to the viewer as it becomes available.

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Equipment:
None.

Significant Deviation:
None.

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APPENDIX A

Harvest Estimates – Tables and Graphs

Table A1. Distribution of license types for Game Harvest Survey population (Oklahoma resident hunting license holders), sample, and completed surveys, 2019.

LICENSE TYPE	Population		Sampled		Completed	
	Number	Percent	Number	Percent	Number	Percent
Lifetime						
Hunting	40,366	11.1	412	8.3	182	8.6
Combination	116,269	32.0	1,303	26.3	557	26.2
Hunting Over 60	542	0.1	9	0.2	2	0.1
Combination Over 60	1,931	0.5	22	0.4	7	0.3
Subtotal	*159,108*	43.8	*1,746*	35.2	*748*	35.2
Senior Citizen						
Hunting	2,481	0.7	31	0.6	15	0.7
Combination	121,257	33.4	1,430	28.9	426	20.0
Subtotal	*123,738*	34.1	*1,461*	29.5	*441*	20.8
Annual						
Hunting	34,012	9.4	904	18.2	488	23.0
Hunting Fiscal Year (FY)	6,206	1.7	168	3.4	81	3.8
Combination	13,360	3.7	180	3.6	112	5.3
Combination FY	2,877	0.8	49	1.0	28	1.3
Youth Hunting	3,009	0.8	82	1.7	42	2.0
Youth Hunting FY	751	0.2	20	0.4	7	0.3
Youth Combination	1,428	0.4	25	0.5	12	0.6
Youth Combination FY	737	0.2	9	0.2	5	0.2
Subtotal	*62,380*	17.2	*1,437*	29.0	*775*	36.5
Five-Year						
Hunting	5,084	1.4	135	2.7	72	3.4
Combination	12,628	3.5	176	3.6	89	4.2
Subtotal	*17,712*	4.9	*311*	6.3	*161*	7.6
Tribal						
Choctaw	13,943	10.4	500	0.5	209	64.9
Cherokee	120,449	89.6	500	0.5	113	35.1
Subtotal	*134,392*		*1,000*		*322*	
Total	**497,330**		**5,955**		**2,447**	

Table A2. Statewide hunter and game harvest estimates and statistics by species/subspecies in Oklahoma, 2019.

SPECIES/SEASON	SAMPLE	MEAN BAG/ HUNTER	MEAN DAYS HUNTED	MEAN DAILY BAG	NUMBER OF HUNTERS	NUMBER OF DAYS HUNTED	TOTAL HARVEST	95% CONFIDENCE INTERVAL FOR TOTAL HARVEST	
Crow	42	12.54	5.21	3.25	8,536	44,432	107,014	55,615 −	158,413
Dove	345	18.42	4.78	4.60	70,118	335,419	1,291,703	1,026,624 −	1,556,781
Furbearers	170	.	.	.	34,551[a]	.	225,459[b]	.	.
Coyote	140	5.23	23.45	0.49	28,454	667,369	148,915	80,452 −	217,377
Bobcat	38	1.84	13.11	0.27	7,723	101,236	14,194	6,332 −	22,056
Raccoon	51	4.82	31.25	0.58	10,365	323,915	49,923	32,778 −	67,067
Beaver	13	3.86	37.79	0.94	2,642	99,835	10,191	3,272 −	17,110
Gray Fox	6	0.50	27.17	0.09	1,219	33,128	610	0 −	1,426
Red Fox	2	0.00	1.00	0.00	406	406	0	0 −	0
Otter	5	1.60	7.20	0.47	1,016	7,317	1,626	0 −	3,362
Pheasant	61	3.70	3.77	1.73	12,398	46,698	45,871	28,523 −	63,220
Quail	120	6.54	5.95	1.71	24,389	145,027	159,415	116,162 −	202,668
Rabbits	100	.	.	.	20,324[a]	.	125,806[b]	.	.
Cottontail	92	5.88	6.85	1.19	18,698	128,156	109,852	71,755 −	147,949
Jackrabbit	5	0.50	1.50	0.25	1,016	1,524	508	0 −	1,399
Swamp Rabbit	17	4.47	5.38	0.95	3,455	18,571	15,446	2,473 −	28,419
Squirrels	234	.	.	.	47,558[a]		527,428[b]	.	.
Fox Squirrel	188	6.55	9.61	0.96	38,209	367,059	250,209	201,602 −	298,816
Gray Squirrel	174	7.86	9.69	1.16	35,364	342,678	277,219	223,162 −	332,675
Turkeys	342	.	.	.	69,508[a]	.	25,742[b]	.	.
Fall Turkey	88	0.27	6.87	0.11	17,885	122,882	4,878	2,298 −	7,457
Spring Turkey	310	0.33	5.29	0.10	63,005	333,054	20,864	16,615 −	25,112
Woodcock	3	1.33	1.00	1.33	610	610	813	0 −	1,867
Feral Swine	342				69,508[a]		1,215,353[b]		
Shooting	321	12.23	28.83	0.94	65,240	1,880,556	798,148	575,125 −	1,021,170
Trapping	62	33.11	101.18	1.91	12,601	1,274,943	417,205	241,050 −	593,360

[a]Estimated number of hunters that hunted at least one species/subspecies within a given season.
[b]Estimated total harvest within a given season.

Table A3. Hunter and game harvest estimates and statistics for all public hunting land in Oklahoma, 2019.

SPECIES/SEASON	SAMPLE	MEAN BAG/ HUNTER	MEAN DAYS HUNTED	MEAN DAILY BAG	NUMBER OF HUNTERS	NUMBER OF DAYS HUNTED	TOTAL HARVEST	% OF STATEWIDE HARVEST	95% CONFIDENCE INTERVAL FOR TOTAL HARVEST
Crow	11	9.10	4.91	2.78	2,236	10,975	20,344	19.0	635 – 40,053
Dove	60	8.55	4.48	2.88	12,194	54,672	104,284	8.1	65,425 – 143,142
Pheasant	15	1.29	2.07	0.54	3,049	6,315	3,920	8.5	421 – 7,418
Quail	38	3.15	4.16	0.89	7,723	32,145	24,305	15.2	10,308 – 38,303
Rabbits: Cottontail	28	5.67	6.12	0.99	5,691	34,801	32,248	29.4	3,691 – 60,804
Jackrabbit	2	0.00	1.50	0.00	406	610	.	0.0	. – .
Swamp Rabbit	10	3.10	6.00	0.58	2,032	12,194	6,300	41.0	1,424 – 11,177
Squirrels: Fox	73	5.96	10.24	0.91	14,837	151,918	88,393	35.3	63,982 – 112,803
Gray	76	6.76	8.86	1.14	15,446	136,901	104,477	37.7	71,674 – 137,280
Turkey: Fall	25	0.21	8.04	0.08	5,081	40,860	1,059	21.7	0 – 2,369
Spring	87	0.27	5.06	0.07	17,682	89,488	4,841	23.2	0 – 10,201
Woodcock	0	.	.	.	.	.	.	0.0	. – .

Table A4. Statewide trends in estimated harvest and estimated number of hunters in Oklahoma, 1986-2019.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Crow	1986	12,398	18.55	5.15	3.60	229,979	142,439	–	317,519
	1987	13,987	14.07	12.25	1.15	196,744	109,783	–	283,705
	1988	6,711	14.45	6.45	2.24	96,957	55,851	–	138,063
	1989	8,467	17.08	4.05	4.21	144,601	56,951	–	232,252
	1990	7,675	16.64	5.79	2.86	127,678	65,706	–	189,650
	1991	6,518	19.77	7.32	2.94	128,893	70,572	–	187,214
	1992	6,197	12.77	4.82	2.84	79,150	36,475	–	121,826
	1993	7,654	22.22	8.56	3.57	170,054	70,368	–	269,740
	1994	5,309	24.58	4.10	4.86	130,501	41,608	–	219,394
	1995	6,756	22.30	5.18	3.85	150,683	53,458	–	247,909
	1996	13,958	20.87	5.69	3.94	291,375	190,710	–	392,041
	1997	9,900	36.28	7.41	3.29	359,196	87,504	–	630,888
	1998	11,861	23.74	7.88	3.04	281,628	172,534	–	390,722
	1999	12,318	15.16	7.25	3.55	186,684	133,942	–	239,426
	2000	16,692	28.54	6.38	3.97	476,319	174,552	–	778,086
	2001	13,328	40.12	8.00	3.44	534,702	33,840	–	1,035,565
	2002	15,221	23.52	6.95	3.54	358,009	179,811	–	536,206
	2003	17,627	21.11	7.91	4.18	372,186	255,519	–	488,854
	2004	12,209	12.59	5.10	2.94	153,766	88,743	–	218,790
	2005	12,353	20.55	7.00	3.90	253,837	144,478	–	363,196
	2006	11,616	38.68	12.61	3.29	449,351	183,569	–	715,134
	2007	9,536	24.95	8.09	4.01	237,882	94,337	–	381,427
	2008	9,359	18.45	8.21	2.57	172,655	73,100	–	272,210
	2009	10,856	18.26	8.62	3.74	198,224	93,397	–	303,052
	2010	9,763	10.30	11.93	1.93	100,562	62,208	–	138,915
	2011	10,728	19.49	6.62	4.59	209,039	90,600	–	327,478
	2012	9,369	15.17	9.78	2.32	142,145	61,829	–	222,462
	2013	8,867	15.55	5.71	3.43	137,838	82,795	–	192,881
	2014	7,984	11.17	5.99	3.07	89,216	56,084	–	122,348
	2015	6,688	15.15	8.05	2.50	101,292	16,261	–	186,322
	2016	8,064	17.54	7.81	3.12	141,443	52,808	–	230,078
	2017	9,432	11.17	4.70	3.79	105,371	50,853	–	159,889
	2018	6,609	11.90	4.05	3.16	78,646	13,738	–	143,553
	2019	8,536	12.54	5.21	3.25	107,014	55,615	-	158,413

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Dove	1986	73,973	28.00	6.25	4.48	2,071,048	1,771,207	–	2,370,889
	1987	78,325	25.13	5.91	4.25	1,968,139	1,668,916	–	2,267,362
	1988	71,966	23.74	5.96	3.98	1,708,665	1,475,536	–	1,941,794
	1989	59,044	20.66	4.99	4.14	1,219,640	1,049,482	–	1,389,799
	1990	65,583	26.72	5.66	4.86	1,752,372	1,464,888	–	2,039,856
	1991	60,142	24.43	5.53	4.69	1,469,351	1,276,161	–	1,662,541
	1992	61,828	23.26	5.18	4.80	1,437,806	1,249,094	–	1,626,519
	1993	48,706	19.64	5.33	4.33	956,451	825,859	–	1,087,044
	1994	61,483	22.66	5.50	4.37	1,393,209	1,157,469	–	1,628,949
	1995	59,598	17.52	4.54	4.14	1,044,286	900,397	–	1,188,176
	1996	64,959	18.05	4.71	4.56	1,172,345	1,016,774	–	1,327,916
	1997	60,666	18.78	4.70	4.58	1,139,192	1,016,289	–	1,262,095
	1998	62,562	23.97	5.12	5.98	1,499,400	1,307,724	–	1,691,076
	1999	69,527	20.32	5.04	4.68	1,413,132	1,254,042	–	1,572,222
	2000	75,116	26.04	6.01	4.71	1,956,043	1,672,467	–	2,239,619
	2001	69,507	20.25	5.11	4.65	1,407,192	1,240,641	–	1,573,742
	2002	73,379	24.60	5.48	4.96	1,804,942	1,570,543	–	2,039,340
	2003	69,844	25.31	5.89	4.83	1,767,431	1,432,089	–	2,102,773
	2004	65,621	23.34	5.36	5.00	1,531,717	1,314,727	–	1,748,707
	2005	53,430	23.30	5.88	5.07	1,244,858	1,067,456	–	1,422,260
	2006	61,700	25.72	5.50	5.36	1,586,916	1,323,873	–	1,849,959
	2007	53,470	21.47	5.78	4.67	1,147,814	944,320	–	1,351,307
	2008	49,537	21.95	5.03	5.14	1,087,404	925,280	–	1,249,528
	2009	57,945	23.31	5.59	4.75	1,350,721	1,160,476	–	1,540,966
	2010	48,976	23.58	4.91	5.08	1,154,651	803,429	–	1,505,873
	2011	49,670	21.04	4.67	5.12	1,044,986	888,392	–	1,201,580
	2012	50,505	24.37	5.21	5.02	1,230,761	898,432	–	1,563,089
	2013	57,392	25.77	4.97	4.90	1,479,101	1,075,013	–	1,883,189
	2014	59,297	22.39	4.98	5.18	1,327,749	1,184,961	–	1,469,966
	2015	45,330	23.49	5.10	4.97	1,064,832	918,750	–	1,210,915
	2016	58,569	23.49	4.83	5.68	1,375,710	898,531	–	1,852,889
	2017	62,619	30.24	6.43	7.43	1,893,421	1,241,116	–	2,545,727
	2018	52,193	19.35	4.48	5.11	1,009,704	824,468	–	1,194,940
	2019	70,118	18.42	4.78	4.60	1,291,703	1,026,624	-	1,556,781

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Pheasant	1986	20,043	4.12	4.16	0.99	82,652	60,345	–	104,959
	1987	19,348	3.01	3.83	0.79	58,277	46,072	–	70,482
	1988	16,429	3.27	3.35	0.98	53,769	40,807	–	66,731
	1989	15,819	3.00	3.56	0.84	47,458	37,129	–	57,787
	1990	16,280	2.89	3.21	1.07	46,978	33,790	–	60,166
	1991	13,775	2.95	4.01	0.94	40,586	30,920	–	50,253
	1992	16,478	4.00	4.71	1.05	65,912	47,535	–	84,288
	1993	18,787	3.55	5.19	0.97	66,658	54,001	–	79,315
	1994	16,441	2.96	3.71	0.94	48,638	36,766	–	60,510
	1995	17,131	3.13	4.37	0.90	53,566	38,927	–	68,205
	1996	13,690	2.84	3.80	0.98	38,922	27,664	–	50,179
	1997	15,195	3.89	4.36	1.17	59,170	47,167	–	71,173
	1998	13,946	3.86	4.24	1.02	53,830	39,450	–	68,210
	1999	18,203	4.06	5.20	1.15	73,907	59,268	–	88,546
	2000	22,592	5.32	7.14	0.91	120,203	86,005	–	154,401
	2001	16,194	4.52	4.42	0.94	73,233	37,037	–	109,429
	2002	14,740	3.89	4.55	1.41	57,358	35,876	–	78,840
	2003	20,621	4.76	4.77	1.26	98,114	77,301	–	118,927
	2004	21,823	3.79	3.38	1.36	82,713	65,053	–	100,373
	2005	19,348	5.02	3.87	1.56	97,037	72,896	–	121,178
	2006	17,047	4.17	3.65	1.30	71,053	52,350	–	89,756
	2007	18,391	4.39	3.54	1.37	80,783	63,519	–	98,046
	2008	18,072	4.25	4.61	1.18	76,807	60,512	–	93,102
	2009	18,924	6.06	3.81	1.63	114,725	83,682	–	145,769
	2010	19,366	4.57	3.82	1.39	88,440	65,260	–	111,621
	2011	12,344	3.86	3.48	1.20	47,613	34,745	–	60,481
	2012	11,711	2.29	3.14	0.91	26,789	18,965	–	34,614
	2013	10,640	3.26	3.45	1.08	34,661	25,063	–	44,259
	2014	10,887	2.64	2.95	1.09	28,741	20,824	–	36,658
	2015	10,616	3.20	2.95	1.27	33,950	26,496	–	41,404
	2016	13,157	3.67	3.62	1.39	48,241	32,215	–	61,268
	2017	11,790	3.36	3.31	1.19	39,039	18,774	–	60,351
	2018	10,506	4.29	4.26	1.12	45,076	23,812	–	66,340
	2019	12,398	3.70	3.77	1.73	45,871	28,523	-	63,220

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Quail	1986	110,960	24.43	7.06	3.46	2,711,186	2,352,252	–	3,070,119
	1987	120,517	26.90	7.51	3.58	3,242,080	2,800,473	–	3,683,687
	1988	97,651	20.61	7.08	2.91	2,012,172	1,701,565	–	2,322,779
	1989	92,465	23.57	7.05	3.34	2,179,840	1,805,160	–	2,554,520
	1990	93,026	24.26	7.46	3.04	2,256,571	1,892,142	–	2,621,000
	1991	98,268	32.98	9.85	3.35	3,240,764	2,846,242	–	3,635,286
	1992	94,079	35.38	8.58	3.86	3,328,404	2,861,486	–	3,795,323
	1993	90,733	22.19	8.31	2.60	2,013,098	1,778,982	–	2,247,214
	1994	84,089	27.44	9.35	2.64	2,307,057	1,976,583	–	2,637,532
	1995	68,646	14.42	6.86	2.15	990,118	836,199	–	1,144,036
	1996	72,743	18.18	7.14	2.58	1,322,260	1,141,940	–	1,502,580
	1997	60,551	24.66	8.01	2.96	1,493,212	1,256,216	–	1,730,208
	1998	60,477	17.34	6.83	2.54	1,048,878	894,731	–	1,203,026
	1999	59,263	17.35	7.54	2.20	1,028,316	836,071	–	1,220,561
	2000	53,243	21.50	8.61	2.75	1,144,868	930,191	–	1,359,544
	2001	38,838	9.43	6.46	1.71	366,289	291,121	–	441,458
	2002	49,507	15.58	6.51	2.41	771,218	645,620	–	896,815
	2003	50,221	17.44	6.68	2.66	875,614	665,353	–	1,085,875
	2004	42,577	24.03	6.62	3.31	1,023,086	834,117	–	1,212,056
	2005	41,524	20.66	6.64	3.25	857,856	681,772	–	1,033,939
	2006	34,395	16.85	5.82	2.64	579,436	421,911	–	736,962
	2007	28,949	13.32	5.61	2.63	385,467	282,172	–	488,762
	2008	31,142	15.28	7.34	2.58	475,850	373,848	–	577,852
	2009	30,659	12.25	5.55	2.22	375,653	289,321	–	461,985
	2010	28,169	13.61	5.94	2.53	383,265	232,279	–	534,251
	2011	17,341	6.30	5.67	1.37	109,186	75,774	–	142,599
	2012	16,396	7.75	5.60	1.69	127,067	89,421	–	164,713
	2013	14,187	8.23	5.36	1.80	116,719	80,308	–	153,130
	2014	20,758	12.43	4.96	2.71	258,081	208,869	–	307,293
	2015	20,276	20.19	6.02	3.42	409,284	276,416	–	542,152
	2016	29,072	17.57	6.34	2.87	510,807	372,263	–	649,351
	2017	30,655	14.33	5.91	2.95	439,291	341,199	–	537,384
	2018	21,352	9.56	6.18	1.58	204,108	147,507	–	260,710
	2019	24,389	6.54	5.95	1.71	159,415	116,162	-	202,668

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Cottontail Rabbit	1986	73,560	10.70	7.07	1.51	787,052	658,305	–	915,798
	1987	78,558	14.37	7.39	1.94	1,128,714	678,501	–	1,578,926
	1988	66,181	9.38	8.45	1.11	621,080	512,259	–	729,902
	1989	49,686	9.24	7.23	1.28	459,203	370,984	–	547,423
	1990	57,909	9.24	7.17	1.57	534,898	431,376	–	638,420
	1991	53,746	12.00	7.6	1.77	645,201	488,080	–	802,322
	1992	44,786	8.49	5.84	1.81	280,260	320,761	–	439,759
	1993	35,903	8.99	7.15	1.47	322,714	256,101	–	389,326
	1994	39,219	7.89	6.94	1.45	309,469	249,874	–	369,063
	1995	37,761	7.01	5.95	1.38	264,812	222,666	–	306,957
	1996	43,351	8.56	6.37	1.58	370,963	305,406	–	436,520
	1997	31,772	10.37	7.88	1.62	329,463	264,429	–	396,497
	1998	36,625	9.95	7.92	1.53	364,426	293,158	–	435,695
	1999	35,311	7.42	6.04	1.46	261,880	195,480	–	328,280
	2000	45,616	9.25	7.24	1.80	422,095	356,135	–	488,055
	2001	31,959	13.45	7.25	1.78	429,797	221,176	–	638,417
	2002	31,403	8.39	7.35	1.51	263,397	194,256	–	332,538
	2003	30,598	8.85	10.62	1.46	270,869	221,939	–	319,800
	2004	21,975	10.01	8.55	1.40	219,907	146,217	–	293,596
	2005	23,962	12.09	6.61	1.71	289,772	111,813	–	467,730
	2006	21,572	14.81	8.58	1.59	319,483	169,745	–	469,222
	2007	18,391	7.76	8.81	1.39	142,700	94,777	–	190,624
	2008	19,202	6.78	8.59	1.39	130,217	92,611	–	167,824
	2009	25,672	7.47	7.01	1.53	191,643	149,663	–	233,623
	2010	20,167	6.90	7.29	1.50	139,247	101,532	–	176,961
	2011	18,957	7.81	8.67	1.30	147,982	113,594	–	182,371
	2012	16,981	6.89	6.45	1.26	116,966	86,617	–	147,315
	2013	17,089	7.43	6.21	1.27	126,944	75,628	–	178,261
	2014	19,596	8.04	6.21	1.53	157,648	120,011	–	195,284
	2015	16,667	6.49	5.73	1.72	108,119	83,309	–	132,929
	2016	19,098	7.16	8.27	1.66	136,762	107,591	–	165,933
	2017	17,030	7.10	5.67	1.72	120,887	83,517	–	158,257
	2018	13,726	4.44	6.25	0.97	60,986	41,210	–	80,761
	2019	18,698	5.88	6.85	1.19	109,852	71,755	-	147,949

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Jackrabbit	1986	6,612	7.06	6.97	1.01	46,698	5,716	–	87,681
	1987	7,926	4.62	6.35	0.73	36,598	8,927	–	64,269
	1988	2,314	4.00	3.50	1.14	9,256	1,850	–	16,662
	1989	2,005	0.78	7.44	0.10	1,560	128	–	2,991
	1990	2,326	3.00	3.67	0.67	6,977	1,541	–	12,413
	1991	2,583	7.71	5.71	0.88	19,924	0	–	41,977
	1992	1,268	4.89	8.89	0.41	6,197	0	–	17,124
	1993	2,227	4.12	5.75	0.95	9,185	2,580	–	15,790
	1994	1,199	1.14	1.86	0.67	1,370	0	–	3,318
	1995	603	2.20	1.60	1.20	1,327	0	–	3,644
	1996	805	0.50	21.67	0.33	403	0	–	942
	1997	1,151	2.60	3.20	1.01	2,993	1,481	–	4,505
	1998	912	6.29	12.29	0.54	5,735	666	–	10,804
	1999	1,506	2.00	3.82	0.83	3,011	432	–	5,590
	2000	1,151	3.38	7.13	0.54	3,885	0	–	9,411
	2001	1,433	2.10	7.10	0.40	3,010	856	–	5,163
	2002	1,762	1.09	3.55	0.47	1,923	490	–	3,355
	2003	998	1.50	5.17	0.41	1,497	3	–	2,990
	2004	1,679	4.55	3.91	1.41	7,630	3,779	–	11,482
	2005	1,191	4.13	7.25	0.94	4,911	1,056	–	8,767
	2006	1,961	7.08	8.08	1.19	13,879	0	–	28,118
	2007	1,533	6.44	2.78	3.00	9,877	2,315	–	17,438
	2008	1,291	5.00	12.13	1.64	6,454	1,673	–	11,236
	2009	2,054	29.00	15.57	1.29	59,559	0	–	127,281
	2010	1,601	3.30	4.70	0.66	5,282	443	–	10,120
	2011	882	27.33	26.67	1.75	24,100	0	–	66,544
	2012	1,025	0.43	3.86	0.29	439	0	–	1,036
	2013	1,773	1.55	6.18	0.46	2,741	427	–	5,054
	2014	1,524	0.89	3.72	0.28	1,364	0	–	2,945
	2015	849	5.56	4.11	0.92	4,718	0	–	10,113
	2016	1,061	3.20	6.60	0.94	3,395	0	–	6,961
	2017	1,310	3.60	9.20	0.77	4,716	0	–	10,016
	2018	1,186	3.43	2.67	1.68	4,067	1,249	–	6,885
	2019	1,016	0.50	1.50	0.25	508	0	-	1,399

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Swamp Rabbit	1986	8,885	7.53	7.37	1.02	66,948	36,672	–	97,224
	1987	12,122	3.85	7.62	0.51	46,622	30,227	–	63,016
	1988	10,876	4.23	9.02	0.47	46,049	32,353	–	59,744
	1989	12,032	4.13	10.22	0.40	49,686	31,287	–	68,084
	1990	9,535	5.68	8.80	0.70	54,187	23,908	–	84,466
	1991	10,454	7.45	10.60	0.96	77,852	41,742	–	113,962
	1992	8,028	9.75	10.21	1.28	78,305	35,583	–	121,027
	1993	9,045	7.31	9.32	0.83	66,101	43,944	–	88,259
	1994	7,535	6.11	7.57	0.96	46,069	28,701	–	63,438
	1995	7,721	5.95	8.22	0.78	45,965	27,923	–	64,007
	1996	10,737	3.66	6.21	0.69	39,324	23,196	–	55,452
	1997	5,641	6.33	8.53	0.81	35,686	19,760	–	51,612
	1998	7,560	5.76	10.19	0.90	43,533	29,328	–	57,738
	1999	6,980	5.80	10.24	0.93	40,512	27,075	–	53,950
	2000	5,036	3.94	8.29	0.69	19,858	12,309	–	27,407
	2001	7,309	4.36	9.24	0.83	31,867	21,768	–	41,966
	2002	4,486	3.57	9.39	0.78	16,022	8,368	–	23,676
	2003	5,820	9.91	19.11	0.68	57,690	23,946	–	91,433
	2004	3,357	6.36	5.33	0.65	21,365	775	–	41,955
	2005	2,977	3.70	6.51	0.62	11,013	4,333	–	17,694
	2006	3,319	6.05	21.00	0.50	20,064	10,216	–	29,912
	2007	2,725	2.88	24.25	0.34	7,833	3,060	–	12,607
	2008	2,420	5.73	9.40	0.69	13,877	7,081	–	20,673
	2009	2,347	4.19	10.47	0.52	9,829	4,021	–	15,636
	2010	3,041	2.74	11.05	0.59	8,323	3,250	–	13,395
	2011	2,645	5.50	12.28	0.51	14,548	6,908	–	22,188
	2012	2,489	3.24	9.00	0.69	8,051	4,072	–	12,031
	2013	2,418	8.20	8.27	0.92	19,829	3,520	–	36,138
	2014	2,250	5.35	6.30	0.91	12,048	5,338	–	18,758
	2015	1,592	2.14	4.69	0.61	3,412	945	–	5,879
	2016	2,334	2.40	7.64	0.67	5,602	966	–	10,238
	2017	2,358	11.86	13.50	1.13	27,960	4,020	–	51,899
	2018	1,695	1.90	3.80	0.45	3,220	0	–	6,630
	2019	3,455	4.47	5.38	0.95	15,446	2,473	-	28,419

