

FINAL PERFORMANCE REPORT



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

Game Harvest Survey

Oklahoma Department of Wildlife Conservation

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

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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

TRACS Project Category:
Conservation/Management

TRACS Action Categories:
Data Collection and Analysis

Project Description:

This grant allows the Oklahoma Department of Wildlife Conservation to monitor upland game harvest and hunter opinion as well as share data trends within the agency and to the public.

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.

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

Year 1: July 1, 2019- June 30, 2020 (See interim report for full annual results)

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.

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. (https://public.tableau.com/views/OklahomaGameHarvestSurvey_edit6_10/page1?:language=en-US&:embed=y&:embed_code_version=3&:loadOrderID=0&:display_count=y&:origin=viz_share_link)

Year 2: July 1, 2020 - June 30, 2021:

Abstract:

The Oklahoma Department of Wildlife Conservation (ODWC) has conducted hunter surveys since 1986 to estimate the number of hunters and game harvest statewide and regionally. A sample of hunting license holders ($n = 2,371$) was contacted during February 2021. Fifty-eight percent of individuals interviewed hunted during 2020. 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 2020 increased from 2019 estimates for woodcock (*Scolopax minor*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), crow (*Corvus brachyrhynchos*), cottontail (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), red fox (*Vulpes fulva*), quail (*Colinus virginianus* and *Callipepla s. quamata*), gray fox (*Urocyon cinereoargenteus*), jackrabbit (*Lepus californicus*) and coyote (*Canis latrans*). Harvest estimates decreased from 2019 estimates for pheasant (*Phasianus colchicus*), dove (*Zenaida macroura*), swamp rabbit (*S. aquaticus*), fall turkey and spring turkey (*Meleagris gallopavo silvestris* and *M. g. intermedia*), bobcat (*Lynx rufus*), river otter (*Lutra canadensis*), and gray squirrel (*S. carolinensis*). Prairie chicken (*Tympanuchus cupido* and *T. pallidicinctus*) season remained closed during 2020. A series of human dimensions questions were asked to learn about access to private land, experience hunting, support for foraging and current participation in other activities on WMAs, the effect of the coronavirus pandemic on hunting participation, and interest in new communication opportunities from ODWC.

Procedures:

The 2020-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 2020 survey included tribal license holders following the first-time inclusion of this license type during the 2019 survey. 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 sample was split 50/50 between Cherokee and Choctaw license holders.

Based on the sampling scheme above, a sample of 6,072 license holders (1,319 annual/five-year, 2,019 lifetime, 1,734 senior citizen, and 500 Choctaw and 500 Cherokee) was selected for the survey. A goal of more than 2,000 completed responses 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 C). The survey was mailed on January 15, 2021. 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 1, 2021. All license holders who had not responded by any method were sent a mailed reminder postcard on February 3, 2021 (Appendix C). License holders without telephone numbers, and who had not responded to the first mailed survey were mailed a second survey on February 5, 2021.

The ODWC hired 9 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.

Telephone 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 2020. 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 like 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.

We calculated statewide (Figure A1-A19) estimates for harvest and hunter participation. 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:

Surveys were completed for 39% ($n = 2,372$) of the 6,072 individuals we attempted to contact. The remaining license holders were not interviewed for a variety of reasons:

- Wrong or disconnected number ($n = 1,332$)
- No phone number available ($n=1,141$)
- “Over quota” after six attempts ($n = 774$)

- Refused to complete the interview ($n = 404$)
- Health issues or deceased ($n = 55$)
- Unavailable during the survey period ($n = 87$)
- Language barrier or hearing impaired ($n = 4$)

The final adjusted response rate was calculated by dividing the number of completed surveys by the number of all eligible individuals. “Eligible individuals” were individuals that could potentially have resulted in completed surveys. After eliminating phone numbers that could not possibly have resulted in completed surveys (deceased license holders, fax numbers, and wrong or disconnected numbers; $n = 1,401$), the final, adjusted survey response rate was 51%.

Sixty-one percent of the completed surveys were conducted by telephone and 39% by mail. This contrasts with 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 statistically significant differences found between mail and telephone respondents for licenses held, 2020 deer season participation, 2020 dove season participation, public land use, and 2020 quail season participation ($P < 0.05$). Overall, there was no significant difference for likelihood to hunt in 2020 and spring turkey participation ($P > 0.05$).

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 11.61 minutes, with a median time of 7.4 minutes (for complete calls only).