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Fox Squirrel	1986	57,856	10.95	8.68	1.26	633,526	523,349	–	743,704
	1987	73,662	12.67	11.22	1.13	933,602	727,904	–	1,139,300
	1988	65,718	11.65	9.22	1.26	765,706	604,072	–	927,340
	1989	59,489	13.61	9.89	1.38	809,727	673,544	–	945,910
	1990	54,187	11.30	10.98	1.25	612,342	463,989	–	760,695
	1991	49,934	12.43	9.66	1.37	620,849	467,251	–	774,448
	1992	38,167	12.49	9.09	1.58	476,593	371,000	–	582,186
	1993	37,156	12.82	9.27	1.55	476,486	391,293	–	561,679
	1994	41,788	15.73	11.18	1.64	657,300	507,640	–	806,959
	1995	45,000	12.09	8.22	1.69	544,221	444,539	–	643,902
	1996	53,551	11.84	10.43	1.60	633,976	527,694	–	740,258
	1997	42,248	12.05	10.75	1.50	509,281	416,914	–	601,648
	1998	46,661	14.73	11.74	1.80	687,108	560,613	–	813,604
	1999	41,607	10.67	9.26	1.40	444,038	366,757	–	521,319
	2000	46,911	11.79	8.85	1.66	553,236	447,442	–	659,029
	2001	39,411	16.40	11.30	1.46	646,228	344,774	–	947,681
	2002	41,336	9.07	9.93	1.42	374,769	316,121	–	433,418
	2003	41,906	11.57	12.71	1.27	484,749	406,934	–	562,564
	2004	34,489	13.13	12.61	1.34	452,690	264,873	–	640,507
	2005	38,249	12.26	10.17	1.60	469,002	388,729	–	549,276
	2006	36,054	21.85	13.33	1.57	787,745	188,944	–	1,386,546
	2007	32,355	9.53	11.12	1.25	308,390	254,067	–	362,713
	2008	32,433	10.85	12.95	1.43	351,926	287,011	–	416,841
	2009	33,593	11.99	12.54	1.40	402,825	308,350	–	497,299
	2010	32,011	14.69	13.51	1.44	470,188	147,961	–	792,414
	2011	31,448	14.49	11.23	1.30	455,624	157,811	–	753,437
	2012	31,181	10.67	11.70	1.25	332,649	257,327	–	407,971
	2013	29,180	7.53	8.47	1.26	219,821	178,286	–	261,355
	2014	29,975	9.27	12.21	1.27	277,823	226,013	–	329,634
	2015	28,132	7.29	9.11	1.10	205,010	167,161	–	242,858
	2016	30,557	11.09	9.71	1.20	338,809	220,525	–	457,093
	2017	29,607	10.42	9.17	1.24	271,535	209,442	–	333,627
	2018	29,486	8.27	10.98	1.34	243,960	174,411	–	313,508
	2019	38,209	6.55	9.61	0.96	250,209	201,602	-	298,816

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Gray Squirrel	1986	45,458	10.87	10.14	1.07	494,258	383,057	–	605,459
	1987	53,149	14.36	11.93	1.20	763,199	573,765	–	952,633
	1988	39,570	9.27	9.85	0.94	367,002	259,805	–	474,199
	1989	43,002	17.21	11.08	1.55	740,162	288,418	–	1,191,906
	1990	41,164	11.53	12.78	1.10	474,664	307,081	–	642,246
	1991	38,742	14.04	10.31	1.30	543,981	381,217	–	706,745
	1992	26,759	12.21	10.44	1.37	326,601	246,865	–	406,338
	1993	28,667	12.39	9.73	1.46	355,138	284,629	–	425,647
	1994	28,943	16.20	12.47	1.49	468,741	334,001	–	603,482
	1995	33,056	10.58	8.42	1.37	349,744	278,775	–	420,714
	1996	43,082	12.56	10.35	1.44	541,144	417,513	–	664,776
	1997	34,074	13.58	11.73	1.48	462,653	340,049	–	585,256
	1998	36,886	15.80	12.22	1.67	582,978	429,766	–	736,191
	1999	32,984	11.24	8.67	1.50	370,729	274,683	–	466,775
	2000	37,270	10.85	8.33	1.63	404,395	323,112	–	485,678
	2001	32,102	27.64	11.68	1.70	887,334	131,722	–	1,642,946
	2002	32,524	12.85	8.08	1.69	417,797	305,531	–	530,062
	2003	34,257	11.84	11.25	1.39	405,759	323,635	–	487,883
	2004	28,080	15.57	13.15	1.54	437,241	258,660	–	615,822
	2005	29,915	21.27	10.78	2.63	636,397	321,275	–	951,519
	2006	30,020	31.32	13.64	1.72	940,381	149,264	–	1,731,497
	2007	25,713	25.25	12.29	1.45	649,304	0	–	1,319,893
	2008	28,238	12.94	13.51	1.56	365,319	282,518	–	448,120
	2009	29,633	10.19	10.68	1.16	301,836	226,912	–	376,759
	2010	27,209	12.87	12.19	1.22	350,176	255,386	–	444,967
	2011	24,982	15.96	10.43	1.37	398,673	105,095	–	692,250
	2012	23,569	12.77	12.01	1.31	300,979	225,288	–	376,670
	2013	21,603	8.19	9.27	1.12	176,882	131,725	–	222,039
	2014	24,822	11.41	12.23	1.32	277,823	226,013	–	329,634
	2015	24,629	8.82	9.56	1.11	217,124	175,438	–	258,811
	2016	27,799	11.02	12.02	1.48	306,471	212,971	–	399,970
	2017	24,890	12.13	10.80	1.34	301,797	211,694	–	391,900
	2018	25,927	7.39	10.91	1.12	191,475	139,676	–	243,275
	2019	35,364	7.86	9.69	1.16	277,919	223,162	-	332,675

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Turkey: Fall[a]	1986	25,607	0.42	4.56	0.09	10,755	.	–	.
	1987	24,568	0.39	3.99	0.10	9,589	.	–	.
	1988	21,057	0.24	3.34	0.07	5,054	.	–	.
	1989	18,199	0.30	4.08	0.07	5,460	.	–	.
	1990	19,574	0.24	3.92	0.10	4,698	.	–	.
	1991	20,049	0.34	3.68	0.19	6,817	.	–	.
	1992	16,247	0.35	3.33	0.20	5,687	.	–	.
	1993	12,664	1.10	4.11	0.27	13,930	.	–	.
	1994	11,746	0.21	6.21	0.10	2,467	.	–	.
	1995	13,150	0.19	9.28	0.08	2,557	1,571	–	3,543
	1996	19,863	0.22	6.81	0.10	4,429	3,092	–	5,766
	1997	17,267	0.26	6.78	0.14	4,434	3,214	–	5,653
	1998	17,596	0.27	5.13	0.15	4,763	3,429	–	6,096
	1999	21,625	0.25	4.59	0.15	5,406	3,392	–	6,880
	2000	20,434	0.26	4.49	0.13	5,217	3,741	–	6,693
	2001	21,354	0.22	5.99	0.11	4,617	3,196	–	6,038
	2002	27,557	0.35	5.27	0.16	9,669	7,692	–	11,646
	2003	27,605	0.26	6.79	0.14	7,151	5,305	–	8,996
	2004	28,690	0.34	5.06	0.18	9,614	7,673	–	11,555
	2005	22,920	0.37	4.40	0.20	8,483	6,730	–	10,237
	2006	22,628	0.28	6.99	0.13	6,336	4,705	–	7,967
	2007	16,688	0.21	8.88	0.12	3,576	2,213	–	4,939
	2008	20,977	0.20	8.28	0.07	4,195	2,747	–	5,643
	2009	22,444	0.32	7.11	0.14	7,188	5,523	–	8,853
	2010	20,967	0.26	8.67	0.12	5,442	3,862	–	7,022
	2011	16,753	0.32	9.31	0.15	5,290	3,855	–	6,726
	2012	17,860	0.25	9.77	0.08	4,538	3,153	–	5,924
	2013	16,927	0.20	6.46	0.08	3,385	2,084	–	4,687
	2014	20,467	0.27	7.12	0.12	5,600	4,336	–	6,865
	2015	12,421	0.19	9.27	0.10	2,421	1,529	–	3,313
	2016	20,372	0.22	8.83	0.12	4,429	2,703	–	6,155
	2017	21,484	0.26	10.71	0.16	5,640	3,555	–	7,724
	2018	17,793	0.21	6.60	0.12	3,764	2,361	–	5,167
	2019	17,885	0.27	6.87	0.11	4,878	2,298	-	7,457

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Turkey: Spring[a]	1986	31,632	0.56	5.35	0.10	17,714	.	–	.
	1987	30,909	0.55	5.62	0.10	17,000	.	–	.
	1988	30,082	0.40	5.18	0.08	12,033	.	–	.
	1989	45,244	0.58	6.00	0.10	27,146	.	–	.
	1990	32,391	0.45	6.02	0.12	14,576	.	–	.
	1991	32,564	0.46	6.12	0.13	14,980	.	–	.
	1992	34,226	0.58	5.40	0.18	19,851	.	–	.
	1993	28,667	0.52	5.66	0.16	14,906	.	–	.
	1994	29,102	0.43	5.60	0.15	12,514	.	–	.
	1995	43,190	0.48	5.64	0.14	20,751	17,509	–	23,992
	1996	46,706	0.38	6.41	0.09	17,582	14,337	–	20,826
	1997	45,011	0.38	6.08	0.10	17,196	14,349	–	20,044
	1998	44,315	0.46	5.40	0.13	20,393	16,967	–	23,818
	1999	47,903	0.45	5.71	0.14	21,549	18,012	–	25,087
	2000	49,502	0.49	5.89	0.14	24,390	20,678	–	28,102
	2001	53,456	0.48	5.15	0.15	25,866	22,072	–	29,659
	2002	64,407	0.50	5.97	0.13	32,123	27,553	–	36,694
	2003	73,502	0.56	5.7	0.14	41,241	36,135	–	46,347
	2004	63,027	0.54	6.00	0.14	33,879	29,532	–	38,225
	2005	58,490	0.62	6.23	0.17	36,463	31,824	–	41,102
	2006	66,075	0.63	6.20	0.17	41,485	36,636	–	46,334
	2007	61,984	0.50	6.86	0.11	30,992	26,092	–	35,893
	2008	56,799	0.55	6.97	0.14	31,142	26,628	–	35,657
	2009	65,720	0.57	6.65	0.13	37,407	32,609	–	42,206
	2010	54,578	0.47	5.83	0.12	25,769	21,519	–	30,018
	2011	56,283	0.51	6.23	0.12	28,954	24,701	–	33,207
	2012	52,554	0.42	5.21	0.13	22,251	18,760	–	25,743
	2013	49,331	0.45	5.17	0.12	22,394	18,527	–	26,261
	2014	51,894	0.38	5.32	0.11	19,835	17,385	–	22,286
	2015	41,296	0.45	5.34	0.14	18,781	16,019	–	21,543
	2016	57,083	0.48	5.20	0.16	27,460	22,091	–	32,830
	2017	52,925	0.51	5.42	0.17	26,865	21,248	–	32,483
	2018	49,651	0.43	4.99	0.13	21,425	17,595	–	25,255
	2019	63,005	0.33	5.29	0.10	20,864	16,615	-	25,112

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Woodcock	1986	3,513	2.00	5.69	0.35	7,025	2,978	–	11,073
	1987	3,030	2.92	3.17	0.92	8,858	4,968	–	12,748
	1988	694	2.67	5.00	0.53	1,851	0	–	3,828
	1989	2,451	3.27	6.91	0.47	8,021	1,907	–	14,135
	1990	2,093	3.44	8.11	1.32	7,209	976	–	13,443
	1991	984	2.25	4.25	0.81	2,214	814	–	3,613
	1992	563	1.25	5.00	0.58	704	0	–	1,749
	1993	974	1.57	2.00	0.66	1,531	223	–	2,839
	1994	514	0.33	0.67	0.50	171	0	–	507
	1995	603	1.60	5.00	0.65	965	0	–	1,996
	1996	537	1.50	20.75	0.21	805	126	–	1,484
	1997	1,036	18.89	5.11	2.79	19,570	0	–	40,238
	1998	782	1.00	3.00	0.85	782	222	–	1,342
	1999	821	3.67	4.83	0.89	3,011	947	–	5,075
	2000	1,151	2.00	6.88	0.73	2,302	213	–	4,391
	2001	1,003	1.00	3.43	0.26	1,003	0	–	2,360
	2002	801	2.80	2.00	1.10	2,243	0	–	5,113
	2003	665	1.25	1.00	1.25	831	506	–	1,157
	2004	305	2.50	1.00	2.50	763	464	–	1,062
	2005	595	1.75	14.25	0.81	1,042	750	–	1,334
	2006	302	1.00	1.00	1.00	302	302	–	302
	2007	341	0.50	1.50	0.50	170	0	–	504
	2008	323	0.50	2.50	0.50	161	0	–	475
	2009	733	0.60	2.80	0.45	440	88	–	792
	2010	640	0	1.50	0	0	0	–	0
	2011	588	1.50	2.50	0.45	882	0	–	1,879
	2012	878	2.17	5.67	0.56	1,903	401	–	3,405
	2013	1,128	0.29	1.00	0.33	322	0	–	954
	2014	435	1.00	2.17	0.42	435	0	–	975
	2015	106	2.00	2.00	1.00	212	.	–	.
	2016	1,273	1.00	4.40	0.40	1,273	254	–	2,292
	2017	1,048	3.33	1.67	1.67	1,747	0	–	10,340
	2018	508	0.33	3.67	0.17	169	0	–	502
	2019	610	1.33	1.00	1.33	813	0	-	1,867

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Coyote	2003	19,623	5.08	22.11	0.44	99,611	57,158	–	142,063
	2004	17,092	4.79	19.30	0.48	81,918	55,526	–	108,311
	2005	15,329	17.76	29.20	0.52	272,210	0	–	567,975
	2006	17,198	8.70	32.63	0.47	149,649	57,916	–	241,381
	2007	21,797	4.65	15.56	0.45	101,321	75,585	–	127,056
	2008	16,943	9.50	25.53	0.48	161,037	45,366	–	276,708
	2009	23,618	5.14	20.00	0.16	121,485	90,980	–	151,991
	2010	23,208	5.94	21.67	0.50	137,966	87,223	–	188,709
	2011	25,864	5.59	27.04	0.44	144,455	85,406	–	203,504
	2012	31,181	4.86	24.40	0.53	151,661	120,863	–	182,458
	2013	26,117	6.86	21.22	0.45	179,270	89,781	–	268,758
	2014	20,830	8.84	21.68	0.62	184,036	39,004	–	329,069
	2015	18,684	5.81	19.81	0.48	108,587	83,305	–	133,870
	2016	22,918	8.36	20.40	0.53	191,621	103,249	–	279,993
	2017	18,602	8.12	26.09	0.64	151,074	95,992	–	206,156
	2018	18,471	4.04	22.76	0.49	74,574	54,695	–	94,454
	2019	28,454	5.23	23.45	0.49	148,915	80,452	-	217,377
Bobcat	2003	7,650	1.93	16.00	0.22	14,800	6,817	–	22,783
	2004	7,173	1.06	12.96	0.16	7,630	3,702	–	11,559
	2005	8,781	1.90	15.14	0.16	16,669	8,636	–	24,701
	2006	9,051	2.50	23.95	0.20	22,628	14,734	–	30,523
	2007	9,706	1.51	17.16	0.18	14,645	9,647	–	19,642
	2008	8,229	1.76	15.80	0.25	14,522	7,258	–	21,786
	2009	10,415	1.44	14.17	0.21	14,963	8,225	–	21,701
	2010	12,164	1.57	14.01	0.25	19,138	12,287	–	25,990
	2011	10,581	1.15	16.06	0.13	12,220	7,650	–	16,789
	2012	10,101	1.52	17.93	0.13	15,371	7,449	–	23,293
	2013	9,673	0.93	20.49	0.14	9,028	5,751	–	12,305
	2014	7,621	1.44	19.83	0.13	10,950	7,075	–	14,826
	2015	6,263	0.97	16.53	0.09	6,047	3,297	–	8,798
	2016	10,186	1.63	22.48	0.13	16,552	6,665	–	26,439
	2017	8,122	3.52	18.73	0.30	28,559	14,809	–	42,308
	2018	5,931	1.77	19.79	0.20	10,506	2,718	–	18,295
	2019	7,723	1.84	13.11	0.27	14,194	6,332	-	22,056

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Raccoon	2003	9,146	7.26	24.36	0.49	66,439	45,639	–	87,239
	2004	8,088	8.87	20.65	0.44	71,705	47,872	–	95,538
	2005	8,930	8.12	23.95	0.42	72,480	51,955	–	93,005
	2006	6,939	8.30	23.26	0.83	57,627	40,533	–	74,721
	2007	8,174	8.66	24.15	0.77	70,781	46,919	–	94,644
	2008	7,261	8.39	22.82	0.39	60,895	38,468	–	83,322
	2009	9,682	8.02	24.09	0.66	77,607	57,094	–	98,119
	2010	9,123	8.63	25.80	0.52	78,746	55,681	–	101,812
	2011	11,022	8.42	24.05	0.62	92,789	72,481	–	113,097
	2012	9,515	8.20	25.18	0.71	78,026	56,244	–	99,808
	2013	9,189	8.26	24.89	0.73	75,932	52,288	–	99,576
	2014	9,290	8.22	21.83	0.62	76,402	61,077	–	91,727
	2015	6,157	9.38	21.63	0.62	57,751	39,867	–	75,634
	2016	6,791	10.53	30.55	0.67	71,513	46,088	–	96,938
	2017	8,122	9.79	22.56	0.63	79,481	50,182	–	108,780
	2018	6,948	6.58	23.08	0.68	45,682	32,232	–	59,132
	2019	10,365	4.82	31.25	0.58	49,923	32,778	-	67,067
Beaver	2003	3,326	3.00	6.15	0.72	9,978	4,733	–	15,223
	2004	1,984	5.85	39.23	0.54	11,598	4,233	–	18,963
	2005	2,381	5.06	17.13	0.63	12,055	4,464	–	19,647
	2006	2,112	4.93	39.86	0.53	10,409	2,379	–	18,439
	2007	1,873	5.91	20.73	0.53	11,069	1,174	–	20,963
	2008	1,775	7.18	17.55	0.77	12,747	3,629	–	21,866
	2009	2,347	4.13	20.13	1.14	9,682	1,562	–	17,802
	2010	2,561	6.56	15.06	0.50	16,806	1,301	–	32,310
	2011	2,792	2.67	48.28	0.32	7,446	5,022	–	9,869
	2012	2,049	6.29	30.43	0.50	12,882	1,682	–	24,082
	2013	2,741	4.18	36.29	0.26	11,446	0	–	23,156
	2014	3,048	3.68	12.45	0.43	11,227	7,440	–	15,014
	2015	1,911	4.28	39.72	0.44	8,174	3,118	–	13,230
	2016	2,971	2.86	20.71	0.45	8,488	5,768	–	11,208
	2017	3,144	5.18	12.20	0.52	16,292	7,273	–	25,311
	2018	1,017	1.20	13.83	0.31	1,220	244	–	2,196
	2019	2,642	3.86	37.79	0.94	10,191	3,271	-	17,110

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
Gray Fox	2003	831	1.20	12.80	0.12	998	0	–	2,578
	2004	916	2.17	12.83	0.35	1,984	418	–	3,550
	2005	1,637	1.27	11.45	0.35	2,084	1,208	–	2,959
	2006	1,509	0.40	24.40	0.15	603	121	–	1,086
	2007	1,873	0.91	18.91	0.05	1,703	547	–	2,859
	2008	1,291	1.88	27.38	0.10	2,420	482	–	4,359
	2009	1,614	1.09	25.73	0.10	1,760	596	–	2,925
	2010	1,601	2.80	26.70	0.30	4,482	2,298	–	6,665
	2011	1,176	0.38	11.13	0.03	441	19	–	862
	2012	1,464	1.30	21.90	0.04	1,903	300	–	3,506
	2013	1,935	0.75	13.64	0.15	1,451	0	–	3,076
	2014	1,234	1.53	20.00	0.18	1,887	934	–	2,840
	2015	1,274	2.00	17.18	0.21	2,548	0	–	5,559
	2016	2,334	0.55	30.18	0.03	1,273	0	–	2,702
	2017	1,572	1.17	16.67	0.13	1,834	364	–	3,305
	2018	678	2.00	15.75	0.13	1,356	0	–	2,890
	2019	1,219	0.50	27.17	0.09	610	0	-	1,426
Red Fox	2007	851	0.40	21.40	0.04	341	0	–	1,008
	2008	484	1.00	12.67	0.43	484	0	–	1,032
	2009	1,027	0.67	31.86	0.20	685	14	–	1,355
	2010	320	0.50	36.00	0.01	160	0	–	474
	2011	735	0	10.20	0	0	0	–	0
	2012	1,610	0.64	20.64	0.23	1,025	255	–	1,795
	2013	1,290	0.13	14.88	0.01	161	0	–	477
	2014	653	0.44	15.44	0.04	290	0	–	600
	2015	743	0.43	24.29	0.03	319	24	–	613
	2016	1,061	0.60	12.60	0.06	637	0	–	1,468
	2017	1,048	0	23.00	0	0	0	–	–
	2018	847	0.25	10.80	0.02	212	0	–	627
	2019	406	0	1.00	0	0	0	-	0

Table A4. Continued.

	Year	Number Of Hunters	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Total Harvest	95% Confidence Interval for Total Harvest		
River Otter	2007	170	0	10.00	0	0	.	–	.
	2008	645	1.50	8.75	1.02	968	336	–	1,601
	2009	293	1.00	50.00	0.10	293	0	–	868
	2010	320	0.50	3.00	0.10	160	0	–	474
	2011	588	0.75	14.75	0.03	441	0	–	992
	2012	0	0	0	0	0	.	–	.
	2013	967	0.50	24.67	0.01	484	0	–	1,131
	2014	581	0.88	21.13	0.08	508	172	–	844
	2015	318	1.67	21.67	0.08	531	0	–	1,081
	2016	1,273	0.40	22.00	0.02	509	0	–	1,508
	2017	786	1.50	6.00	0.27	1,179	409	–	1,949
	2018	169	.	42.00	.	.	.	–	.
	2019	1,016	1.60	7.20	0.47	1,626	0	-	3,362
Bear	2014	1,452	0.22	4.17	0.19	323	36	–	609
Elk	2014	1,814	0.33	4.77	0.21	605	255	–	954
Antelope	2014	581	0.67	6.20	0.27	387	147	–	627
Prairie Chicken	1986	5,992	2.07	2.45	0.85	12,398	3,714	–	21,081
	1987	5,595	1.33	1.96	0.68	7,459	3,302	–	11,617
	1988	3,934	1.53	1.65	0.93	6,016	2,388	–	9,645
	1989	3,342	2.29	2.57	0.89	7,639	2,811	–	12,467
	1990	4,186	1.56	2.72	0.51	6,512	2,411	–	10,613
	1991	3,936	2.12	2.25	0.81	8,363	4,921	–	11,805
	1992	3,239	1.65	2.57	0.72	5,352	1,097	–	9,606
	1993	974	1.14	2.43	0.64	1,113	464	–	1,763
	1994	1,713	0.75	1.22	0.59	1,284	101	–	2,468
	1995	1,448	0.56	1.56	0.45	812	169	–	1,455
	1996	671	0.80	3.80	0.53	537	45	–	1,029
	1997	576	1.00	1.80	0.68	576	71	–	1,080

[a]Confidence intervals for turkey harvest estimates were not available for 1986-1994. A correction factor was applied to the turkey estimates during those years, but it was evaluated in 1996 and deemed inappropriate. The harvest estimates for turkey prior to 1995 were recalculated without the correction factor but confidence intervals could not be calculated.

Table A5. Mean number of days deer hunters participated in each deer season in Oklahoma, 1997-2019.

Year	Total Mean Days[a]	Archery Mean Days	Muzzleloader Mean Days	Youth Mean Days	Rifle Mean Days	Holiday Mean Days[b]
1997	15.1	.	.	.	.	N/A
1998	14.5	.	.	.	.	N/A
1999	15.4	.	.	.	.	N/A
2000	16.0	.	.	.	.	N/A
2001	16.2	.	.	.	.	.
2002	16.8	.	.	.	.	.
2003	19.1	18.6	4.7	1.9	6.5	2.1
2004	16.8	16.4	4.6	1.9	6.1	2.1
2005	16.6	16.5	4.5	1.8	6.0	2.1
2006	18.3	18.3	4.6	2.0	6.1	2.0
2007	17.3	17.9	4.7	1.8	6.3	2.5
2008	17.4	17.8	4.7	2.1	6.1	2.3
2009	17.9	17.7	4.6	2.1	6.3	2.3
2010	18.3	18.2	4.6	2.1	6.1	2.8
2011	18.4	18.6	4.7	2.2	6.2	2.8
2012	17.8	18.0	4.7	2.1	6.3	2.8
2013	17.7	16.7	4.5	2.0	5.9	2.9
2014	17.8	17.8	4.6	2.2	5.9	2.8
2015	19.1	18.9	4.6	2.2	6.0	2.7
2016	16.4	17.9	4.3	2.2	5.6	2.6
2017	17.7	16.7	4.6	2.6	6.1	2.1
2018	17.8	18.3	4.7	2.2	5.8	2.7
2019	16.1	17.7	4.4	1.8	5.6	2.6

[a]Number of days of deer hunting was collected as one aggregate variable in years 1997-2002. In years 2003-present, number of days of deer hunting was collected by season and summed to calculate total mean days.
[b]Holiday antlerless deer gun season began in 2001.

Table A6. Mean number of deer harvested by deer hunters in each deer season in Oklahoma, 2001-2019.

| Year	Total: All-Seasons			Archery		Primitive		Youth		Rifle		Holiday
	Mean Number Deer	Mean Number Bucks	Mean Number Does	Mean Number Bucks	Mean Number Does	Mean Number Bucks	Mean Number Does	Mean Number Bucks	Mean Number Does	Mean Number Bucks	Mean Number Does	Mean Number Does
2001	0.91	0.46	0.46	0.13	0.21	0.22	0.16	N/A	N/A	0.27	0.20	0.21
2002	0.93	0.53	0.48	0.16	0.23	0.18	0.17	N/A	N/A	0.28	0.19	0.23
2003	0.98	0.49	0.49	0.19	0.19	0.20	0.17	N/A	0.32	0.29	0.22	0.22
2004	0.89	0.50	0.39	0.20	0.19	0.22	0.19	N/A	0.23	0.29	0.16	0.16
2005	0.84	0.45	0.39	0.13	0.18	0.20	0.15	N/A	0.42	0.29	0.18	0.17
2006	1.04	0.54	0.50	0.15	0.22	0.23	0.20	N/A	0.37	0.34	0.21	0.22
2007	0.86	0.47	0.39	0.14	0.19	0.20	0.13	0.18	0.30	0.28	0.18	0.22
2008	0.94	0.44	0.50	0.16	0.28	0.16	0.15	0.20	0.26	0.29	0.23	0.26
2009	0.92	0.45	0.47	0.17	0.28	0.20	0.13	0.23	0.15	0.27	0.22	0.24
2010	0.89	0.44	0.45	0.15	0.24	0.17	0.13	0.31	0.16	0.28	0.22	0.20
2011	0.95	0.47	0.48	0.20	0.26	0.17	0.17	0.17	0.23	0.31	0.23	0.19
2012	0.87	0.46	0.41	0.17	0.24	0.21	0.14	0.24	0.23	0.28	0.18	0.21
2013	0.72	0.36	0.35	0.16	0.18	0.17	0.13	0.12	0.08	0.20	0.17	0.16
2014	0.78	0.40	0.39	0.18	0.23	0.16	0.12	0.17	0.16	0.25	0.18	0.17
2015	0.74	0.39	0.35	0.16	0.22	0.19	0.12	0.10	0.22	0.24	0.15	0.14
2016	0.81	0.42	0.39	0.19	0.27	0.13	0.11	0.16	0.16	0.30	0.19	0.20
2017	0.92	0.51	0.41	0.18	0.23	0.22	0.11	0.44	0.23	0.32	0.21	0.19
2018	0.87	0.46	0.41	0.19	0.26	0.20	0.14	0.21	0.20	0.31	0.18	0.20
2019	0.79	0.46	0.32	0.22	0.21	0.25	0.12	0.28	0.19	0.28	0.16	0.15
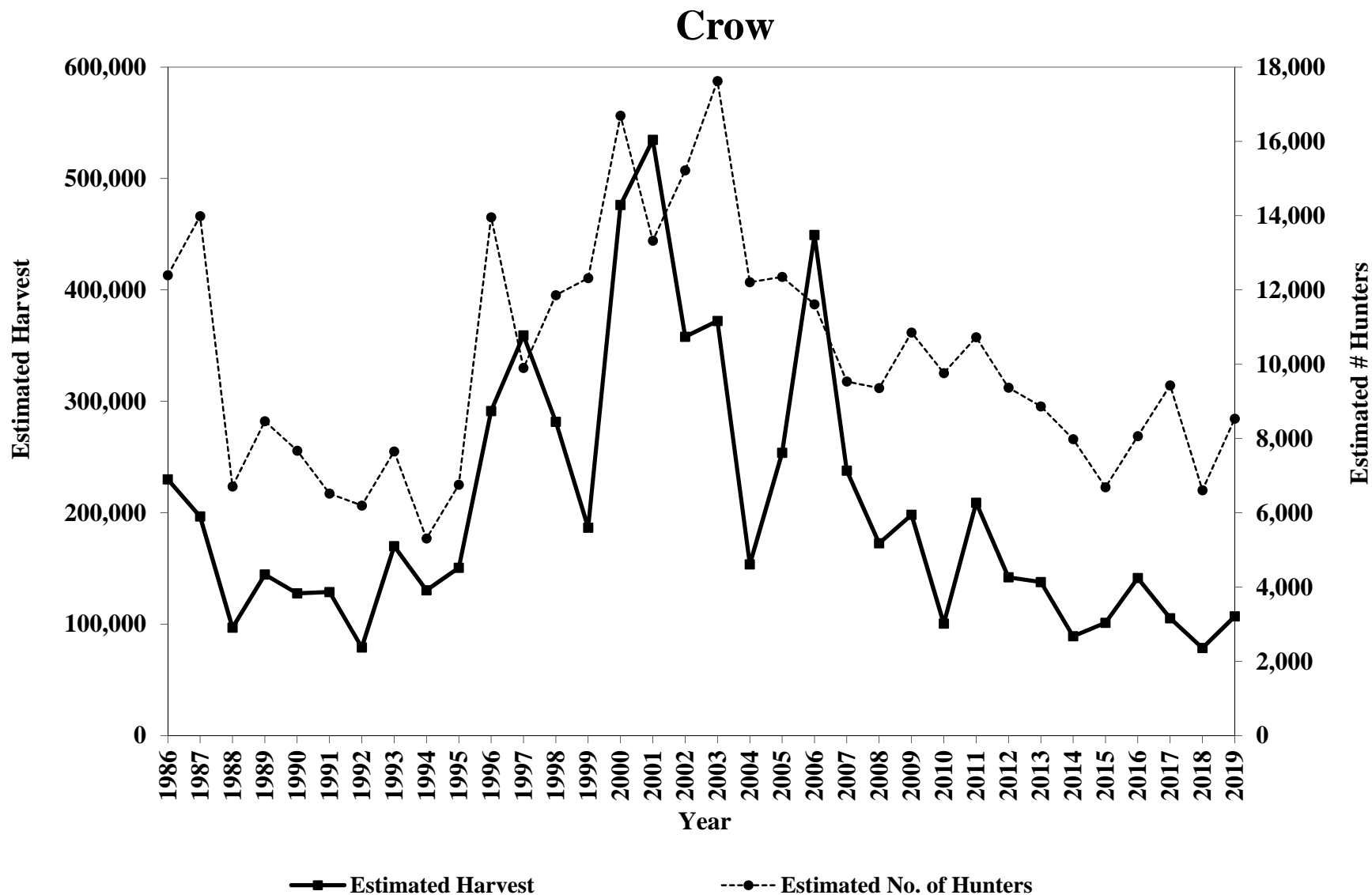
Crow

Figure A1. Statewide trends in estimated crow harvest and estimated number of crow hunters in Oklahoma, 1986-2019.
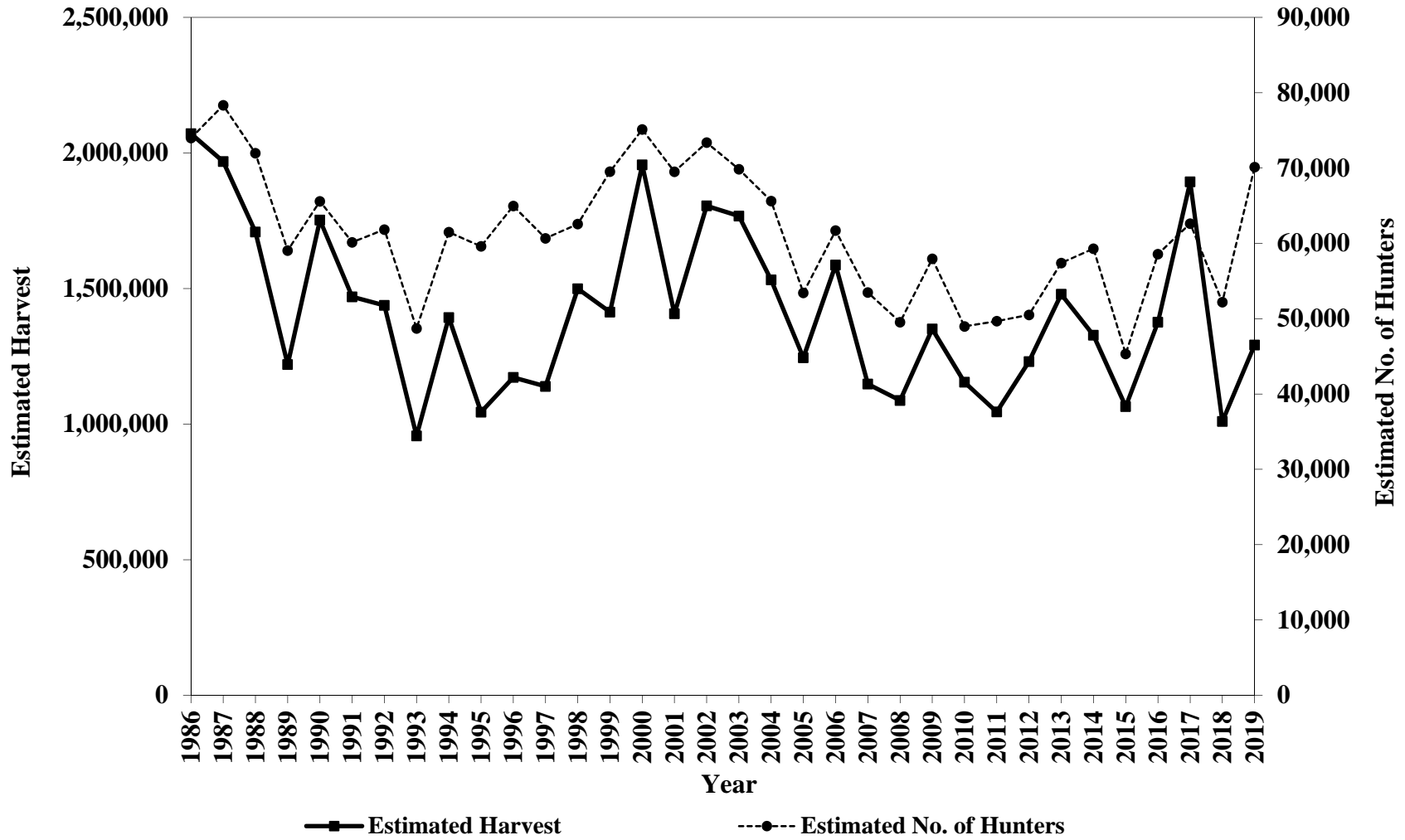
Figure A2. Statewide trends in estimated mourning dove harvest and estimated number of mourning dove hunters in Oklahoma, 1986-2019.

Ring-necked Pheasant
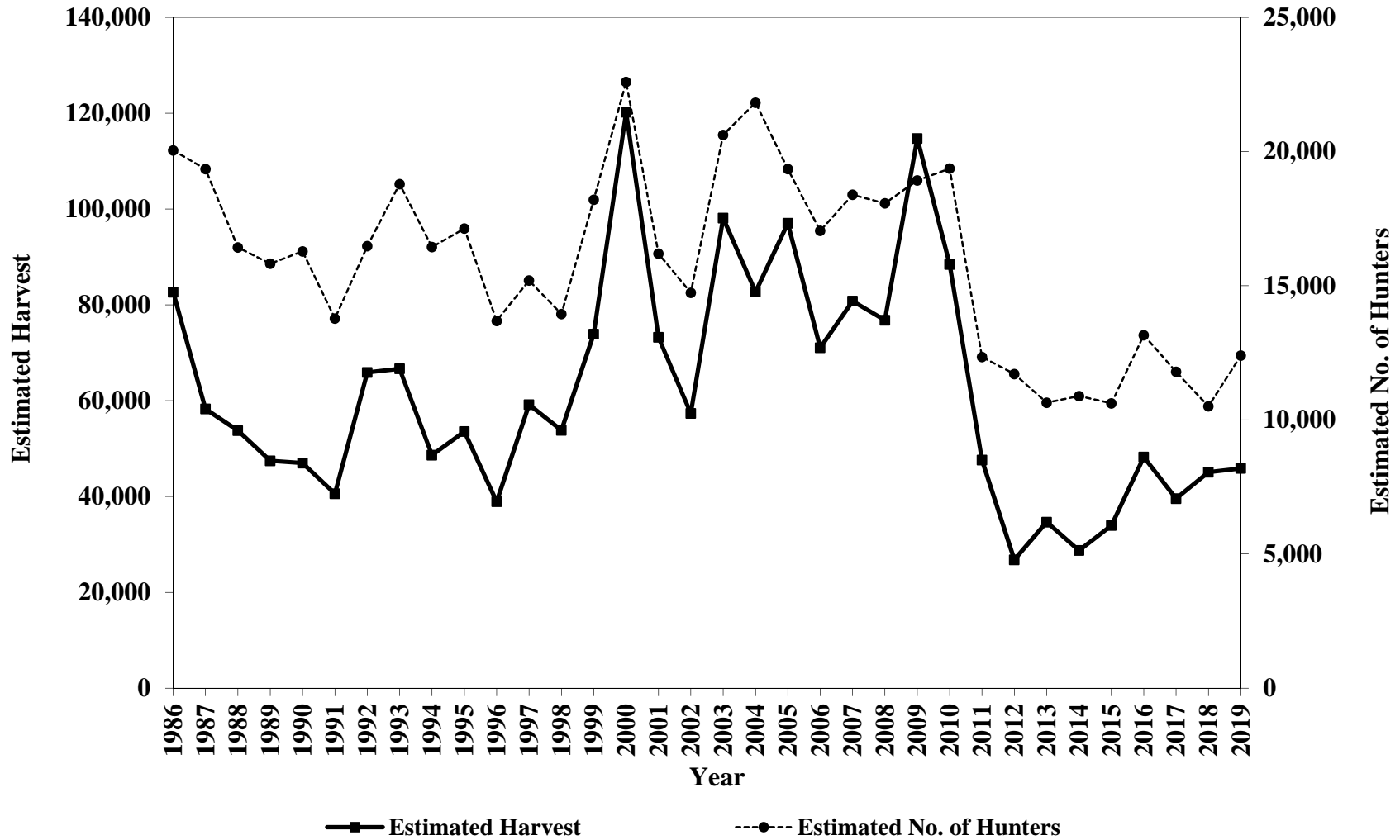
Figure A3. Statewide trends in estimated ring-necked pheasant harvest and estimated number of ring-necked pheasant hunters in Oklahoma, 1986-2019.

Quail
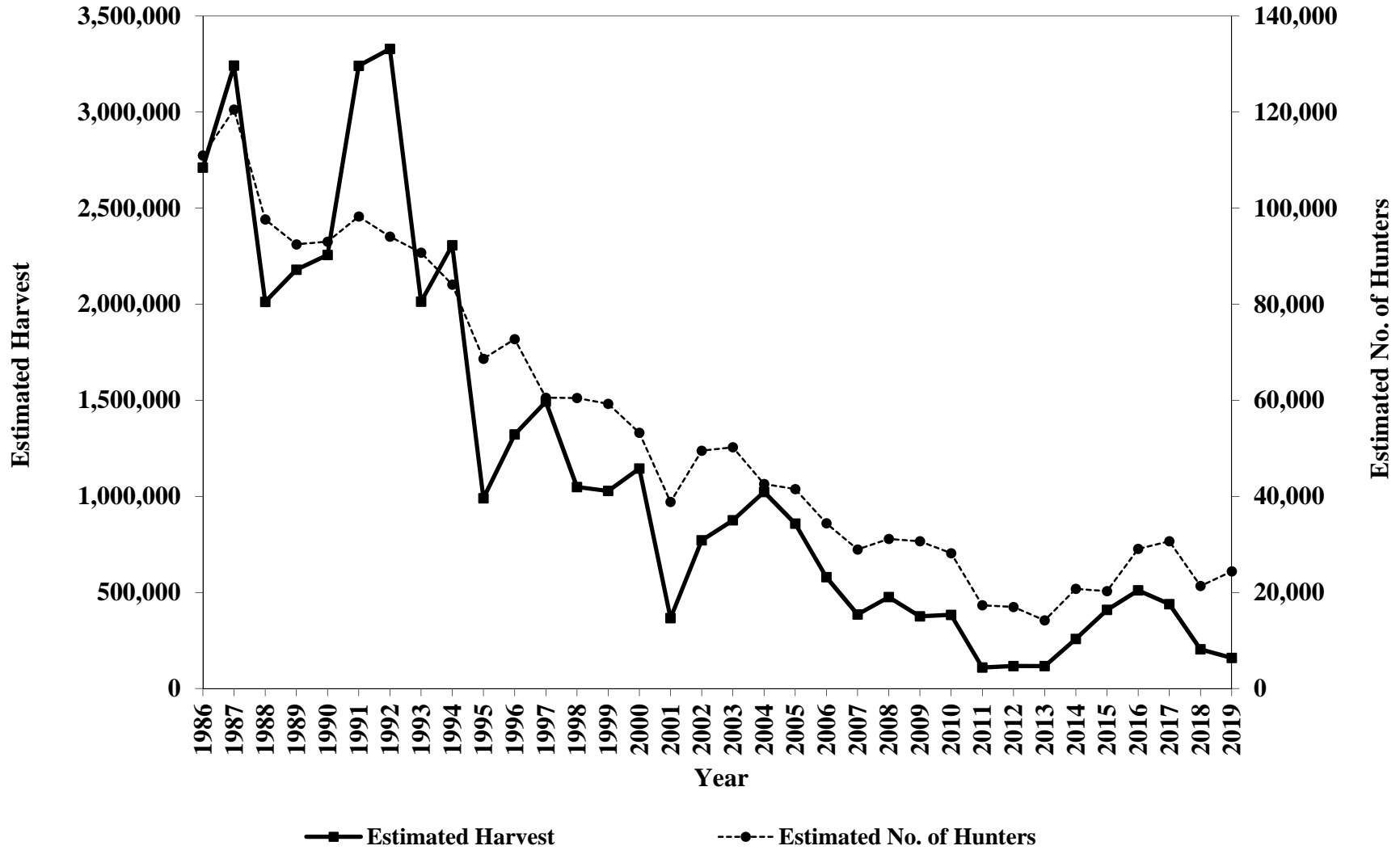
Figure A4. Statewide trends in estimated quail harvest and estimated number of quail hunters in Oklahoma, 1986-2019.
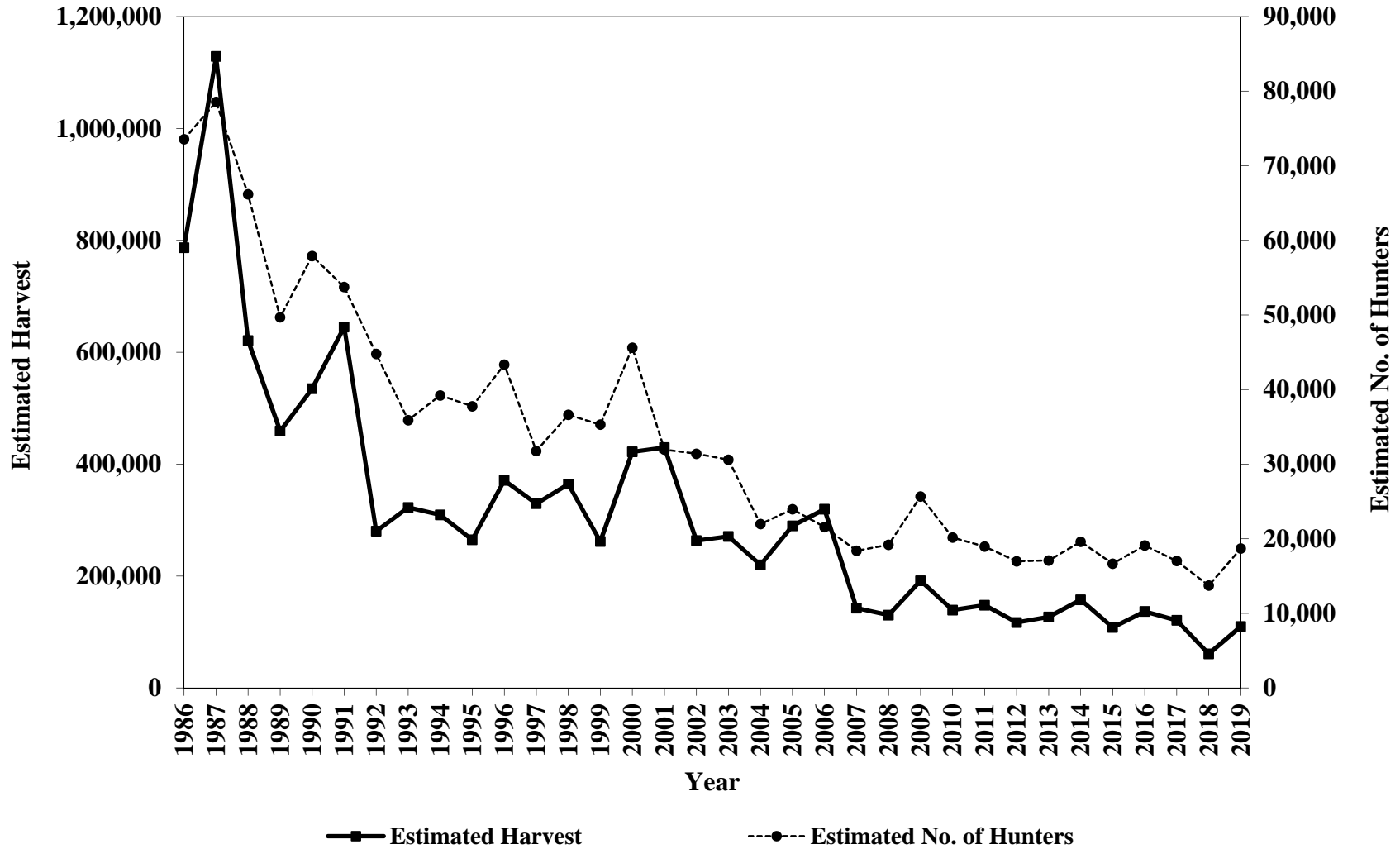
Figure A5. Statewide trends in estimated cottontail rabbit harvest and estimated number of cottontail rabbit hunters in Oklahoma, 1986-2019.

Jackrabbit
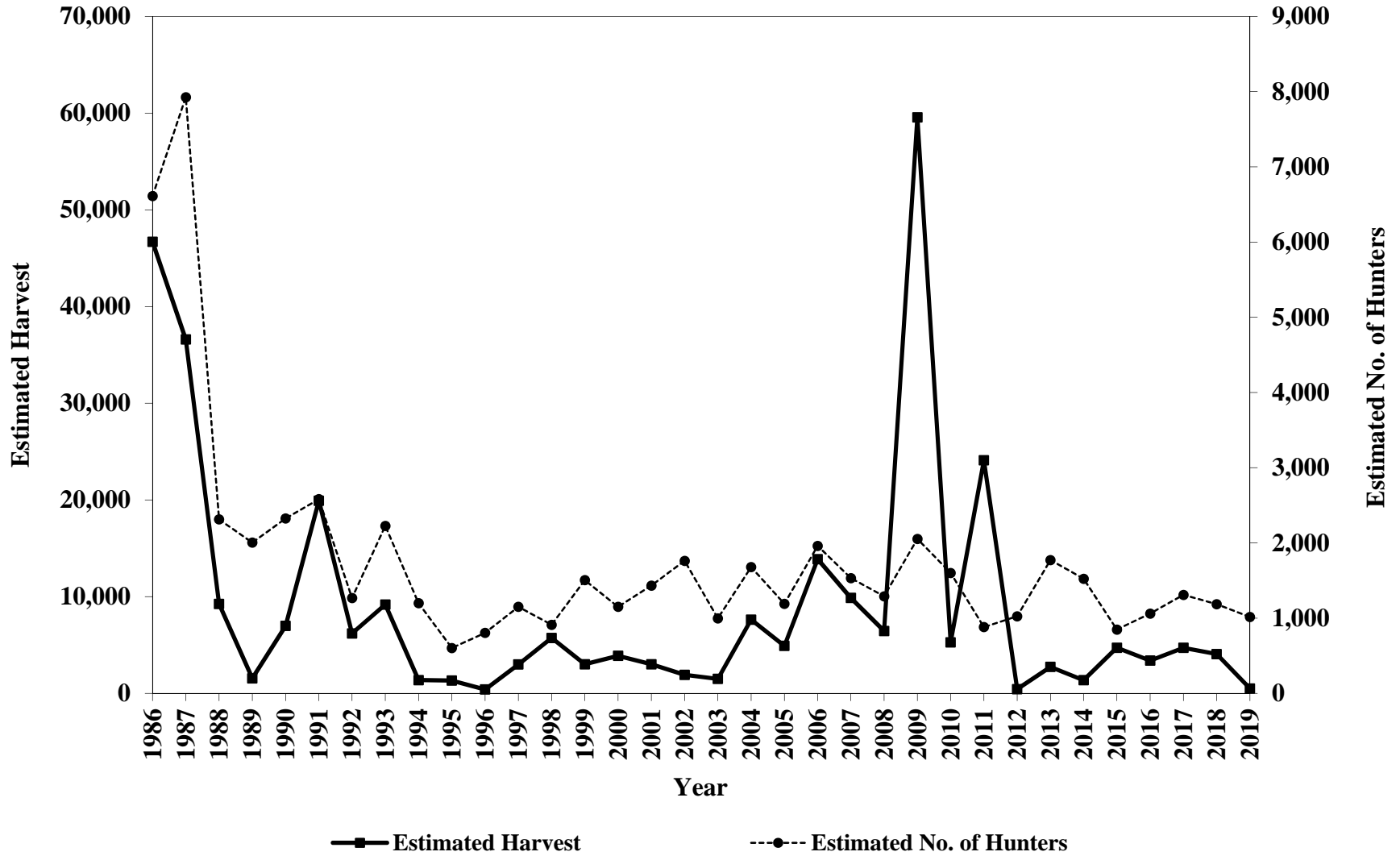
Figure A6. Statewide trends in estimated jackrabbit harvest and estimated number of jackrabbit hunters in Oklahoma, 1986-2019.