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 2020 increased from 2019 estimates for woodcock (+276%), quail (+1%), raccoon (+81%), beaver (+33%), crow (+43%), cottontail (+3%), jackrabbit (+573%), fox squirrel (+8%), gray fox (+116%), coyote (+7%) and red fox (harvest increased from 0 in 2019 to 439 in 2020). Harvest estimates decreased from 2019 estimates for pheasant (-60%), dove (-22%), swamp rabbit (-73%), fall turkey (-55%), bobcat (-12%), river otter (-87%), gray squirrel (-8%), and spring turkey (-12%). Prairie chicken season remained closed during 2020. Statewide trends in estimated harvest and number of hunters by species from 1986 to 2020 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 0.1% for crow to 63.2% 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 17.4 days in the field during the 2020 deer season (Std. Error = 0.55, Table A5). The average number of days spent

hunting deer differed by license category ($P < 0.01$). Deer hunters with a lifetime license averaged 19.4 deer hunting days, annual/five-year license holders averaged 16.7 days, tribal license holders averaged 14.6 days and senior citizen license holders averaged 9.7 days.

The average number of days archery hunters spent in pursuit of deer in 2020 was 18.59 days. Muzzleloader hunters averaged 4.4 days. Youth season hunters averaged 2.6 days. Gun hunters averaged 5.8 days and special antlerless (holiday) season hunters averaged 2.7 days. There was a significant difference found in the number of days hunted by license category during the regular gun season ($P = 0.0106$), with lifetime license holders hunting on average 6.0 days, annual license holders 5.5 days, tribal license holders 5.2 days and senior license holders hunting 4.7 days. There was also a significant difference found in the number of days hunted by license category during the archery season ($P = 0.03$) with annual license holders hunting the most during archery (21.6 days). No differences were found by license type for days spent hunting during archery, muzzleloader, or the holiday antlerless season ($P \geq 0.05$).

Deer hunter success was also examined. On average, deer hunters harvested 0.49 bucks and 0.42 does during all the 2020 deer seasons, for a total average deer harvest of 0.91 per hunter (Table A6). Harvest differed by deer hunter license category ($P < 0.001$). Lifetime license holders on average harvested 1.0 deer, annual license holders harvested 0.67 deer, senior license holders harvested 0.93 deer and tribal license holders averaged 0.85 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, 59% of participants indicated that they hunted in 2020, 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 also more likely to not using their hunting privileges. To estimate the number of license holders that hunted in 2020, the total number of license holders in Table A1 (519,954) was multiplied by the ratio of active hunters interviewed (1,386/2,371). The estimated number of resident license holders who hunted in Oklahoma during 2020 was 303,946.

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 hunting seasons were deer (enjoyed by 51.2% of hunting license holders-both active and non-active), dove and turkey (13.3% and 11.4% respectively). Although the ODWC does not manage feral swine (*Sus scrofa*), we collect data on the amount of people that target feral swine and how many are harvested. Feral swine are now the second most pursued species by Oklahoma licensed hunters, with 15.1% having spent time pursuing them in 2020.

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 crow (97% of crow hunters used only private land), dove (80%) and deer (79%; Figure B2).

Seventeen percent of survey participants used public land for some portion of their hunting during 2020. As can be seen from Figure B3, this statistic also reflects 42% of participants who did not hunt at all. Focusing only on *active* hunting license holders (those who hunted during 2020), 29% hunted on public land in 2020 and 71% did not. Use of public land by active hunters did not vary by license category ($P \geq .05$). When asked how important public land is, 81% of hunters that use public land said it is very important. (Figure B4).

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 2020 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 capture the importance of public land more accurately, active hunters were asked to indicate how much of their hunting in 2020 occurred on public versus private land. Averaging across all active hunters, 17% of the hunting in 2020 occurred on public land. This measure of public land varied by license category ($P = 0.01$) with tribal license holders spending 18% of time on public land, annual/5-year license holders spending 20% of hunting on public land, seniors with 16% on public land and lifetime license holders with 14% on public land. 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 B5). Looking at the issue from another angle, most active license holders used private land for at least some of their hunting during 2020. Only 8% relied exclusively on public land for hunting.

Deer Hunting

Deer season is the most popular hunting season in Oklahoma. Fifty-one percent of *all* survey participants and 88% of *active* hunters (those who hunted at all 2020) hunted deer during 2020. Participation in deer season by active hunters in 2020 varied according to license category ($P < 0.001$). Ninety-two percent of active lifetime license holders hunted deer, while 84% of active annual/five-year license holders, 79% of active senior citizen license holders, and 90% of active tribal license holders hunted deer during 2020.