Swamp Rabbit
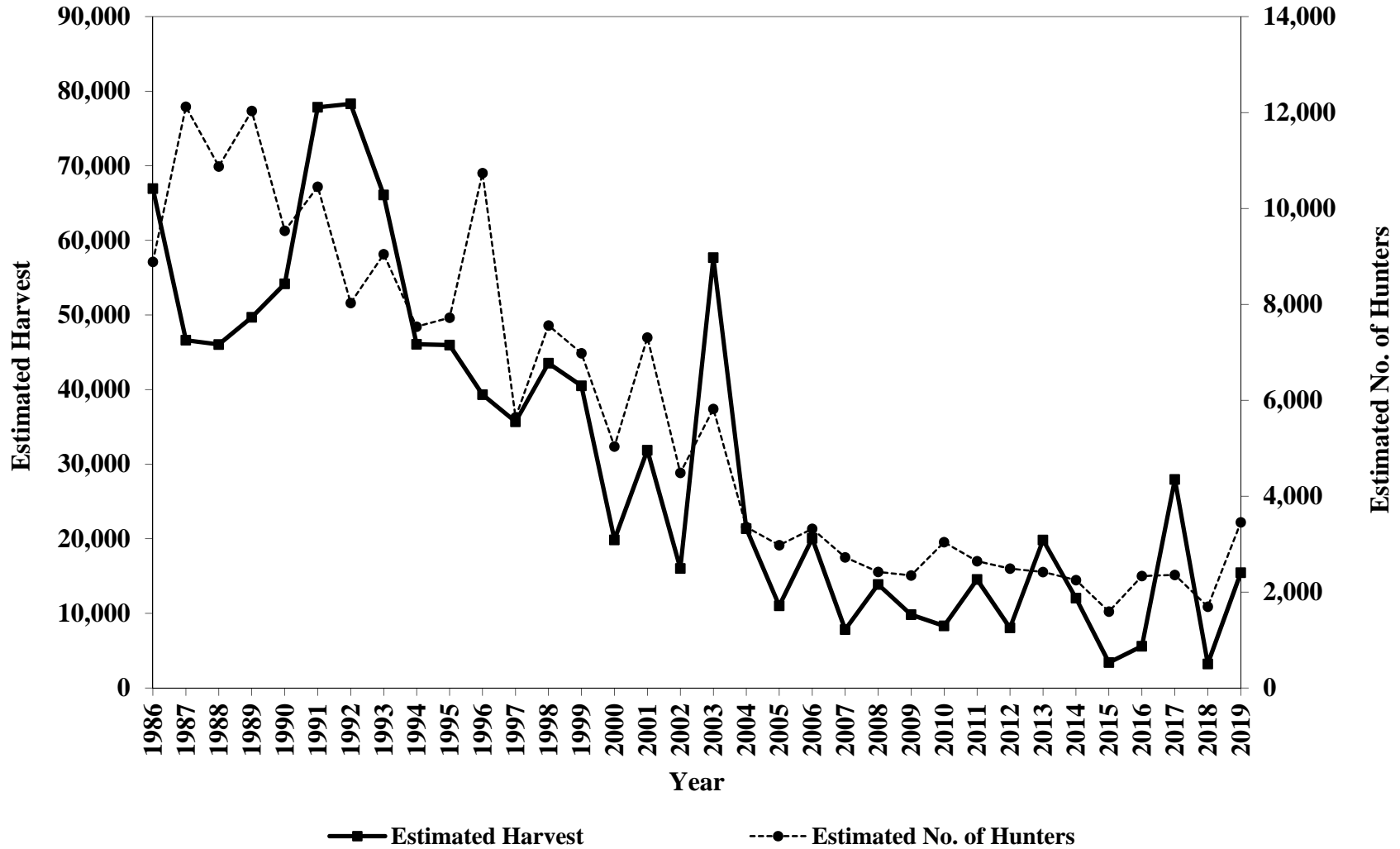
Figure A7. Statewide trends in estimated swamp rabbit harvest and estimated number of swamp rabbit hunters in Oklahoma, 1986-2019.

Fox Squirrel
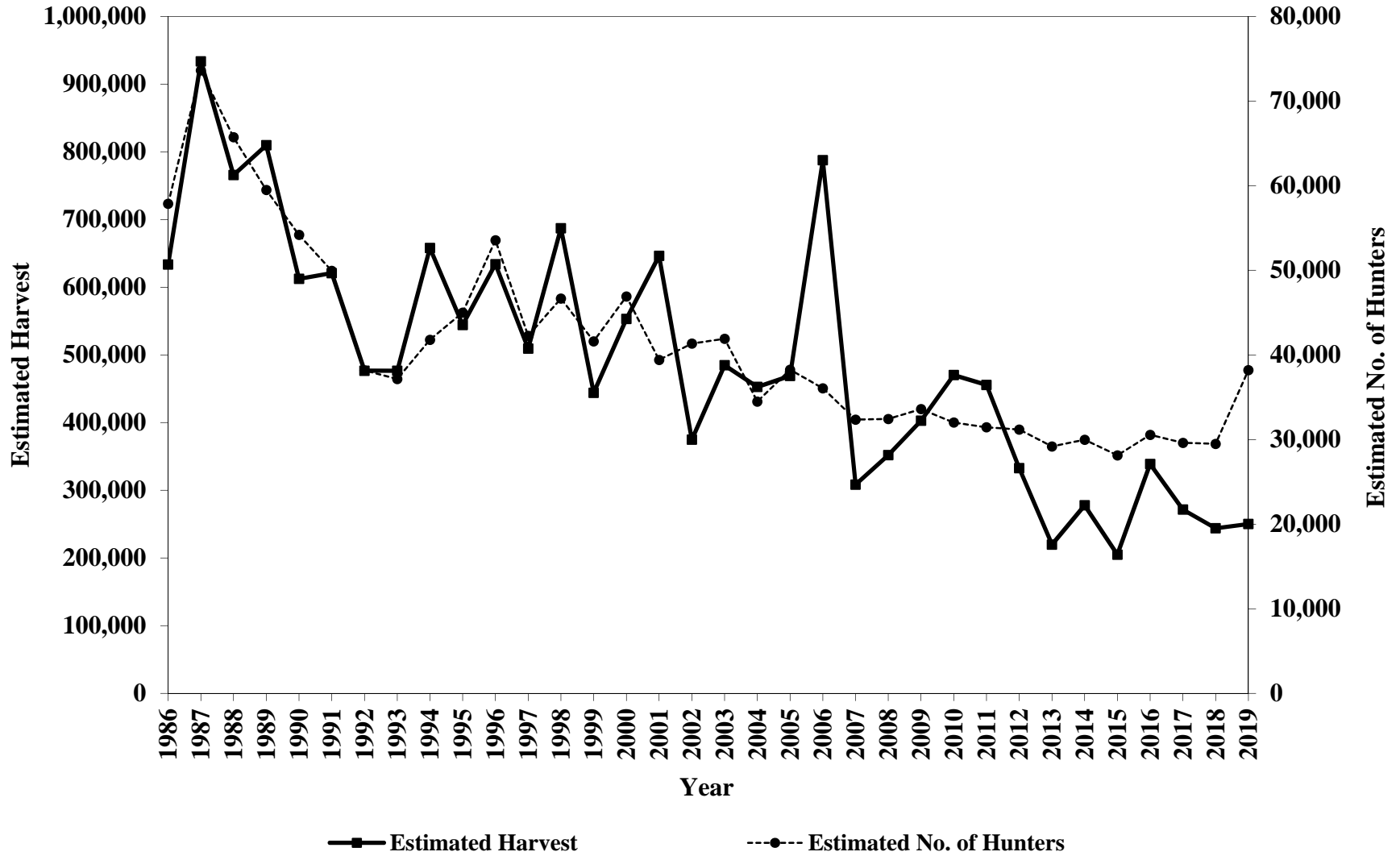
Figure A8. Statewide trends in estimated fox squirrel harvest and estimated number of fox squirrel hunters in Oklahoma, 1986-2019.

Gray Squirrel
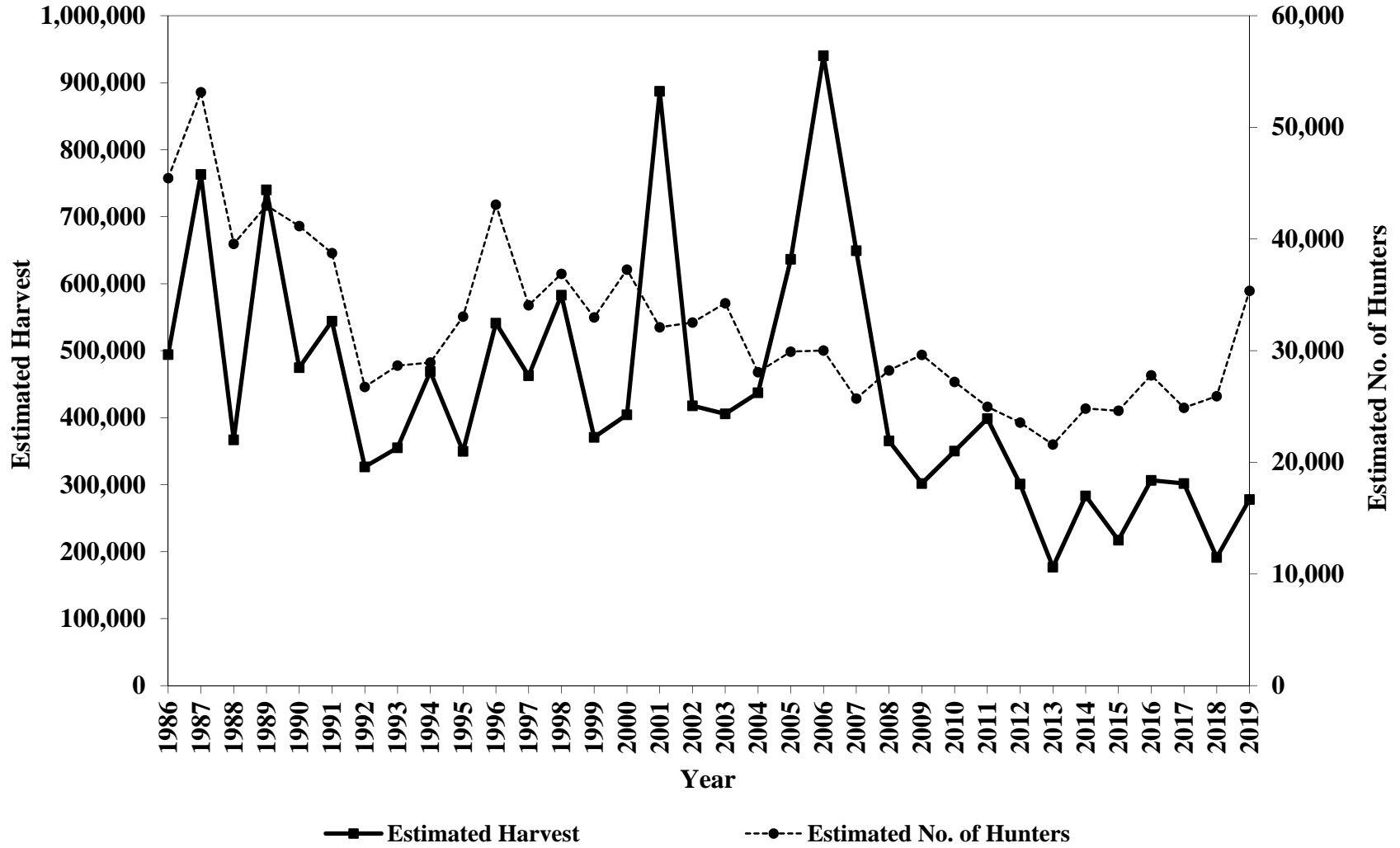
Figure A9. Statewide trends in estimated gray squirrel harvest and estimated number of gray squirrel hunters in Oklahoma, 1986-2019.
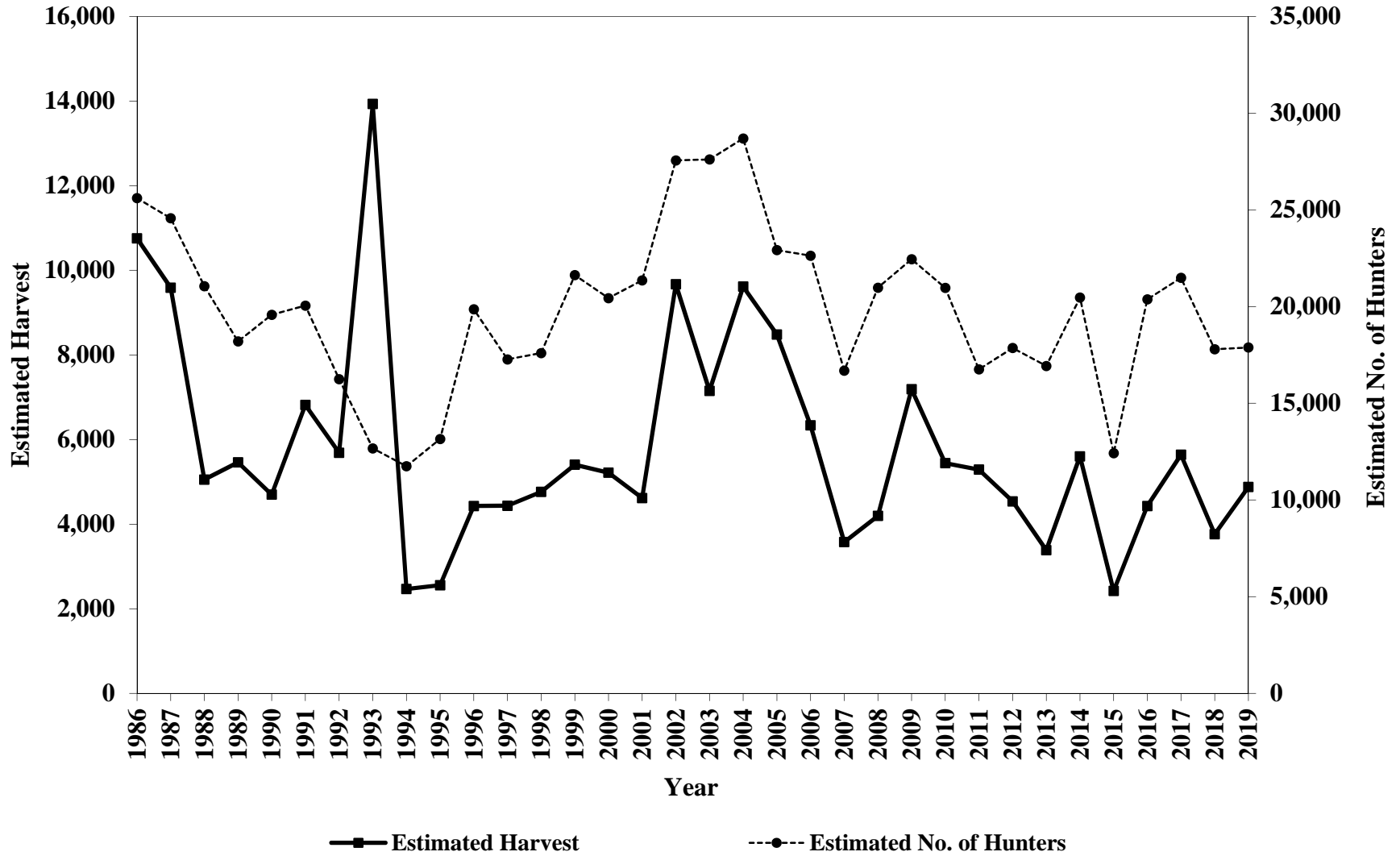
Figure A10. Statewide trends in estimated fall turkey harvest and estimated number of fall turkey hunters in Oklahoma, 1986-2019.

Spring Turkey
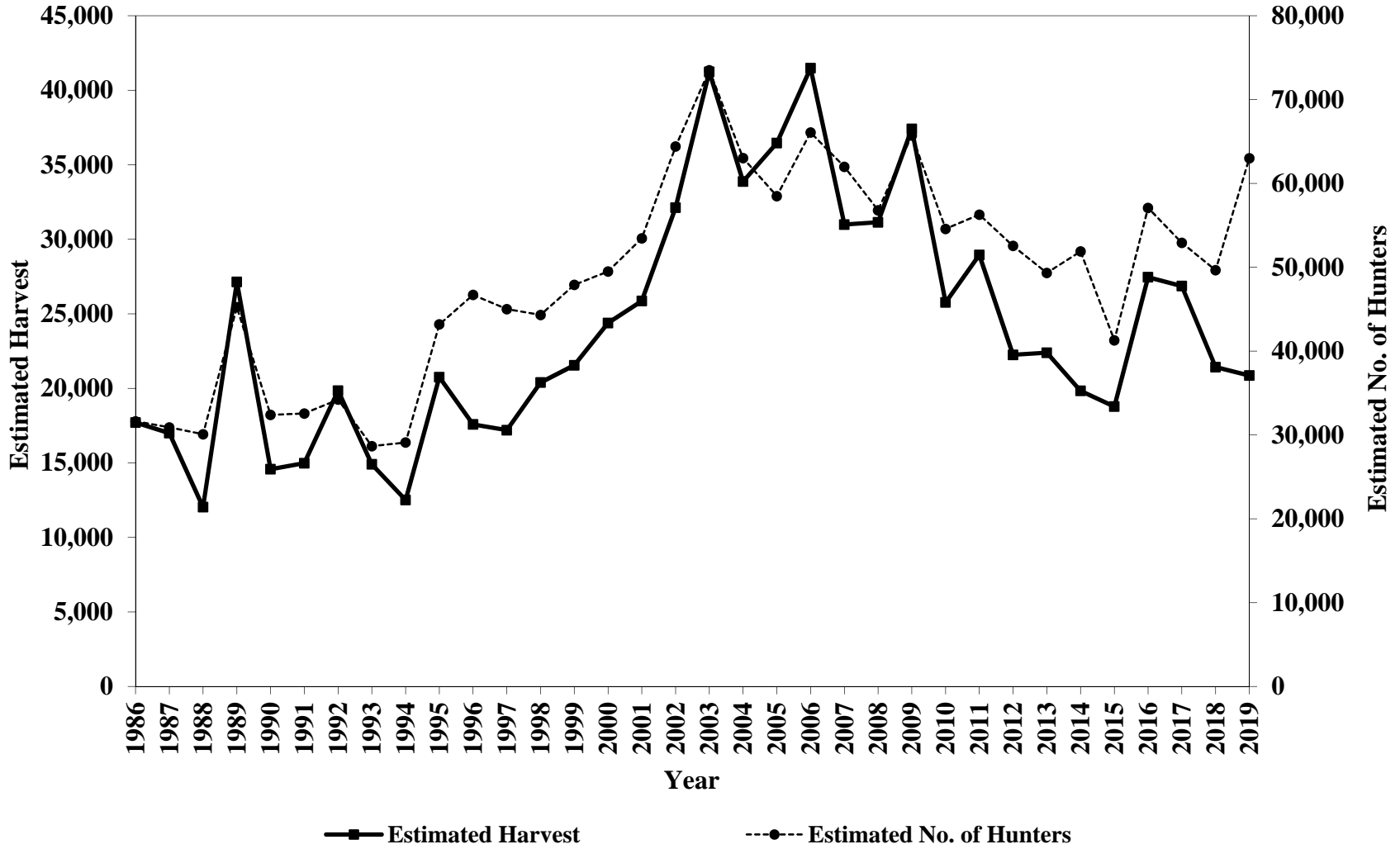
Figure A11. Statewide trends in estimated spring turkey harvest and estimated number of spring turkey hunters in Oklahoma, 1986-2019.

American Woodcock
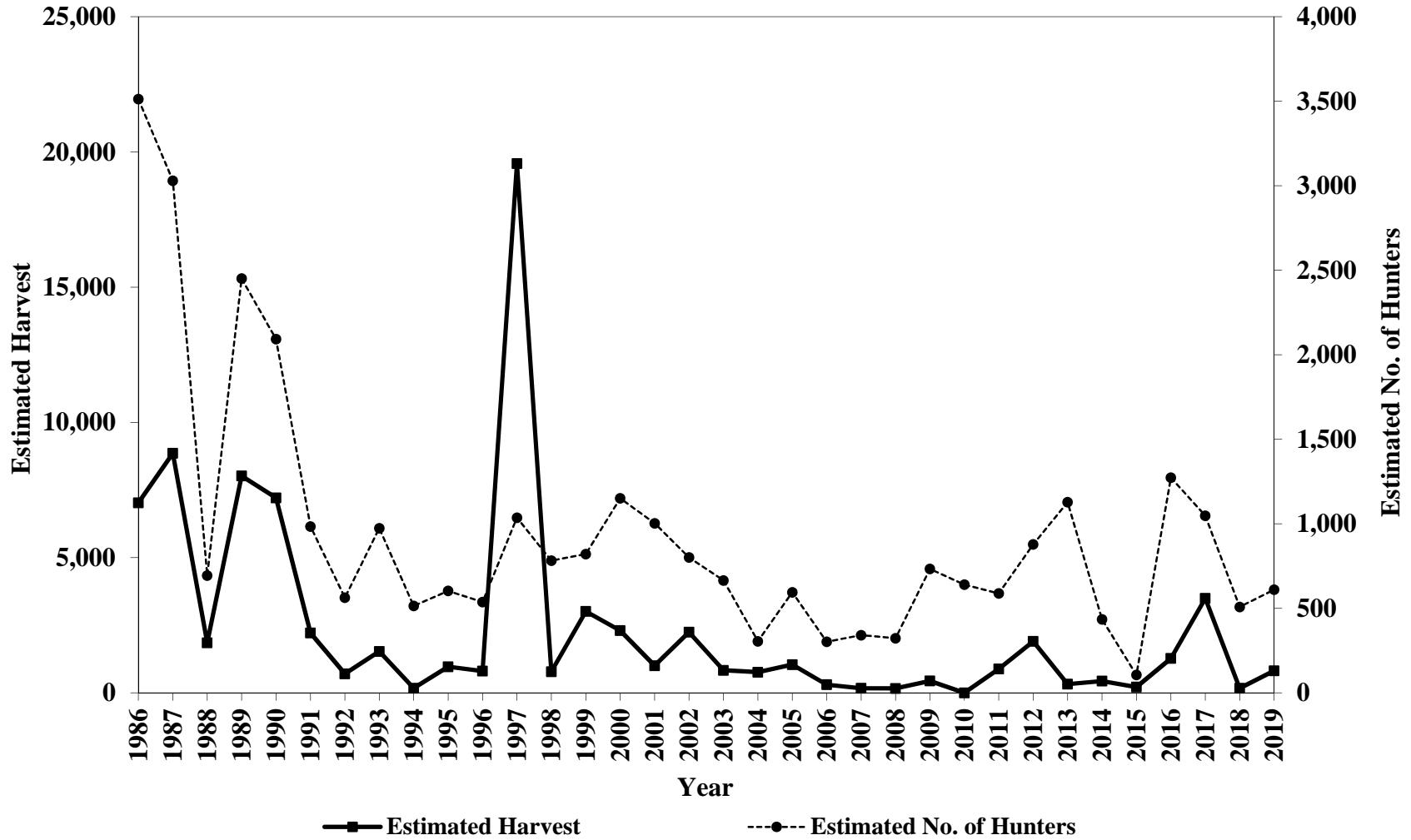
Figure A12. Statewide trends in estimated American woodcock harvest and estimated number of American woodcock hunters in Oklahoma, 1986-2019.

Coyote
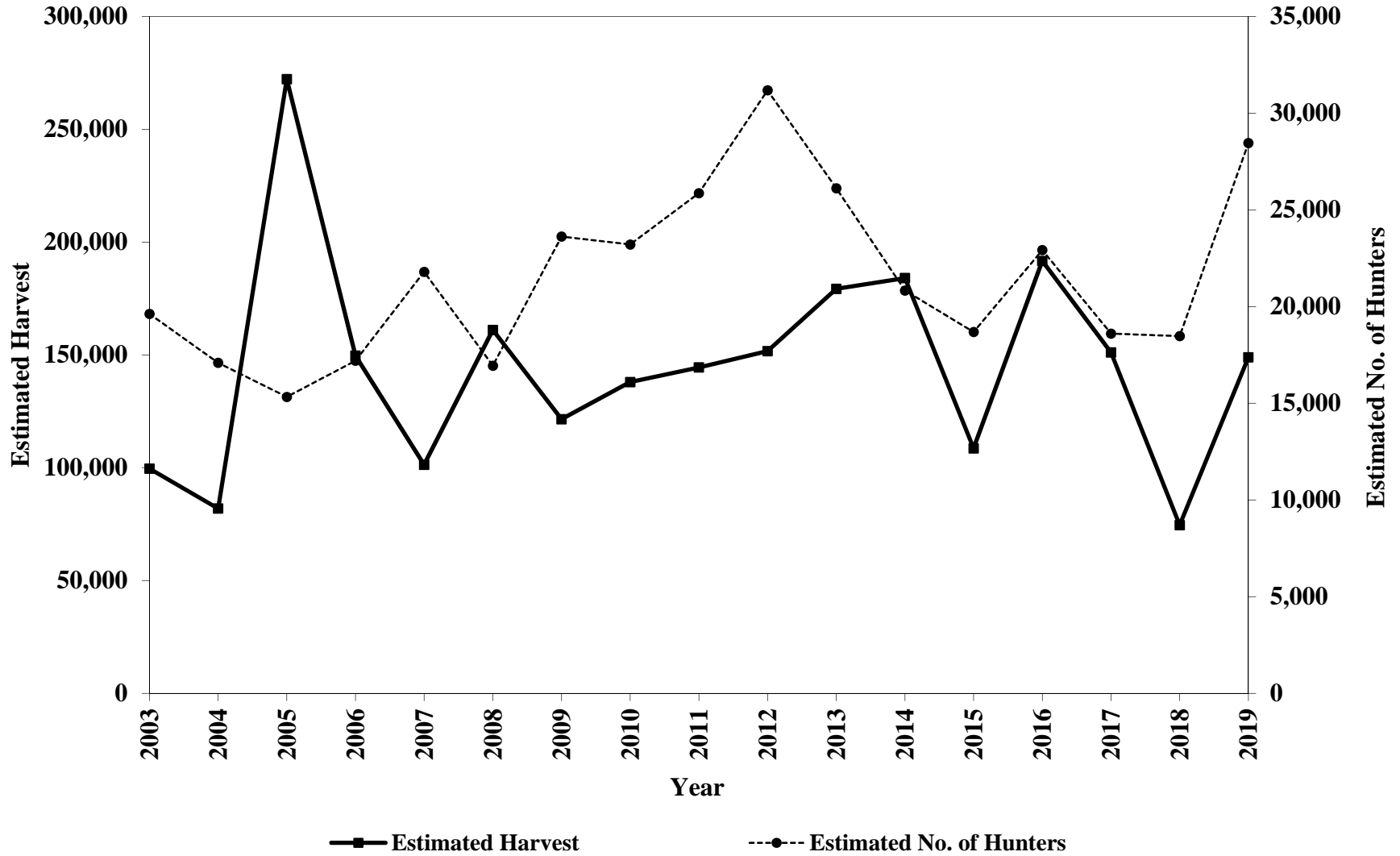
Figure A13. Statewide trends in estimated coyote harvest and estimated number of coyote hunters in Oklahoma, 2003-2019.

Bobcat
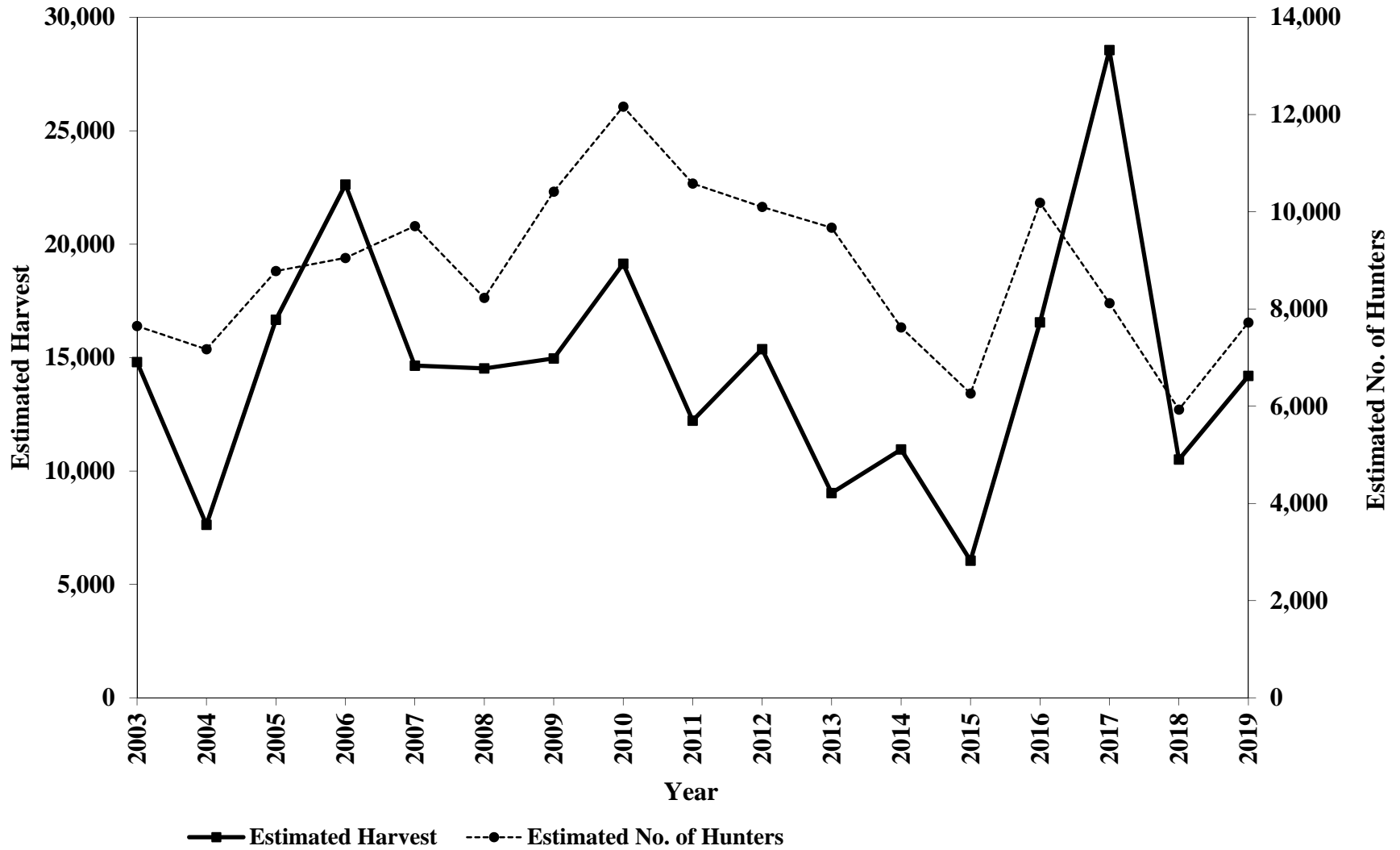
Figure A14. Statewide trends in estimated bobcat harvest and estimated number of bobcat hunters in Oklahoma, 2003-2019.
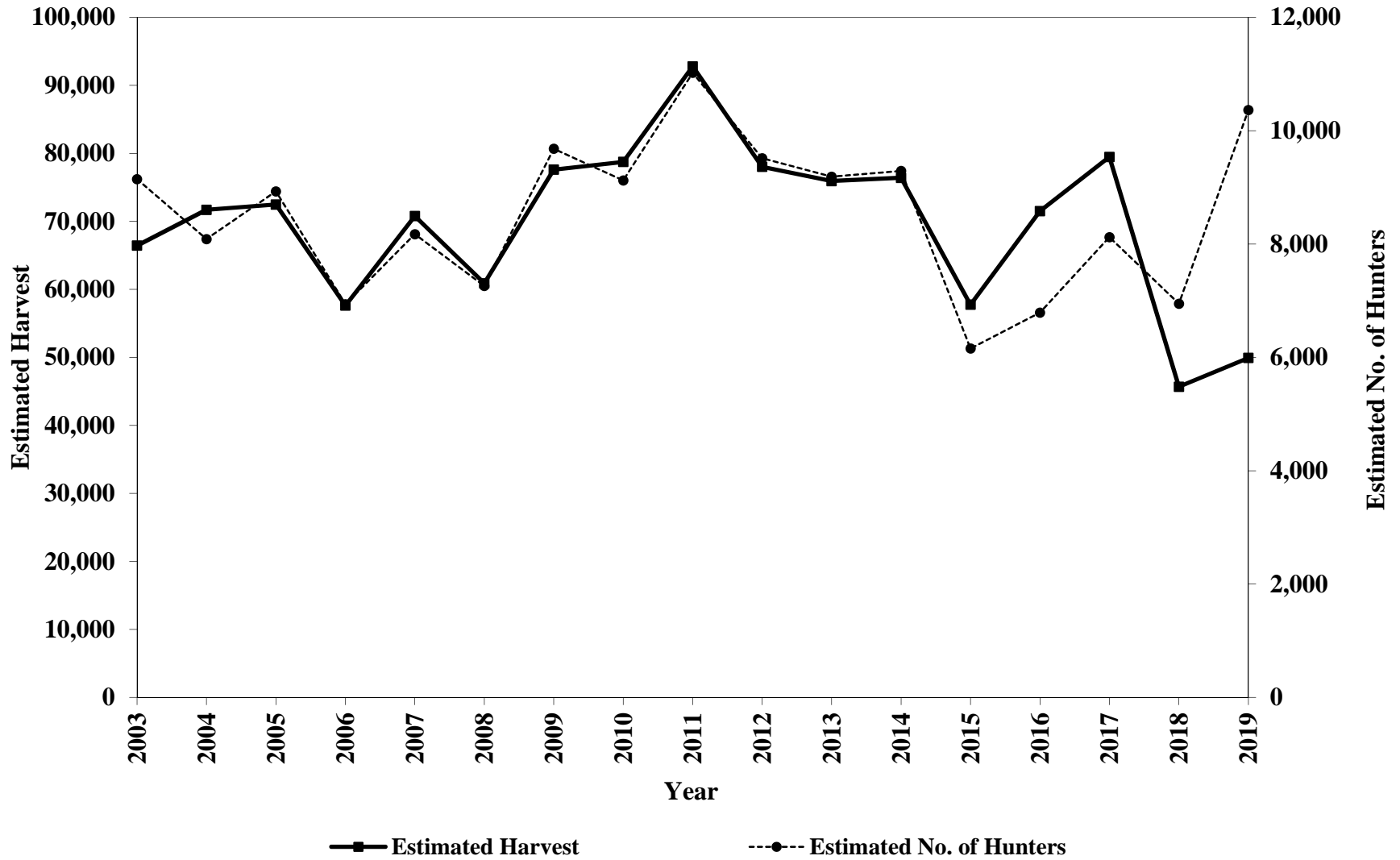
Figure A15. Statewide trends in estimated raccoon harvest and estimated number of raccoon hunters in Oklahoma, 2003-2019.
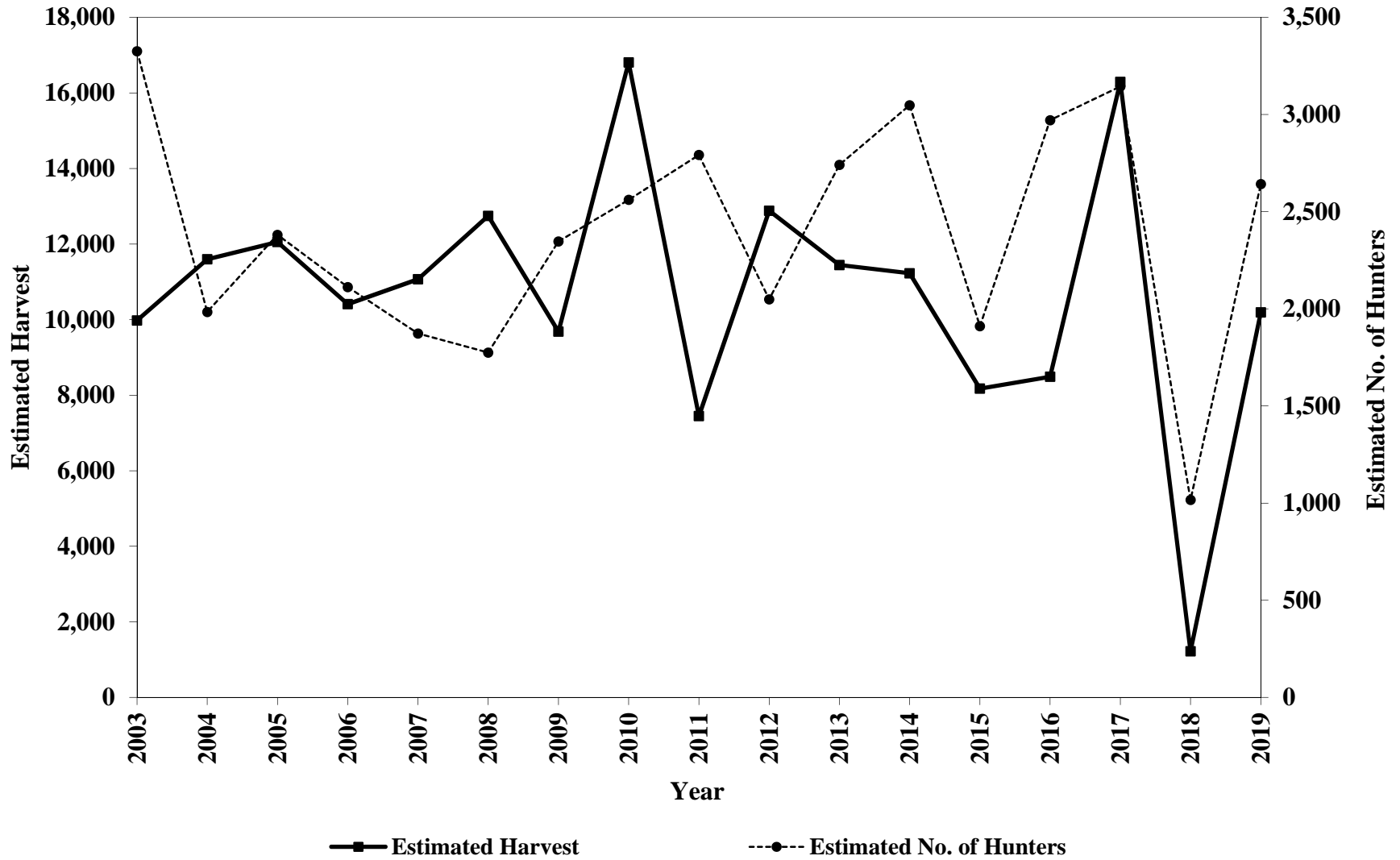
Figure A16. Statewide trends in estimated beaver harvest and estimated number of beaver hunters in Oklahoma, 2003-2019.

Gray Fox
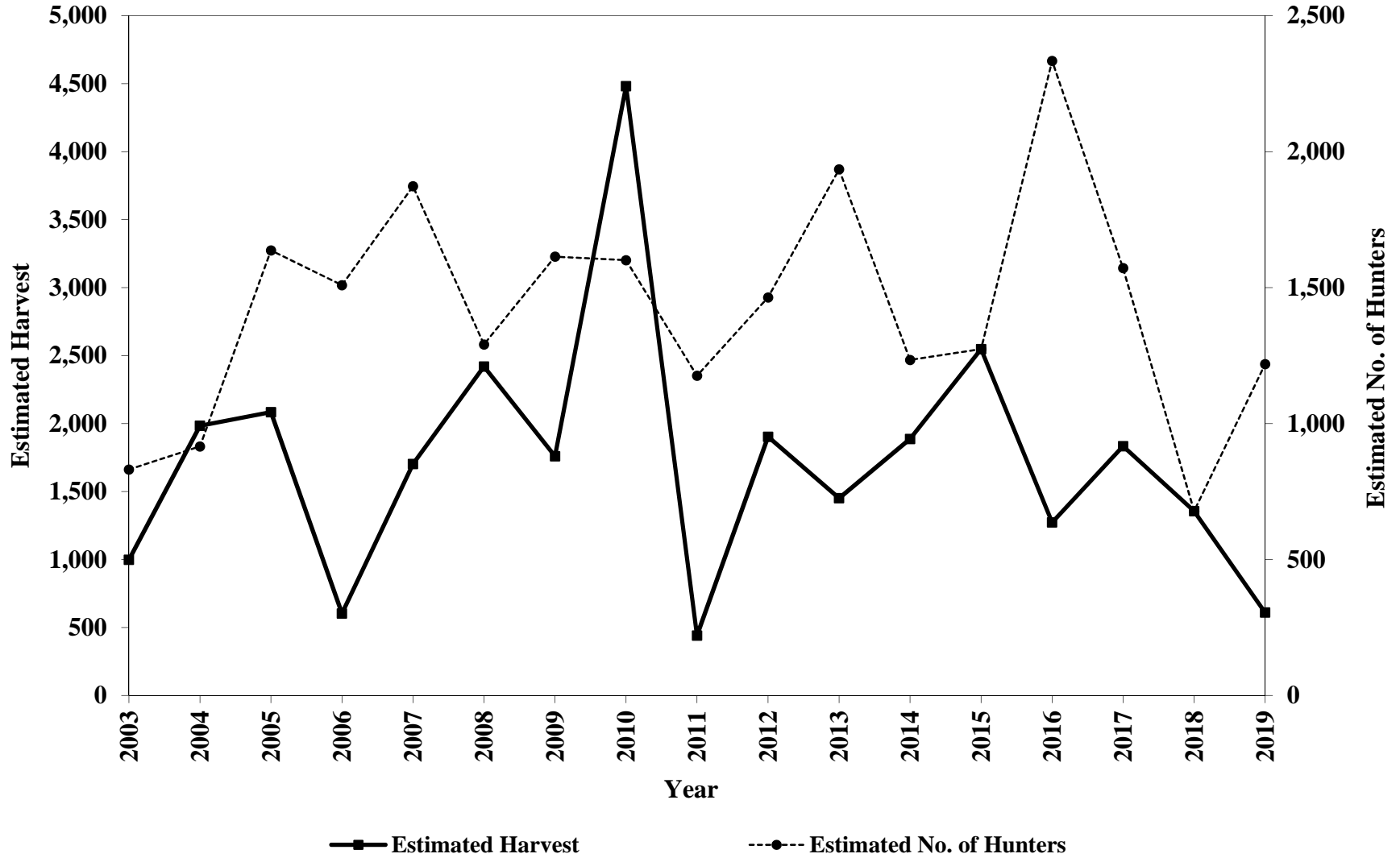
Figure A17. Statewide trends in estimated gray fox harvest and estimated number of gray fox hunters in Oklahoma, 2003-2019.
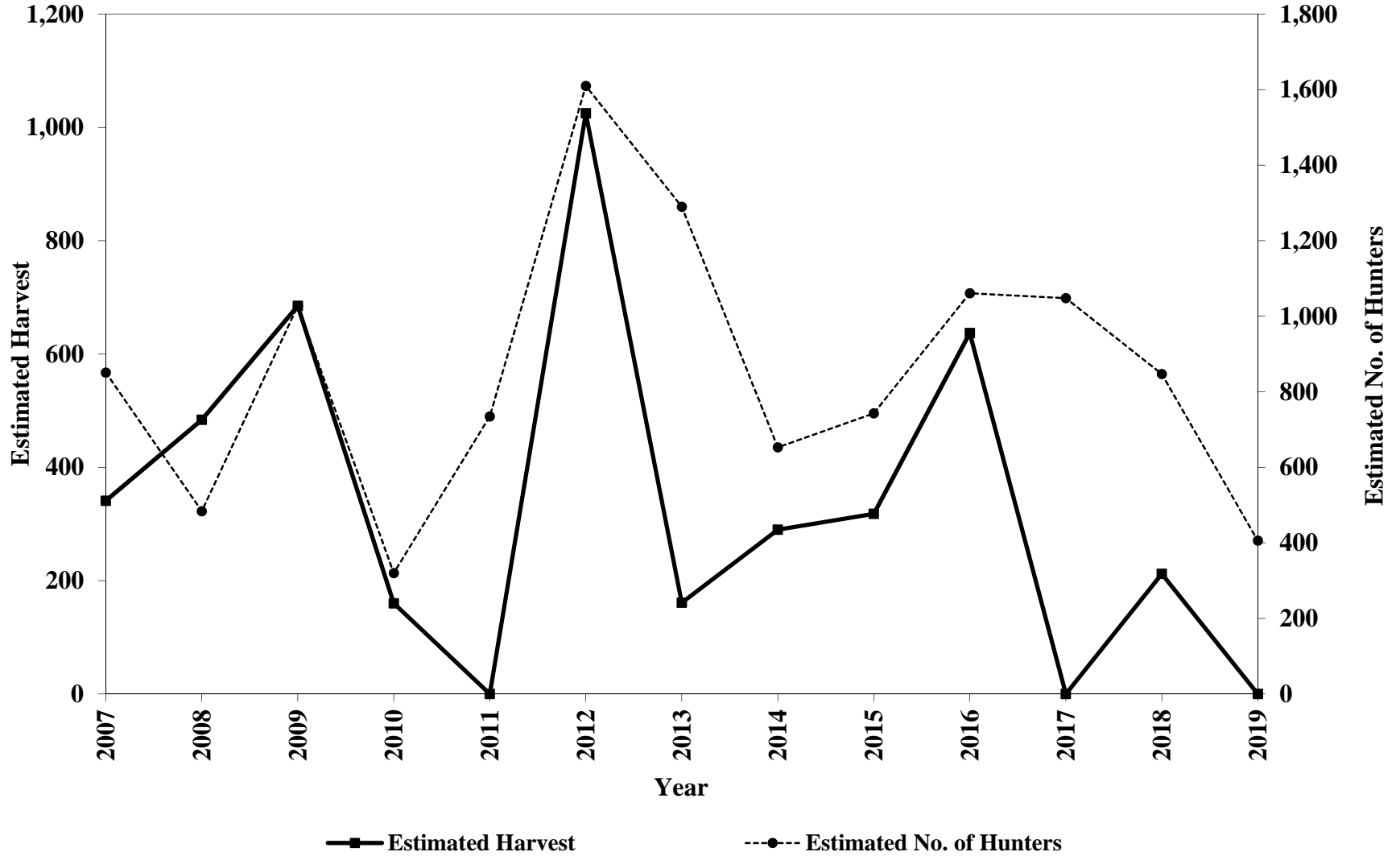
Figure A18. Statewide trends in estimated red fox harvest and estimated number of red fox hunters in Oklahoma, 2007-2019.

River Otter
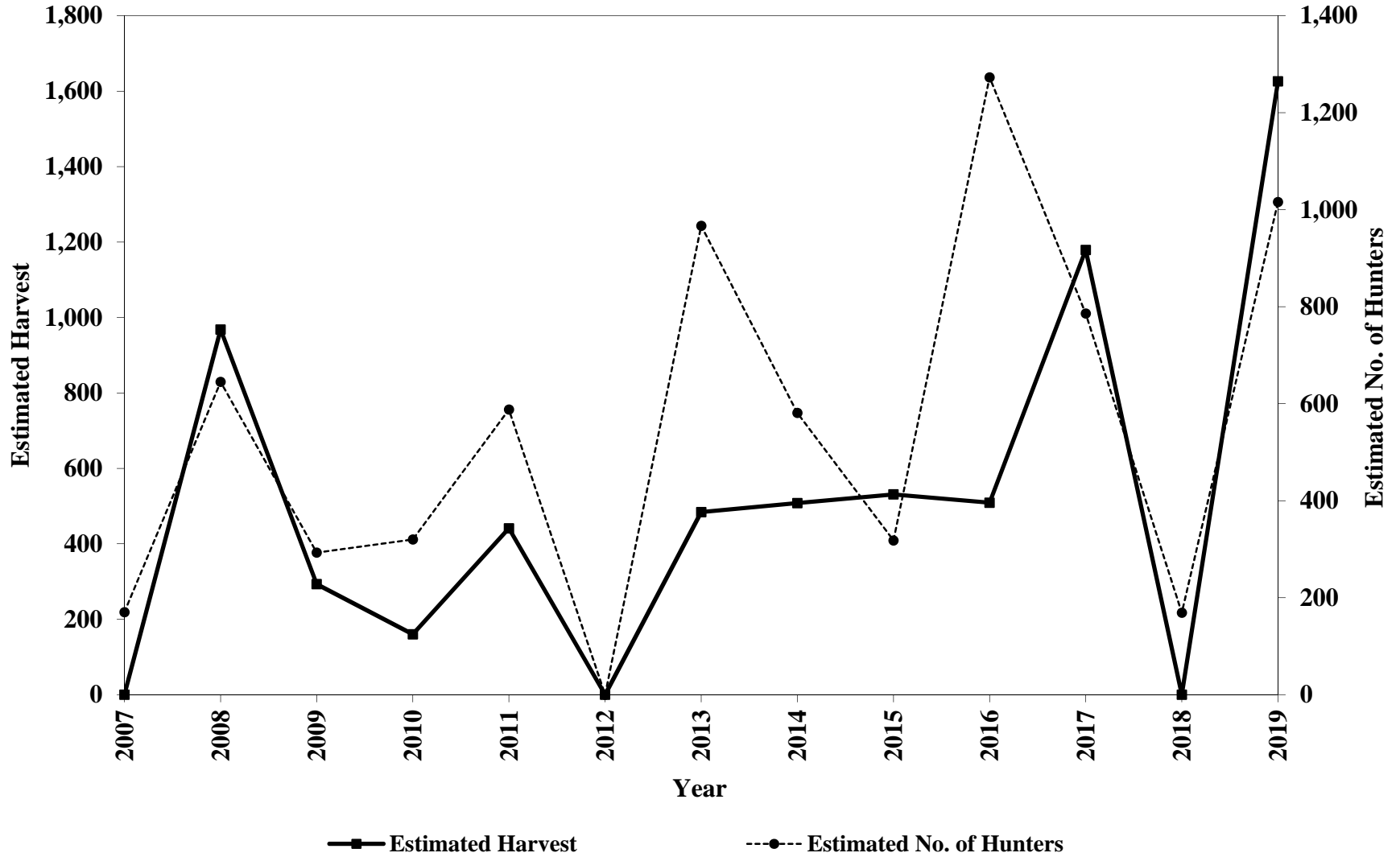
Figure A19. Statewide trends in estimated river otter harvest and estimated number of river otter hunters in Oklahoma, 2007-2019.

APPENDIX B

Human Dimensions Issues – Tables and Graphs

Table B1. Rate of participation in specific 2019 hunting seasons by all license holders, and by license type. (*Small sample size.)

| Hunting Season | Total Sample Participation (n = 2,447) | | Participation by License Type | | | | | |
| | | | Lifetime (n = 748) | | Annual/Five-Year (n = 936) | | Senior (n = 441) | |
	Season *n*	Percent	Season *n*	Percent	Season *n*	Percent	Season *n*	Percent
Any Hunting	1,557	63.6	561	75.0	766	81.8	81	18.4
Deer (Overall)	1,309	53.5	518	69.3	610	65.2	54	12.2
Gun	1,081	44.2	452	60.4	473	50.5	47	10.7
Primitive Firearms	485	19.8	281	37.6	133	14.2	20	4.5
Archery	733	30.0	320	42.8	323	34.5	32	7.3
Special Antlerless	196	8.0	102	13.6	69	7.4	10	2.3
Youth Season	37	1.5	13	1.7	24	2.6	0	0.0
Turkey (Overall)	342	14.0	195	26.1	91	9.7	13	2.9
Spring Turkey	310	12.7	182	24.3	76	8.1	12	2.7
Fall Turkey	88	3.6	41	5.5	25	2.7	7	1.6
Dove	345	14.1	136	18.2	168	17.9	17	3.9
Feral Swine	342	14.0	168	22.5	134	14.3	9	2.0
Ducks	267	10.9	102	13.6	145	15.5	5	1.1
Geese	143	5.8	50	6.7	84	9.0	4	0.9
Squirrel (Overall)	234	9.6	112	15.0	70	7.5	19	4.3
Fox Squirrel	188	7.7	96	12.8	50	5.3	16	3.6
Gray Squirrel	174	7.1	83	11.1	47	5.0	0	0.0
Quail	120	4.9	56	7.5	42	4.5	15	3.4
Furbearers (Overall)	170	6.9	93	12.4	58	6.2	5	1.1
Coyote	140	5.7	75	10.0	50	5.3	4	0.9
Raccoon	51	2.1	29	3.9	15	1.6	1	0.2
Bobcat	38	1.6	26	3.5	10	1.1	0	0.0
Beaver*	13	0.5	7	0.9	3	0.3	0	0.0
Gray Fox*	6	0.2	3	0.4	3	0.3	0	0.0
Red Fox*	2	0.1	0	0.0	2	0.2	0	0.0
Otter*	5	0.2	3	0.4	0	0.0	0	0.0
Rabbit (Overall)	100	4.1	36	4.8	38	4.1	9	2.0
Cottontail Rabbit	92	3.8	33	4.4	35	3.7	8	1.8
Swamp Rabbit*	17	0.7	6	0.8	5	0.5	2	0.5
Jackrabbit*	5	0.2	1	0.1	4	0.4	0	0.0
Pheasant	61	2.5	20	2.7	33	3.5	5	1.1
Crow	42	1.7	14	1.9	18	1.9	3	0.7
Woodcock*	3	0.1	2	0.3	0	0.0	1	0.2

Table B1 (continued). Rate of participation in specific 2019 hunting seasons by all license holders, and by license type. (*Small sample size.)

Hunting Season	Choctaw Tribal Compact (n = 209)		Cherokee Nation Compact (n = 113)	
	Season *n*	Percent	Season *n*	Percent
Any Hunting	100	47.8	49	43.4
Deer (Overall)	83	39.7	44	38.9
Gun	73	34.9	36	31.9
Primitive Firearms	33	15.8	18	15.9
Archery	40	19.1	27	23.9
Special Antlerless	10	4.8	5	4.4
Youth Season*	0	0.0	0	0.0
Turkey (Overall)	35	16.7	8	7.1
Spring Turkey	31	14.8	9	8.0
Fall Turkey	11	5.3	4	3.5
Dove	17	8.1	7	6.2
Feral Swine	23	11.0	8	7.1
Ducks	10	4.8	5	4.4
Geese*	3	1.4	2	1.8
Squirrel (Overall)	24	11.5	9	8.0
Fox Squirrel	20	9.6	6	5.3
Gray Squirrel	22	10.5	8	7.1
Quail*	5	2.4	2	1.8
Furbearers (Overall)*	9	4.3	5	4.4
Coyote*	7	3.3	4	3.5
Raccoon*	5	2.4	1	0.9
Bobcat*	2	1.0	0	0.0
Beaver*	1	0.5	2	1.8
Gray Fox*	0	0.0	0	0.0
Red Fox*	0	0.0	0	0.0
Otter*	1	0.5	1	0.9
Rabbit (Overall)	12	5.7	5	4.4
Cottontail Rabbit	11	5.3	5	4.4
Swamp Rabbit*	3	1.4	1	0.9
Jackrabbit*	0	0.0	0	0.0
Pheasant*	1	0.5	2	1.8
Crow*	3	1.4	4	3.5
Woodcock*	0	0.0	0	0.0

"Did you hunt in Oklahoma during 2019?"

☐ Lifetime license holders (n = 747)
■ Annual/Five-Year license holders (n = 938)
▨ Senior license holders (n = 434)
⣿ Tribal license holders (n=319)
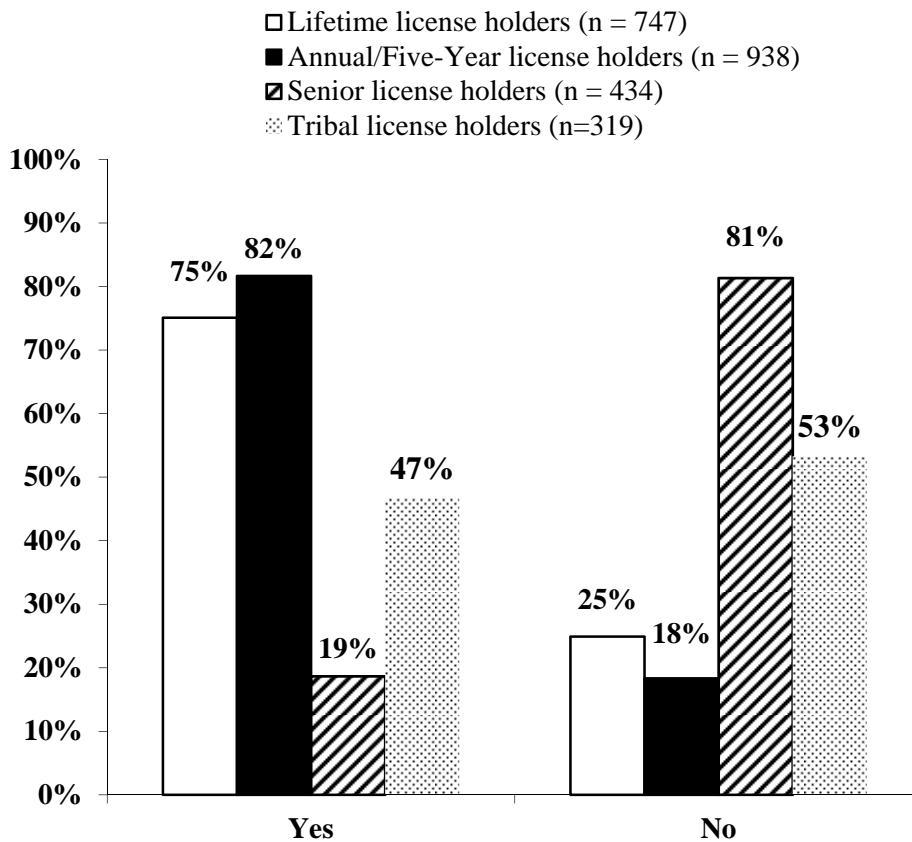
Figure B1. Distribution of hunting license holder participation in hunting activities during 2019, by license category. Both hunting and combination-hunting-and-fishing licenses were included in all license categories (n = 2,438).
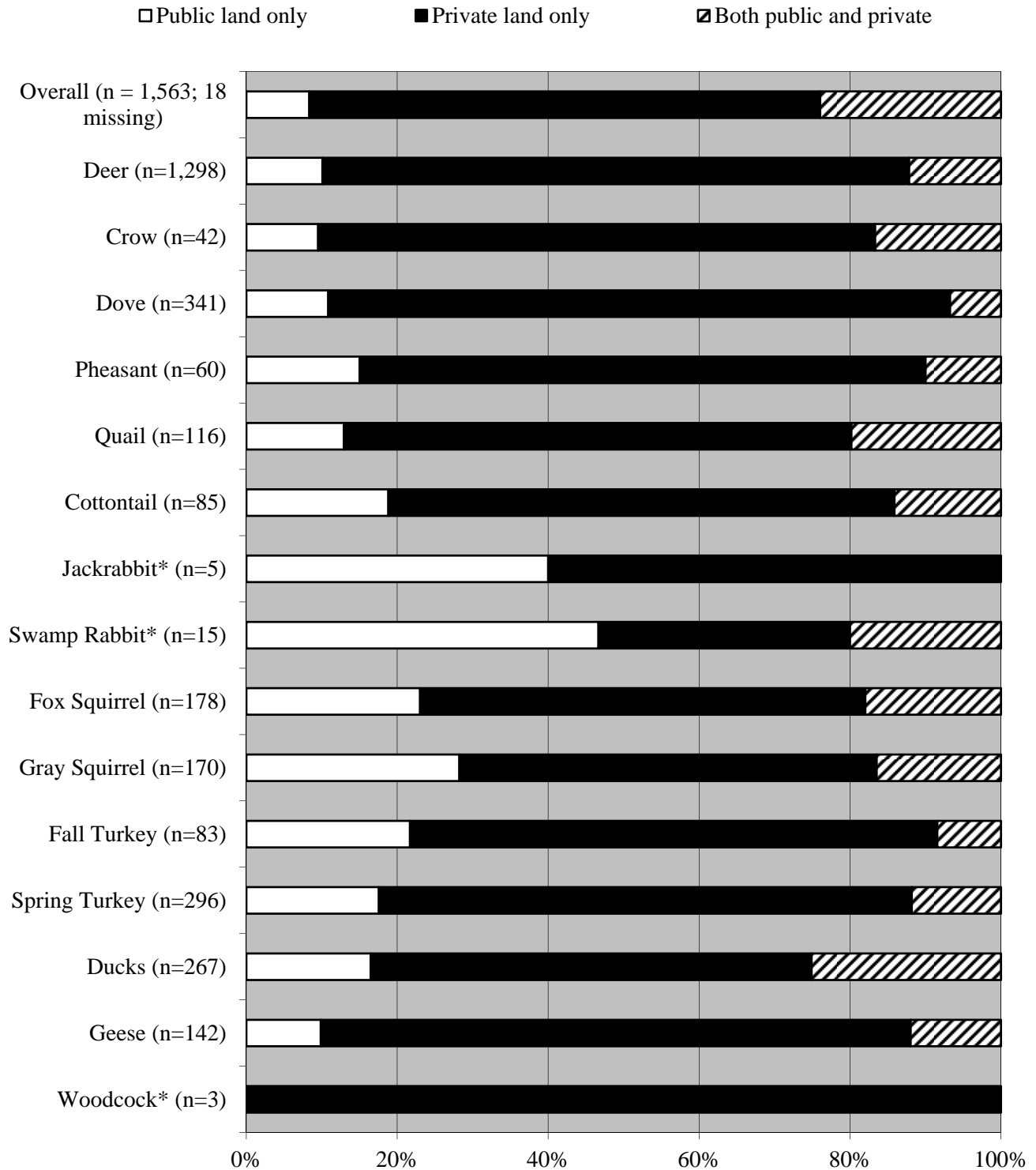
Figure B2. Distribution of land use for specific hunting seasons during 2019. Sample sizes and missing data vary for each species. *Small sample size.

"Did you use public land for any portion of your hunting in Oklahoma during 2019?"

<u>All hunting license holders</u>
(*n* = 2,447; 15 missing)

public land?

Yes
21%

No
43%

Did not
hunt in
2019
36%

<u>Active</u> hunting license holders
(*n* = 1,557; 15 missing)

No
68%

Yes
32%
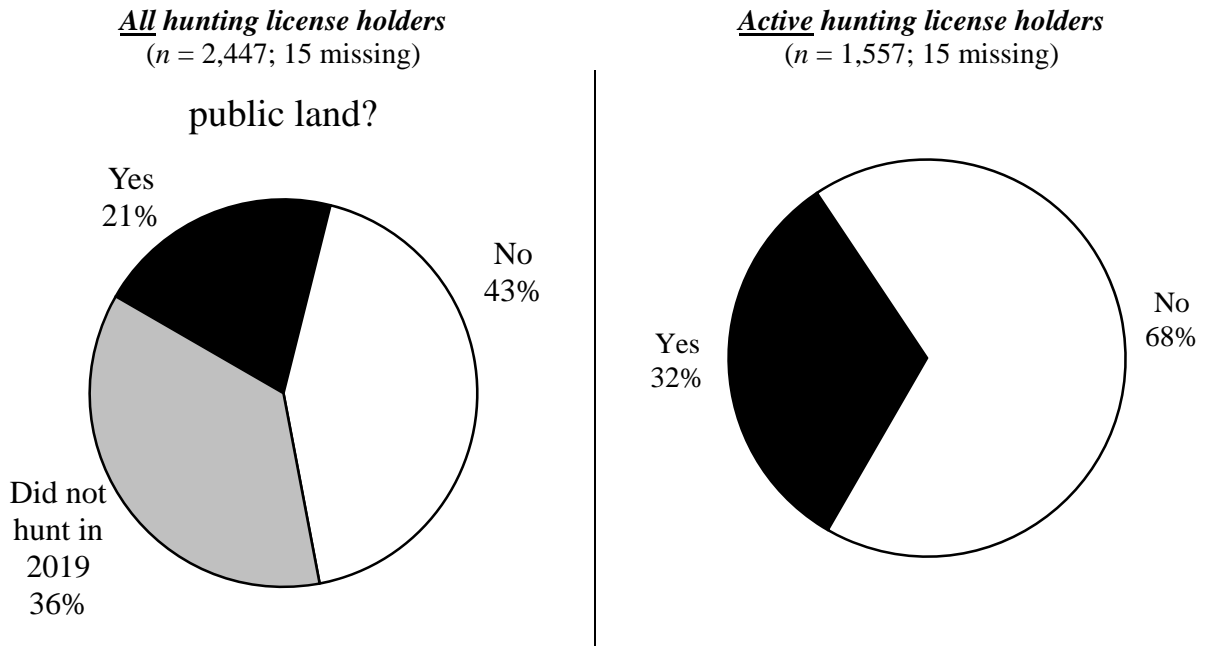
Figure B3. Distribution of hunting license holder use of public land during the 2019 hunting season.

"Considering all Oklahoma hunting seasons in 2019, how much of your hunting occurred on public vs. private land?"

Averaged across <u>active</u> hunters (*n* = 1,557)

Private
Land
81%
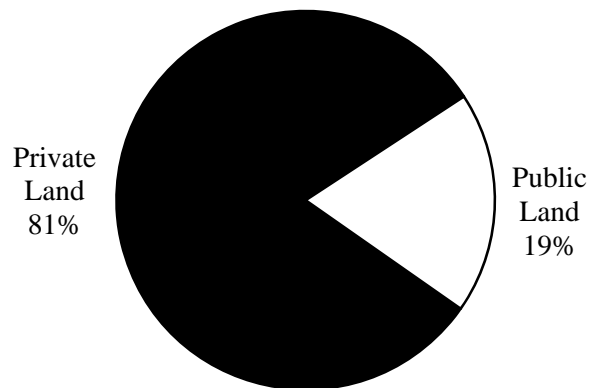
Public
Land
19%

Figure B4. Average proportion of 2019-season hunting that occurred on public or private land, by license holders who hunted during 2019.

"Please check the box for each part of Oklahoma where you hunted on public land during 2019, based on the major highways:"

Active hunters 2019 ($n = 1{,}557$)

I-35

☑ 6%   ☑ 13%

I-40

☑ 5%   ☑ 15%
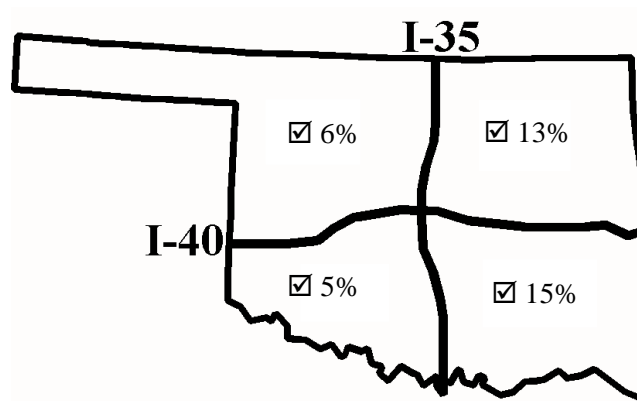
Figure B5. Use of public land located in each region, by active hunting license holders in 2019.

Participation in Specific Deer Seasons
2019-season deer hunters (*n* = 1,309)
(*Senior citizen license holders excluded for Youth Season
as they could not possibly be an active hunter in the youth season.)

Multiple responses allowed
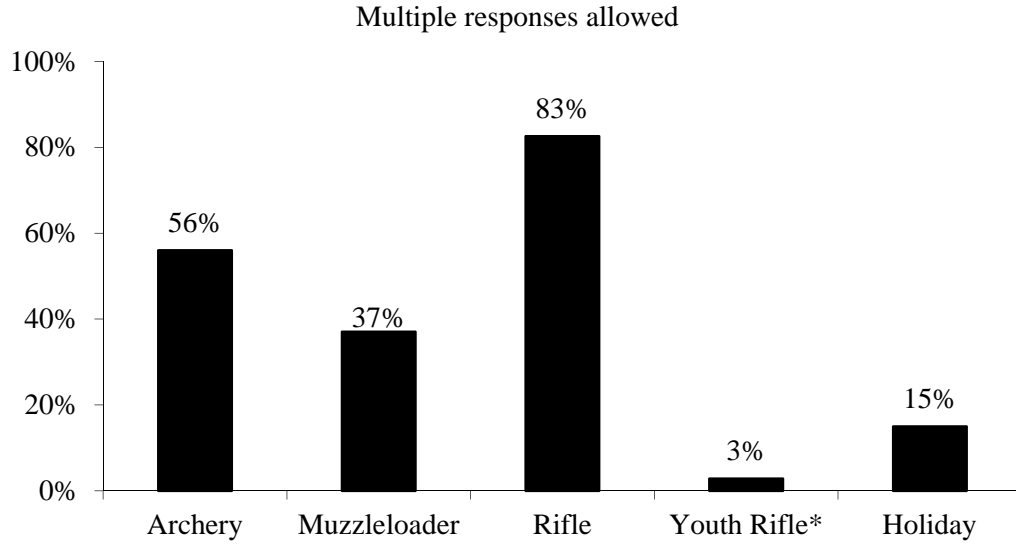
Figure B6. Participation in individual deer seasons, by 2019-season deer hunters.

Patterns of Participation: Number of Deer Seasons
2019-season deer hunters (*n* = 1,299)
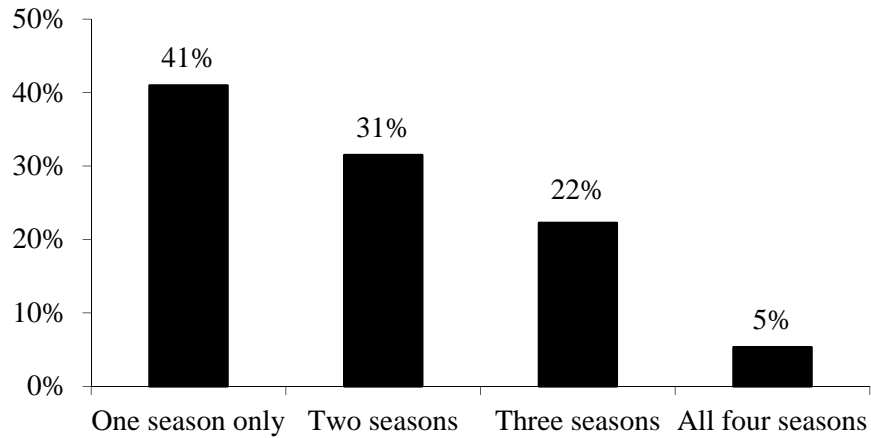
Figure B7. Number of deer seasons (archery, primitive, gun and holiday season; youth season excluded) participated in by 2019-season deer hunters.

Patterns of Participation: Specific Deer Seasons
2019-season deer hunters (*n* = 1,309)

Category	Percentage
Archery only	12%
Muzzleloader only	2%
Gun only	26%
Holiday only	0%
Muzzleloader & holiday	0%
Gun & holiday	3%
Muzzleloader & gun	9%
Archery & holiday	0%
Archery & gun	16%
Archery & muzzleloader	2%
Muzzleloader, gun & holiday	2%
Archery, muzzleloader, holiday	0%
Archery, gun, holiday	3%
Archery, muzzleloader, gun	17%
All four deer seasons	5%
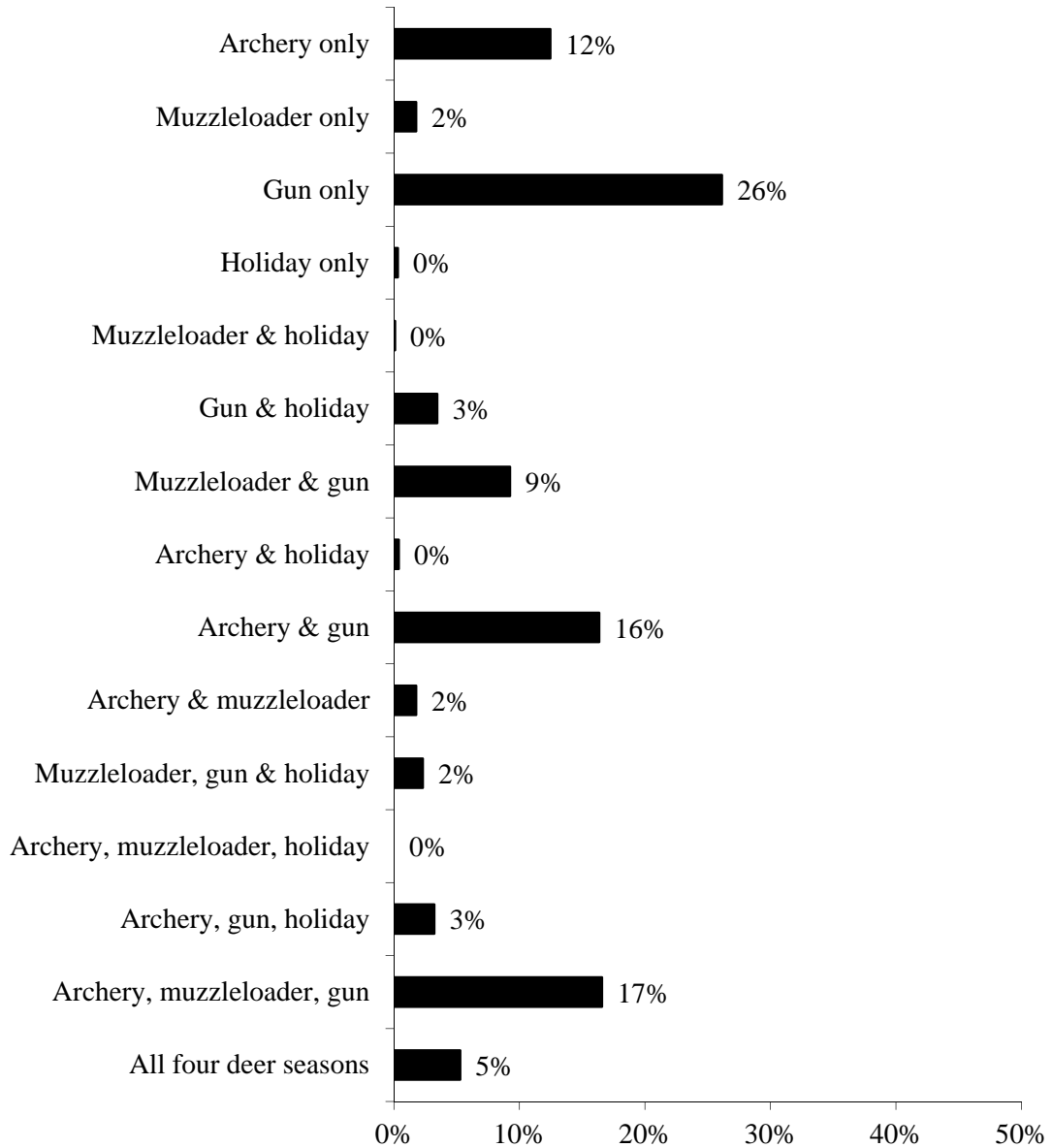
Figure B8. Specific deer seasons (archery, primitive, gun and holiday antlerless season; youth season excluded) participated in by 2019-season deer hunters.

Other Deer Hunting by Youth Season Participants
2019 youth deer season hunters (*n* = 37)

No other season 11%

Archery 54%

Muzzeloader 27%

Regular rifle 73%

Holiday season 8%

0% 20% 40% 60% 80% 100%
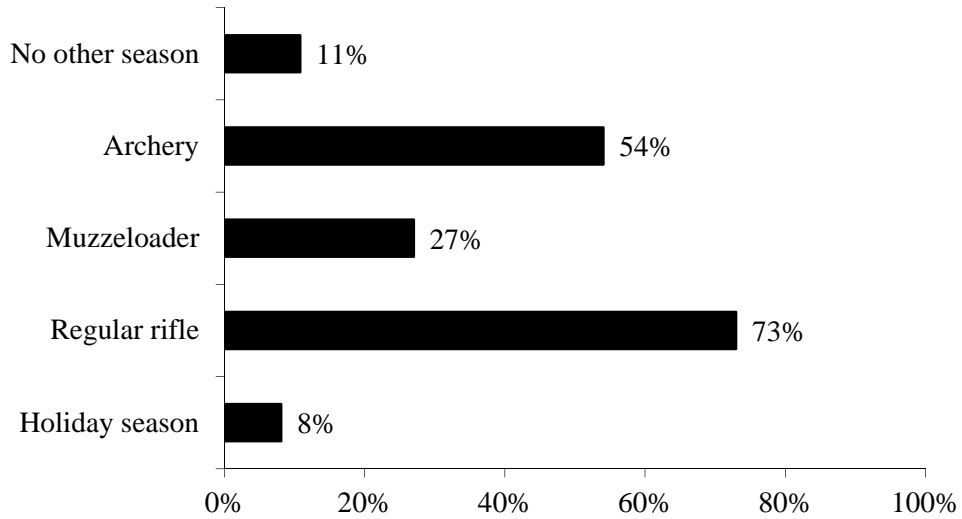
Figure B9. Participation in other deer seasons by 2019 youth deer season hunters.

Total Number of Deer Harvested Per Hunter
2019-season deer hunters (*n* = 1,309)

■ **Total Number of Bucks:** annual limit of 2 in archery, muzzleloader, gun & youth combined

▨ **Total Number of Does:** annual limit of 7 in archery, muzzleloader, gun, youth & the holiday antlerless season combined

▦ **Total Number of Deer:** annual limit of 7 in archery, muzzleloader, gun, youth & the holiday antlerless season combined

100%

80%

60%

40%

20%

0%

0 1 2 3 4 5 6 7
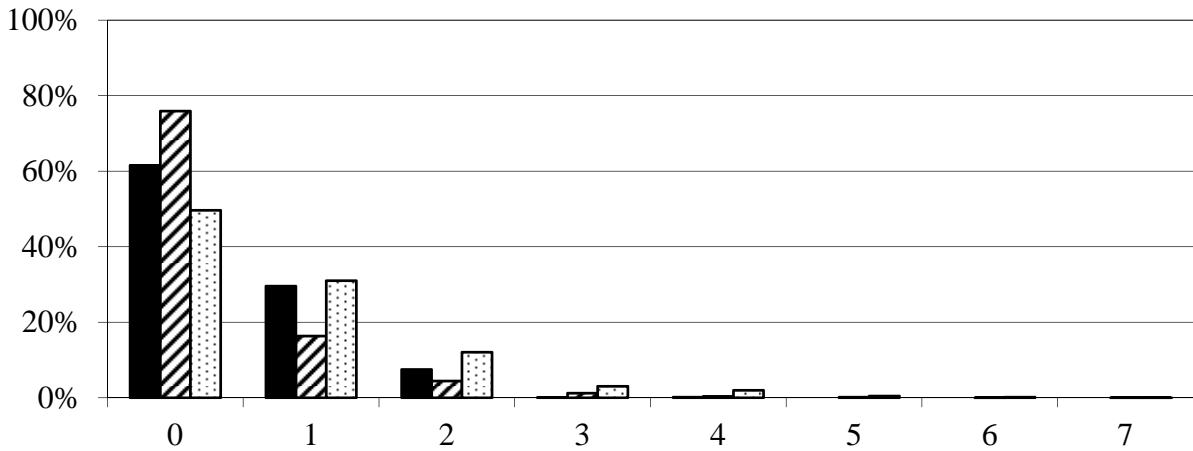
Figure B10. Total number of deer harvested per hunter across all 2019 seasons: archery, muzzleloader, gun, youth, and the holiday antlerless season.

"How much of your archery hunting was done with a crossbow?"
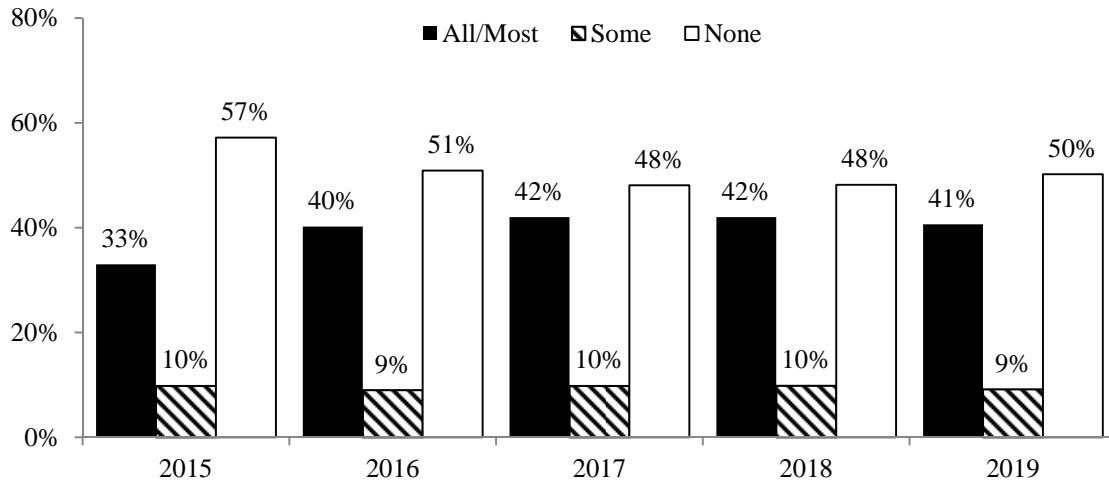
Figure B11. Crossbow use by 2015 archery deer hunters (*n* = 780); 2016 (*n* = 470); 2017 (*n* = 376); 2018 (*n* = 600); 2019 (n=731).

**Reasons for Not Hunting by
Inactive Hunting License Holders**
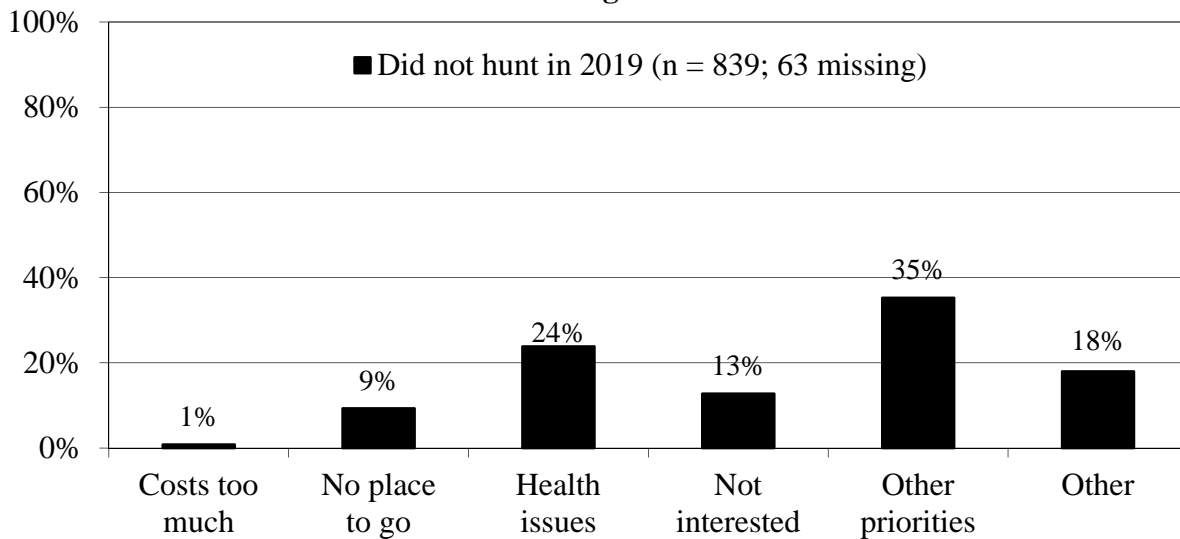
Figure B12. Barriers to hunting participation, by hunting license holders who were inactive in 2019

[Asked of hunters who used public land:]
"Overall, how would you rate your satisfaction with the public land you hunted on?"
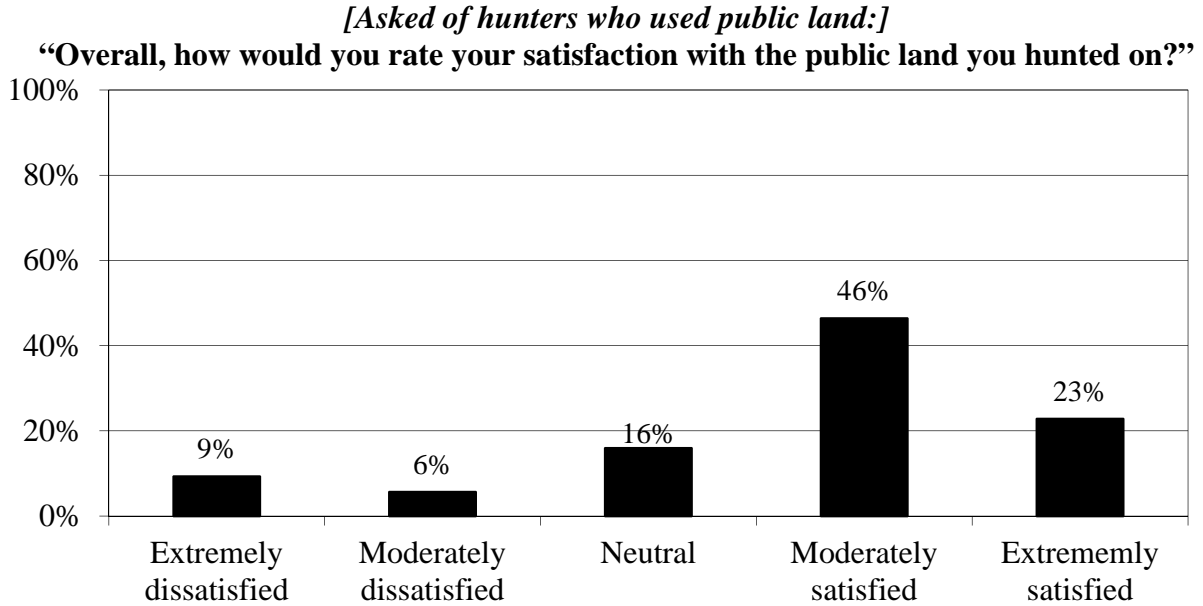
Figure B13. Satisfaction with public land hunting, by 2019 public land hunters ($n = 496$; excludes 3 respondents who selected "No opinion/Don't know").

[Asked of hunters who used public land:]
"Overall, how important to your hunting experience is public land?"
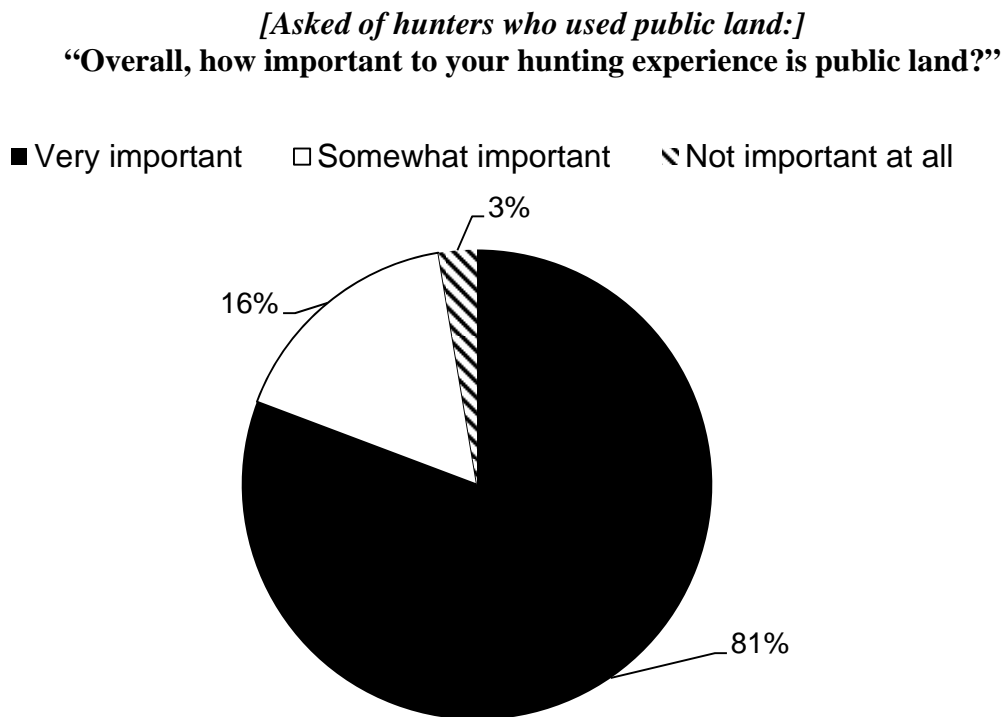
Figure B14. Importance of public land, by 2019 public land hunters ($n = 493$; excludes 6 respondents who selected "No opinion/Don't know").

"In the past three years have you applied for a controlled hunt in Oklahoma?"
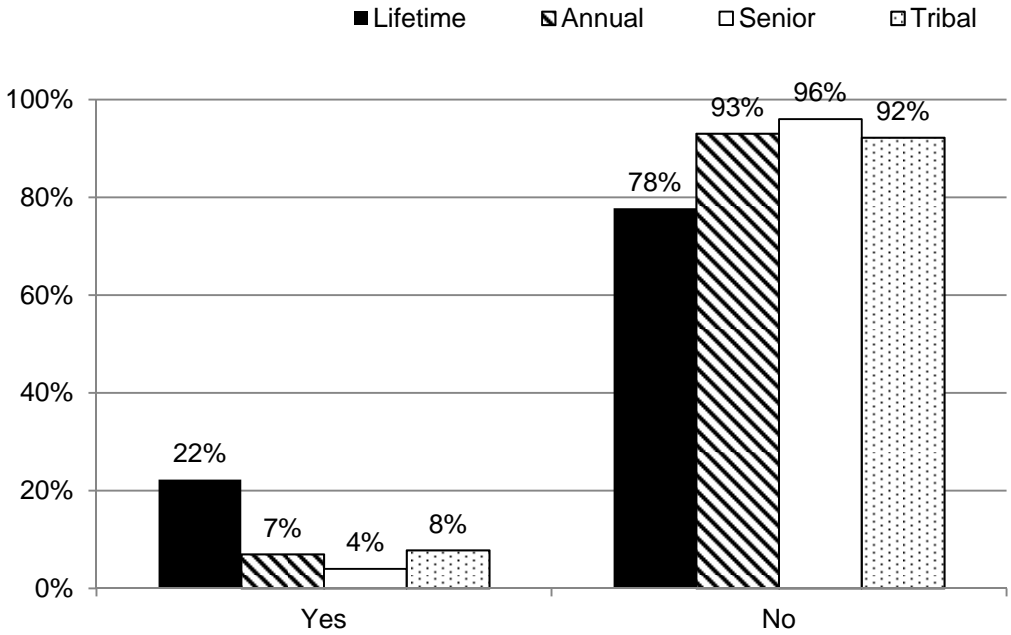
Figure B15. Controlled hunt application frequency of different license types
(*n* = 2,360; missing 87)

[Asked of all that said they had participated in a controlled hunt in the last three years]
"How satisfied were you with your controlled hunt hunting experience?"
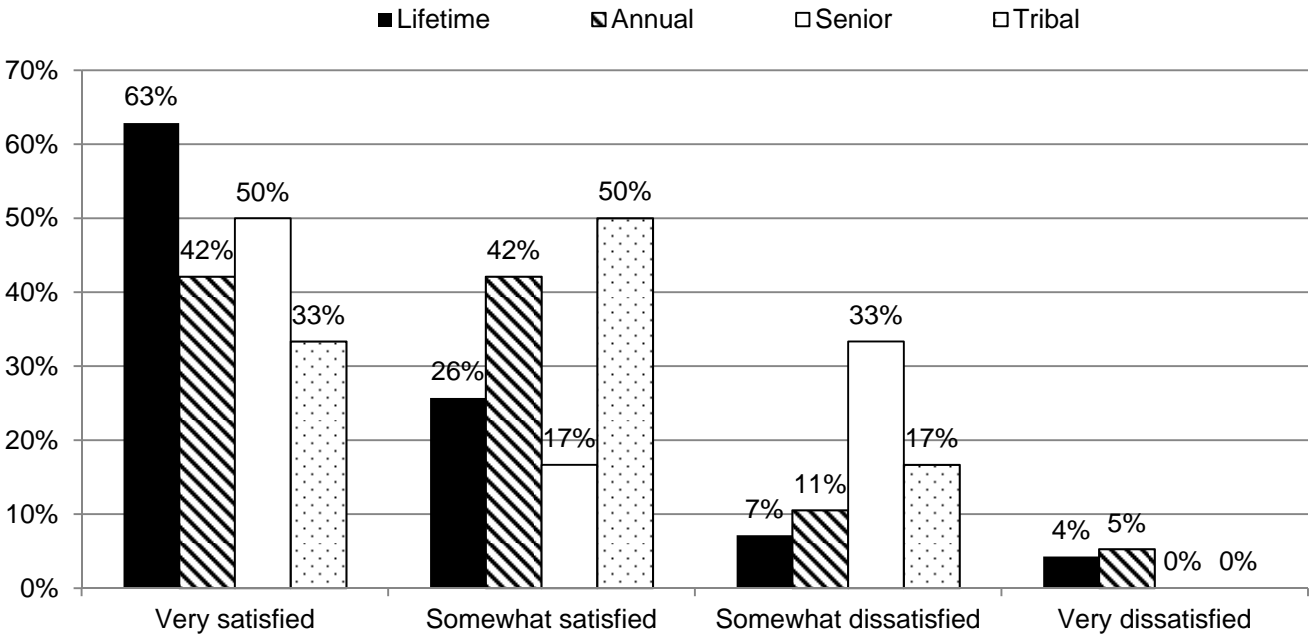
Figure B16. Satisfaction with controlled hunt hunting experience (*n* = 101)

"How would you prefer Wildlife management Areas be managed?"

■ Lifetime ◨ Annual □ Senior ▫ Tribal
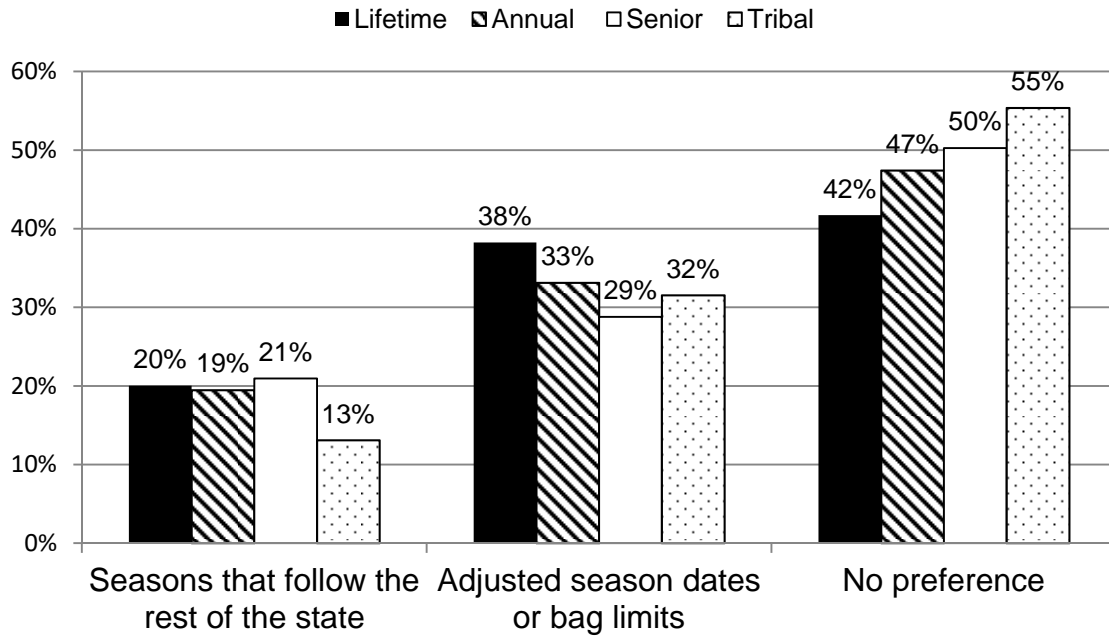
Figure B17. Preference for Wildlife Management Area regulations (*n* = 2,308)

[*Asked of all license holders*]
"If the Department had $10 to split between habitat improvements and infrastructure, how would you recommend that the money be split?"

2019

$3.51

$6.49

■ Improving land for fish and wildlife
□ Improving the area's infrastructure

1997

$2.44

$7.56

■ Improving land for fish and wildlife
□ Improving the land for visitors
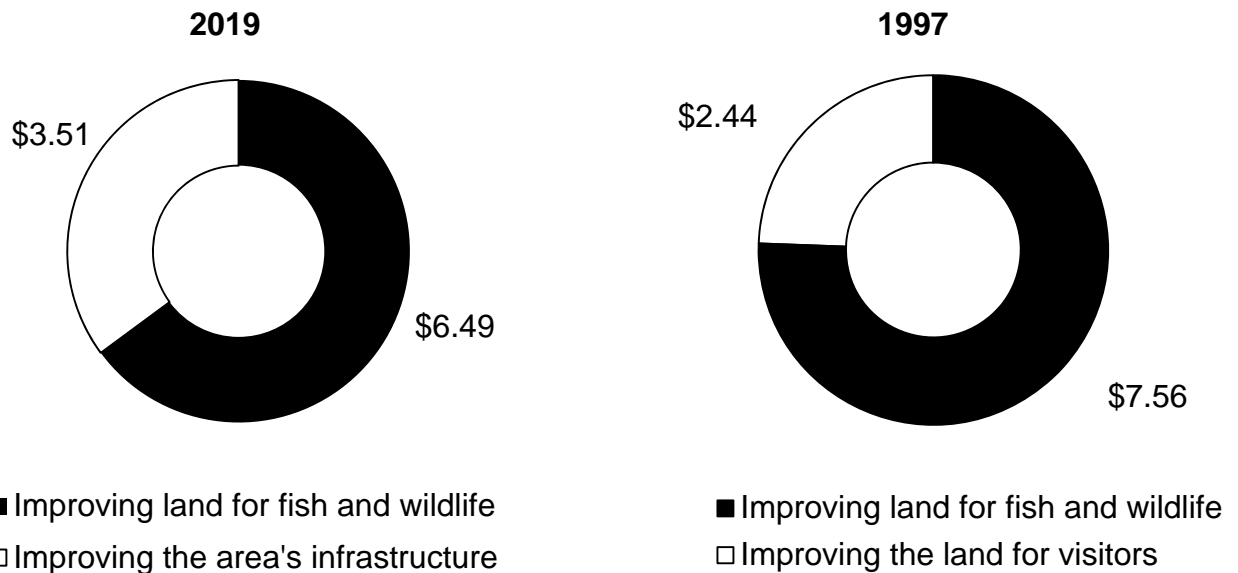
Figure B18. Comparison in desired spending allotment between 2019 and 1997 (*2019, n=1883; 1997, n=881*)

"Which of the following Wildlife Management Area improvements are important to you? *Check all that apply.*"
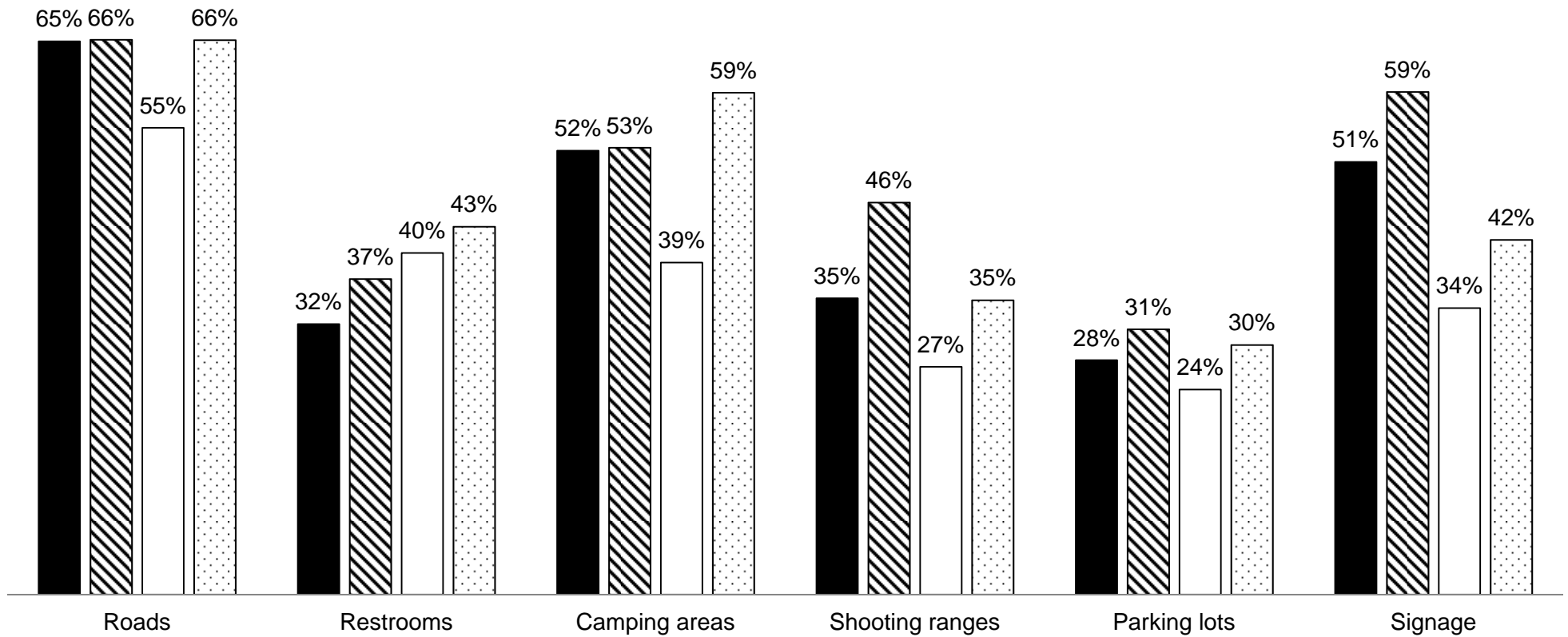
Figure B19. Wildlife management improvements important to hunting license holders in Oklahoma

"Should future legislation and hunting regulations…"

Completely favor resident hunting opportunity — 40%

Somewhat favor resident hunting opportunity — 22%

Equal focus on resident and non-resident hunting opportunity — 23%

Somewhat favor non-resident hunting opportunity — 1%

Completely favor non-resident hunting opportunity — 0%

No opinion/Don't know — 9%

0%   20%   40%   60%
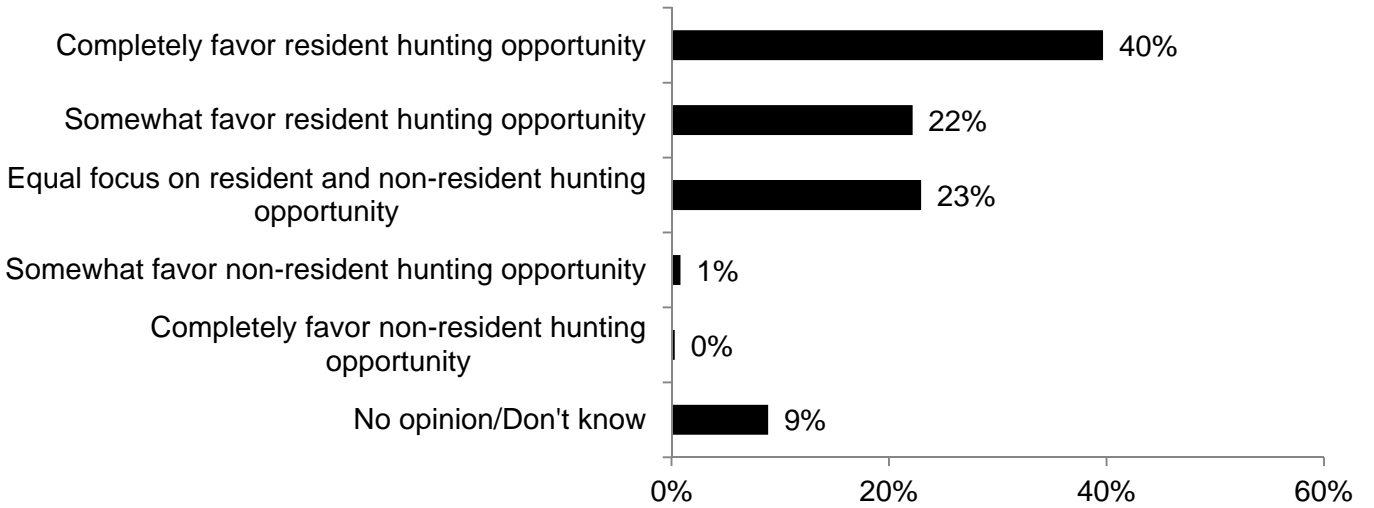
Figure B20. Hunter preference for focus of future legislation and regulations (n=2,422)

[*Asked of all license holders*]
"Did you take a new hunter with you to hunt during 2019?"

⧄ Yes   ☐ No   ■ I did not hunt in 2019

27%   21%

52%
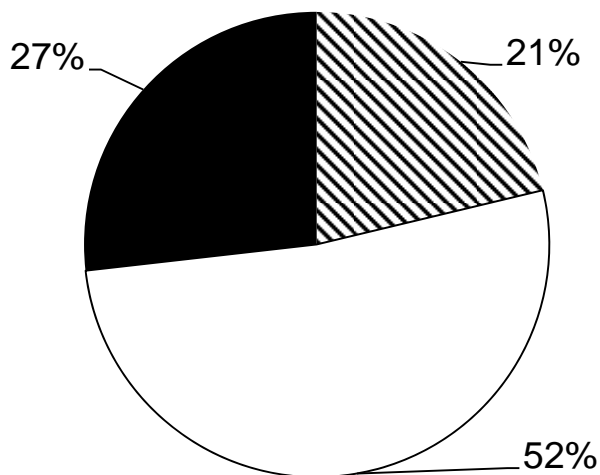
Figure B21. Percentage of current hunters who took a new hunter with them to hunt (n=2,362).

[*Asked of active 2019 hunters that did not take a new hunter with them during 2019*]
"Why did you not take a new hunter?"
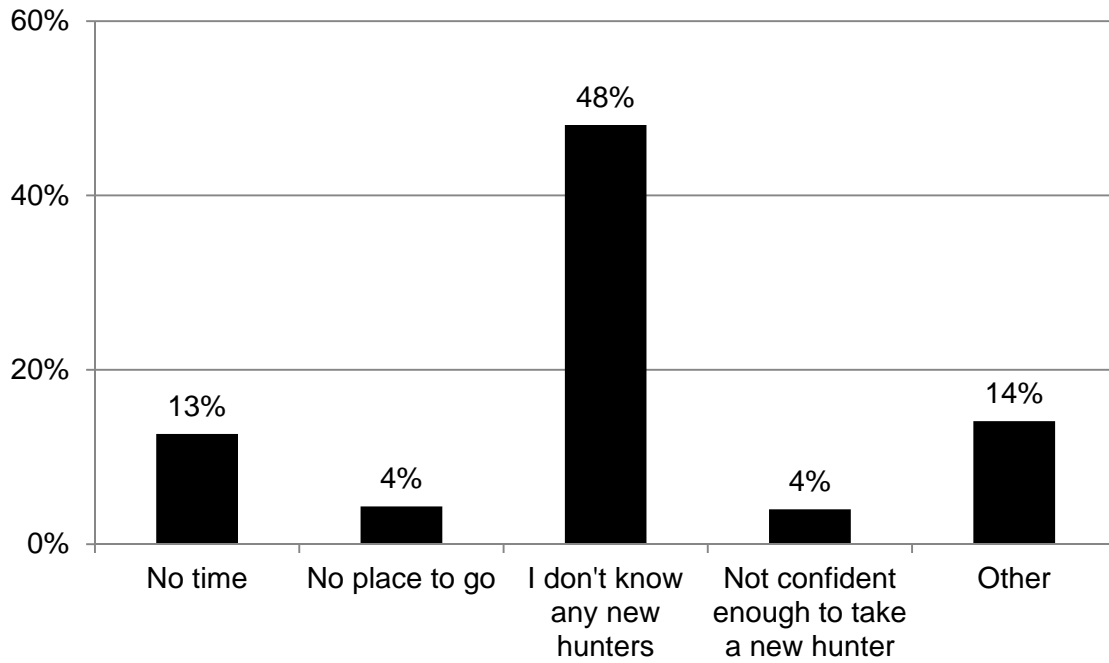
Figure B22. Reasons for current hunters to not recruit new hunters (n=1,020)

[*Asked of all license holders*]
"What was the first species you recall ever hunting?"
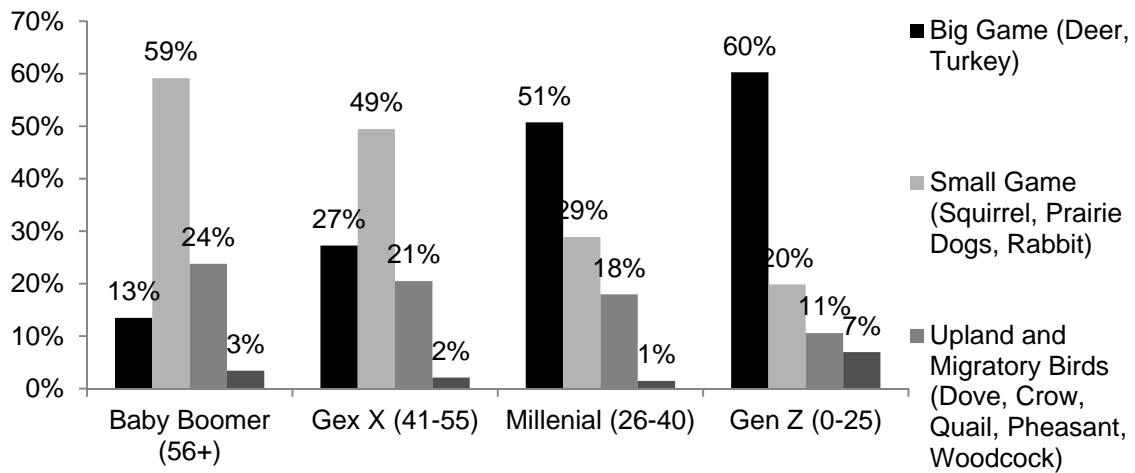
Figure B23. Generational breakdown of first species every pursued while hunting. Species were asked individually, but are presented in groups of game animals for ease of presentation.

[*Asked of all license holders*]
"Are you able to access information from the Wildlife Department online?"
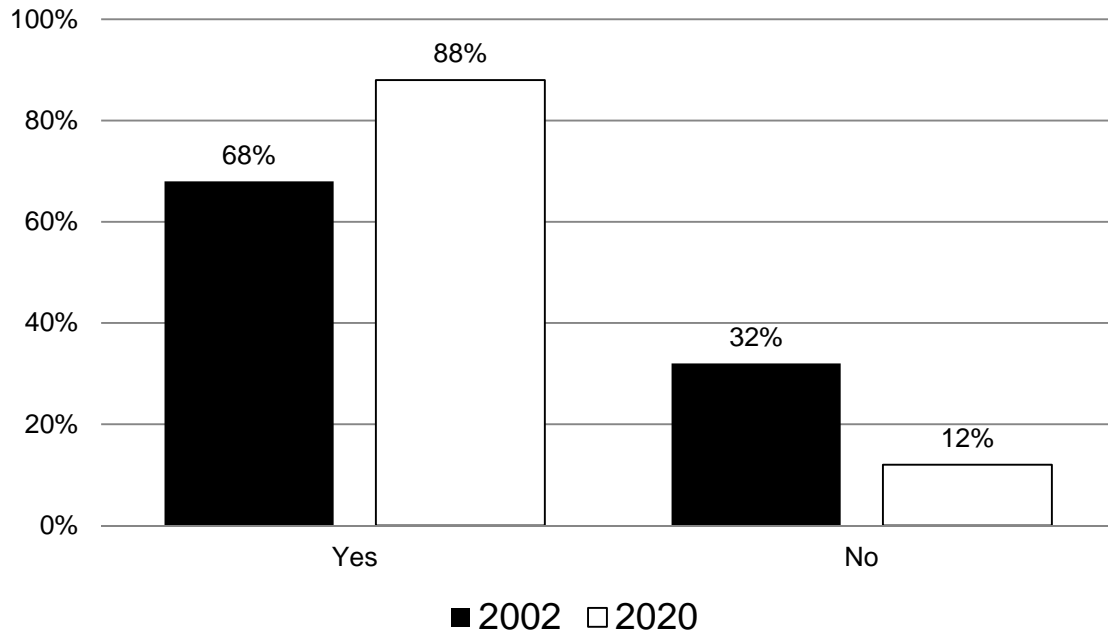
Figure B24. Breakdown of access to internet in 2002 compared to 2020 (n=2,322)

APPENDIX C
Survey Instrument

2019-Season Game Harvest Survey

Please help the Wildlife Department by participating in this study, **even if you did not hunt last year!**

Congratulations, you are one of a few hunting license holders that the Oklahoma Department of Wildlife Conservation (ODWC) has selected for a very important survey. We are interested in learning about the seasons you hunted in 2019 (if any) and the game you harvested. We need your help with this survey <u>even if you did not hunt</u>. Your answers will help us improve wildlife conservation in Oklahoma.

As a token of our appreciation, every 20th hunter to return their completed survey will receive a recently updated Wildlife Management Area atlas. The survey should take no more than 15 minutes of your time.

If you have any questions or would like a report of this study's findings, please contact Betsey York at (405) 401-7532 or betsey.york@odwc.ok.gov. Your help in this project is greatly appreciated, and we look forward to learning about your 2019 hunting experiences!

Sincerely,

Betsey York
Human Dimensions Specialist

1. Did you hunt in Oklahoma during 2019?

☐ Yes → | If yes, please continue with survey on the next page →

☐ No → **1a**. What was the <u>main</u> reason you did not hunt last year?

| ☐ Costs too much | ☐ No place to go | ☐ Health |
| ☐ Not interested | ☐ Other priorities | ☐ Other |

If you did not hunt in 2019, please skip to question #29.
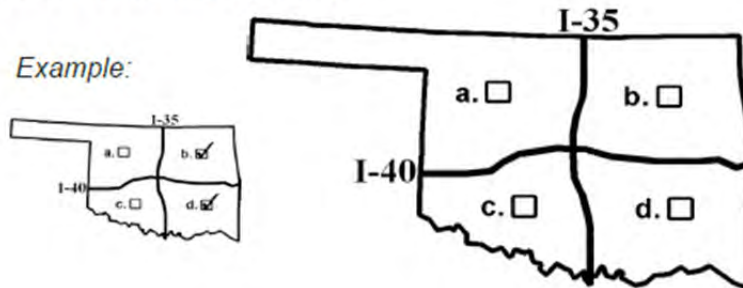
Public Land

2. Did you use <u>public land</u> for any portion of your hunting in Oklahoma during 2019?
   (Public land might include wildlife management areas, wildlife refuges, U.S. Army Corps of Engineers land, state parks, city-owned land, etc. NOT privately owned land.)
   - ☐ No → If no, please go to question #7 on next page.
   - ☐ Yes

3. Considering all Oklahoma hunting seasons in 2019, how much of your hunting occurred on public vs. private land?

   _____% Public land
   _____% Private land

   Total should equal: 100%

4. Please check (☑) the box for <u>each</u> part of Oklahoma where you hunted on public land during 2019, based on the major highways:

   Example:

5. Overall, how important to your hunting experience is public land?
   - ☐ Very important
   - ☐ Somewhat important
   - ☐ Not important at all

6. How satisfied were you with your public land hunting experience?

Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
☐	☐	☐	☐	☐

Hunting in Oklahoma During 2019

Please complete the box for each season <u>you</u> hunted in Oklahoma during 2019 (not others in your household or hunting party). If you are unsure about exact numbers, please estimate.

7. Quail

a. Did you hunt **quail** in Oklahoma during 2019? ☐ Yes ☐ No
   (If not, skip to next box.)

b. How many days did you hunt quail? _____

c. How many quail did you harvest? _____ Scaled quail
   _____ Bobwhite
   _____ Unsure of species
   ☐ None

d. County you hunted quail most often? _____
   (If unsure, what town is closest?)

e. Land used for quail hunting? ☐ Public ☐ Private ☐ Both

If you hunted quail on <u>public</u> land at all during 2019:
   f. How many days did you hunt quail on public land? _____
   g. How many quail did you harvest on public land? _____

8. Pheasant

a. Did you hunt **pheasant** in Oklahoma during 2019? ☐ Yes ☐ No
   (If not, skip to next box.)

b. How many days did you hunt pheasant? _____

c. How many pheasant did you harvest? _____ ☐ None

d. County you hunted pheasant most often? _____
   (If unsure, what town is closest?)

e. Land used for pheasant hunting? ☐ Public ☐ Private ☐ Both

If you hunted pheasant on <u>public</u> land at all during 2019:
   f. How many days did you hunt pheasant on public land? _____
   g. How many pheasant did you harvest on public land? _____

9. Dove

a. Did you hunt **dove** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt dove? _____
c. How many dove did you harvest? _____ ☐ None
d. County you hunted dove most often? _____
(If unsure, what town is closest?)
e. Land used for dove hunting? ☐ Public ☐ Private ☐ Both

If you hunted dove on <u>public</u> land at all during 2019:
f. How many days did you hunt dove on public land? _____
g. How many dove did you harvest on public land? _____

10. Woodcock

a. Did you hunt **woodcocks** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt woodcocks? _____
c. How many woodcocks did you harvest? _____ ☐ None
d. County you hunted woodcocks most often? _____
(If unsure, what town is closest?)
e. Land used for woodcock hunting? ☐ Public ☐ Private ☐ Both

If you hunted woodcocks on <u>public</u> land at all during 2019:
f. How many days did you hunt woodcocks on public land? _____
g. How many woodcocks did you harvest on public land? _____

11. Crow

a. Did you hunt **crows** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt crows? _____
c. How many crows did you harvest? _____ ☐ None
d. County you hunted crows most often? _____
(If unsure, what town is closest?)
e. Land used for crow hunting? ☐ Public ☐ Private ☐ Both

If you hunted crows on <u>public</u> land at all during 2019:
f. How many days did you hunt crows on public land? _____
g. How many crows did you harvest on public land? _____

12. Spring Turkey

a. Did you hunt the **spring turkey season** in Oklahoma during 2019? ☐ Yes   ☐ No
(If not, skip to next box.)
b. How many days did you hunt spring turkey? _____
c. How many spring turkey did you harvest?   _____ ☐ None
d. County you hunted spring turkey most often? _____
(If unsure, what town is closest?)
e. Land used for spring turkey hunting?   ☐ Public   ☐ Private   ☐ Both

If you hunted turkey on <u>public</u> land at all during spring 2019:
  f. How many days did you hunt spring turkey on public land? _____
  g. How many spring turkeys did you harvest on public land? _____

13. Fall Turkey

a. Did you hunt the **fall turkey season** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt fall turkey? _____
c. What did you harvest?   ☐ Hen   ☐ Tom   ☐ No fall turkey harvested
d. County you hunted fall turkey most often? _____
(If unsure, what town is closest?)
e. Land used for fall turkey hunting?   ☐ Public   ☐ Private   ☐ Both

If you hunted turkey on <u>public</u> land at all during fall 2019:
  f. How many days did you hunt fall turkey on public land? _____
  g. How many fall turkeys did you harvest on public land? _____

14. Gray Squirrel

a. Did you hunt **gray squirrels** in Oklahoma during 2019?   ☐ Yes   ☐ No
(If not, skip to next box.)
b. How many days did you hunt gray squirrels? _____
c. How many gray squirrels did you harvest?   _____ ☐ None
d. County you hunted gray squirrels most often? _____
(If unsure, what town is closest?)
e. Land used for gray squirrel hunting?   ☐ Public   ☐ Private   ☐ Both

If you hunted gray squirrels on <u>public</u> land at all during 2019:
  f. How many days did you hunt gray squirrels on public land? _____
  g. How many gray squirrels did you harvest on public land? _____

15. Fox Squirrel

a. Did you hunt **fox squirrels** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt fox squirrels? _____
c. How many fox squirrels did you harvest? _____ ☐ None
d. County you hunted fox squirrels most often? _____
(If unsure, what town is closest?)
e. Land used for fox squirrel hunting? ☐ Public ☐ Private ☐ Both

If you hunted fox squirrels on <u>public</u> land at all during 2019:
  f. How many days did you hunt fox squirrels on public land? _____
  g. How many fox squirrels did you harvest on public land? _____

16. Cottontail Rabbit

a. Did you hunt **cottontail rabbits** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt cottontail rabbits? _____
c. How many cottontail rabbits did you harvest? _____ ☐ None
d. County you hunted cottontail rabbits most often?_____
(If unsure, what town is closest?)
e. Land used for cottontail rabbit hunting? Public ☐ Private ☐ Both

If you hunted cottontail rabbits on <u>public</u> land at all during 2019:
  f. How many days did you hunt cottontail rabbits on public land? _____
  g. How many cottontail rabbits did you harvest on public land? _____

17. Jackrabbit

a. Did you hunt **jackrabbits** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt jackrabbits? _____
c. How many jackrabbits did you harvest? _____ ☐ None
d. County you hunted jackrabbits most often? _____
(If unsure, what town is closest?)
e. Land used for jackrabbit hunting? ☐ Public ☐ Private ☐ Both

If you hunted jackrabbits on <u>public</u> land at all during 2019:
  f. How many days did you hunt jackrabbits on public land? ____
  g. How many jackrabbits did you harvest on public land? ____

18. Swamp Rabbit

a. Did you hunt **swamp rabbits** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. How many days did you hunt swamp rabbits? _____
c. How many swamp rabbits did you harvest? _____ ☐ None
d. County you hunted swamp rabbits most often? _____
(If unsure, what town is closest?)
e. Land used for swamp rabbit hunting? ☐ Public ☐ Private ☐ Both

If you hunted swamp rabbits on <u>public</u> land at all during 2019:
    f. How many days did you hunt swamp rabbits on public land? _____
    g. How many swamp rabbits did you harvest on public land? _____

19. Furbearers

a. Did you hunt or trap **furbearers** in Oklahoma during 2019?
☐ Yes ☐ No *(If not, skip to next box.)*

b. Which did you hunt or trap?		**c.** How many days?		**d.** How many did you harvest?
☐ Coyote	→	_____	→	_____
☐ Bobcat	→	_____	→	_____
☐ Raccoon	→	_____	→	_____
☐ Beaver	→	_____	→	_____
☐ Otter	→	_____	→	_____
☐ Gray fox	→	_____	→	_____
☐ Red fox	→	_____	→	_____

20. Ducks

a. Did you hunt **ducks** in Oklahoma during 2019? ☐ Yes ☐ No
(If not, skip to next box.)
b. Land used for duck hunting? ☐ Public ☐ Private ☐ Both

If you hunted ducks on <u>public</u> land at all during 2019:
    c. How many days did you hunt ducks on public land? _____
    d. How many ducks did you harvest on public land? _____

21. Geese

a. Did you hunt **geese** in Oklahoma during 2019?   ☐ Yes   ☐ No
(If not, skip to next box.)
b. Land used for goose hunting?   ☐ Public   ☐ Private   ☐ Both

If you hunted geese on <u>public</u> land at all during 2019:
c. How many days did you hunt geese on public land? _____
d. How many geese did you harvest on public land? _____

22. Feral Swine (feral hogs, feral pigs, etc.)

a. Did you shoot or trap <u>free-ranging</u> feral swine in   ☐ Yes   ☐ No
Oklahoma during 2019? *(If not, skip to question 23.)*

b. Land used to shoot or trap feral swine?   ☐ Public   ☐ Private   ☐ Both

Did you shoot, trap or do both?   ☐ Shoot   ☐ Trap
Check all that apply and fill in columns below.

c. How many days?   _____   _____

d. How many did you harvest?   _____   _____

e. County you shot/trapped most often?   _____   _____

Deer Hunting in 2019

23. Deer

a. Did you hunt **deer** in Oklahoma during 2019?

☐ Yes ☐ No → *(If you did <u>not</u> hunt deer during 2019, please skip to question 29.)*

b. County you hunted deer most often? _____
(If unsure, what town is closest?)

c. Land used for deer hunting?   ☐ Public   ☐ Private   ☐ Both

24. Deer: Archery Season

a. Did you hunt **deer** during <u>archery</u> season?   (Oct. 1, 2019 - Jan. 15, 2020)
☐ Yes   ☐ No   *(If not, skip to next box.)*

b. How much of your archery hunting was done with a crossbow?
☐   All or most   ☐   Some   ☐   None

c. How many **days** did you hunt during archery?   _____
d. Number of **bucks** harvested during archery?   _____ ☐ None
e. Number of **does** harvested during archery?   _____ ☐ None

25. Deer: Muzzleloader Season

a. Did you hunt **deer** during **muzzleloader** season?   (Oct. 26 – Nov. 3)
☐ Yes   ☐ No   *(If not, skip to next box.)*

b. How many **days** did you hunt during muzzleloader?   _____
c. Number of **bucks** harvested during muzzleloader?   _____ ☐ None
d. Number of **does** harvested during muzzleloader?   _____ ☐ None

26. Deer: Youth Gun Season

a. Did you participate in the **youth deer gun** season in October as a <u>youth hunter</u>? (Oct. 18 – 20)   *(If not, skip to next box.)*
☐   Yes   ☐ No

b. How many **days** did you hunt during youth season?   _____
c. Number of **bucks** harvested during youth season?   _____ ☐ None
d. Number of **does** harvest during youth season?   _____ ☐ None

27. Deer: Regular Gun Season

a. Did you hunt **deer** during the <u>**regular gun**</u> season? (Nov. 23 – Dec. 8)
☐ Yes ☐ No *(If not, skip to next box.)*

b. How many **days** did you hunt during gun season? _____

c. Number of **bucks** harvested during gun season? _____ ☐ None

d. Number of **does** harvest during gun season? _____ ☐ None

28. Deer: Holiday Antlerless Gun Season

a. Did you hunt **deer** during the <u>**holiday antlerless deer gun**</u> season? (Dec. 20 - 29)
☐ Yes ☐ No

b. How many **days** did you hunt during holiday season? _____

c. Did you harvest your bonus doe? ☐ Yes ☐ No

29. In the past *three years* have you **applied** for a controlled hunt in Oklahoma?

☐ No → please skip to **question 31** on next page.

☐ Yes → **29a.** Why did you apply? *Check all that apply.*

☐ Unique hunt location ☐ A place to take kids to hunt

☐ Nowhere else to hunt ☐ Opportunity to harvest a bonus deer

☐ Unique species opportunity ☐ Other: _____

30. In the past *three years* have you **participated** in a controlled hunt in Oklahoma?

☐ No → please skip to **question 31** on next page.

☐ Yes → **30a.** How satisfied were you with your controlled hunt hunting experience?

Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	No opinion
☐	☐	☐	☐	☐

Wildlife Department Funding Priorities

31. How would you prefer Wildlife Management Areas be managed?

- ☐ Seasons that follow the rest of the state
- ☐ Adjusted season dates or bag limits dependent on the WMA (size of area, habitat types, species availability, etc.)
- ☐ No preference

32. The Wildlife Department has a limited amount of money that it can spend to run Wildlife Management Areas. Some money can be spent on improving fish and wildlife habitat, and some can be spent on improving the area's infrastructure (roads, campsites, shooting ranges, etc.) If the Department had $10 to split between habitat improvements and infrastructure, how would you recommend that the money be split?

Improving the land for fish and wildlife: $_____

Improving the area's infrastructure: $_____

Total: $10

33. Considering that some money for WMA management will be spent on infrastructure improvements, which of the following improvements are important to you?
Check all that apply.

- ☐ Roads
- ☐ Restrooms
- ☐ Camping areas
- ☐ Shooting ranges
- ☐ Parking lots
- ☐ Signage

34. Should future legislation and hunting regulations…

- ☐ Completely favor resident hunting opportunity
- ☐ Somewhat favor resident hunting opportunity
- ☐ Equal focus on resident and non-resident hunting opportunity
- ☐ Somewhat favor non-resident hunting opportunity
- ☐ Completely favor non-resident hunting opportunity
- ☐ No opinion/Don't know

Hunter Recruitment

35. Did you take a new hunter with you to hunt during 2019 (any season, any game)?

☐ Yes ☐ No ☐ I did not hunt in 2019…

please go to question 36.

Did you ask them to come along or did they ask you?	Why did you not take a new hunter? *Check all that apply.*
☐ I asked them to hunt with me ☐ They asked to hunt with me What species did you target? _____	☐ No time ☐ No place to go ☐ I don't know any new hunters ☐ Not confident enough to take a new hunter ☐ Other: _____

36. At what age did you feel you did not need a hunting mentor, or you had the skills to hunt alone? _____

37. What was the **first** species you recall ever hunting?

☐ Squirrel ☐ Crow ☐ Quail
☐ Feral Hog ☐ Geese ☐ Pheasant
☐ Dove ☐ Ducks ☐ Crow
☐ Deer ☐ Rabbit ☐ Woodcock
☐ Prairie Dogs ☐ Turkey ☐ Other

38. Thinking back to when you first started hunting, how much of your hunting occurred on public vs. private land?

_____% Public land

_____% Private land

Total should equal: 100%

39. Are you able to access information from the Wildlife Department online?

☐ Yes
☐ No

Thank you for your time filling out this survey.
Please mail this survey back to the Wildlife Department in the pre-paid envelope provided.