The regular rifle season was the most popular among 2020 deer hunters (85% participating), followed by archery (56%), primitive firearms (39%), special antlerless (holiday) season (20%), and the youth rifle season (4% participating as a youth) (Figure B6). Deer hunter participation in the individual seasons was analyzed by license type. Archery season participation was most likely for lifetime license holders (65%), followed by annual license holders (50%), tribal license holders (50%) and senior citizen license holders (33%) ($P < 0.05$). Muzzleloader season participation was more likely for lifetime license holders (54%) than tribal license holders (32%), senior citizen license holders (29%) or annual/five-year license holders (23%) ($P < 0.001$). Rifle season participation was most likely for tribal license holders (89%), followed by lifetime license holders (87%) senior license holders (85%) and annual/5-year license holders (82%) ($P = 0.03$). Special antlerless (holiday) season participation was most likely for lifetime license holders (22%), followed by annual/5-year license holders (19%), senior license holders (15%) and tribal license holders (15%). Differences in the special season were not significant ($P > 0.05$).

Patterns in deer season participation were also examined. Most deer hunters participated in more than one season (63%), and some hunted all four (7%; Figure B7). 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, 88% of youth season participants also hunted deer during other seasons: 88% hunted during rifle season, 42% hunted during archery, 39% hunted during muzzleloader, and 21% hunted during the special antlerless (holiday) deer gun season (Figure B9).

Almost half (49%) of all deer hunters successfully harvested a deer during the 2020 season (Figure B10). Less than 1% of hunters filled the annual bag limit of deer for 2020 (a combined season limit of 6 deer no more than two may be antlered during deer archery, youth deer gun, deer muzzle loader and deer gun seasons. Deer taken during controlled hunts or during the holiday antlerless deer gun season do not count toward the combined season limit.).

An increasing proportion of archery hunters are using crossbows for their hunting. In 2015, 33% of archery hunters used crossbows for all their archery hunting. That number increased to 40% in 2016, 42% in 2017, 42% in 2018, went down to 41% in 2019, and was 43% in 2020 (Figure B11).

Barriers to Participation

ODWC continues to assess barriers to hunting participation. Forty-one percent ($n = 922$) of hunting license holders did not hunt in 2020 and were asked to identify the main reason why they did not hunt. Twenty-four percent identified health issues, and another 32% indicated other priorities. Fourteen percent were simply not interested in hunting (Figure B12). The finding of “health concerns” was unsurprising, given that 41% ($n=393$) 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 only be interested in fishing but receive both hunting and fishing privileges. ODWC continues to face limitations in the things the agency can directly influence to remove barriers to hunting.

Special Management Issues

Coronavirus Pandemic

The 2020 hunting seasons occurred during the coronavirus pandemic that shut down many facets of daily life during this time. The Oklahoma Department of Wildlife Conservation encouraged people to get outdoors with “The Outdoors is Always Open” campaign. We wanted to determine if the pandemic had an impact on hunting participation throughout the year. We could not simply look at species participation rates compared to previous years as there may be several factors unrelated to the pandemic contributing to an increase or decrease in certain seasons. We asked all hunters (both active and inactive), “Has the Covid-19 pandemic influenced the frequency of your hunting?” Overall, 11% of license holders said they hunted more, 21% said they hunted less and 60% said it did not affect the amount they hunted. The responses varied by license type ($P<0.05$; Figure B13) with 31% of senior license holders saying they hunted less than in previous years compared to 27% of tribal license holders, 23% of lifetime license holders and 16% of annual license holders hunting less due to the pandemic.

Land Access for Hunting

In recent years, hunters have been talking about lack of access for land to hunt on. To determine the extent of this issue, we asked licensed hunters (both active and not) “How has your access to private land for hunting changed over the last five years?” Thirty-one percent of respondents said they had less access than five years ago, 47% have about the same as five years ago, and 11% had more access. The remaining percentage left the item blank. This varied by license type ($P < 0.001$; Figure B14) with seniors being most likely to have less access than five years ago (49% of senior license holders selected this), followed by 37% of lifetime license holders having less. Tribal license holders only selected less access 31% of the time and annual selected this 26% of the time. Annual license holders were most likely to select they have the same amount as before (57%). Annual license holders were also the most likely to select that they had more access than five years ago (17%).

Foraging on Public Lands

The Wildlife Department’s strategic plan features several proposals aimed at drawing in new users to hunting, fishing and public lands. One possible activity to attract new users is foraging for food on Wildlife Management Areas. We asked licensed hunters, “Do you support or oppose the Wildlife Department opening up the opportunity to forage for food (mushrooms, sand plums, etc.) on Wildlife Management Areas?” Overall, 60.5% of license holders either support or strongly support allowing foraging on wildlife management areas in Oklahoma. There was a significant difference when comparing the responses of those that use public land to hunt and those that don’t (Figure B15). Of those that depend on public land for any portion of their hunting, 60% either support or strongly support allowing foraging while 72% of those that do not use public land either support or strongly support allowing foraging.

Experience Level and Successful Hunt Factors

To better characterize our hunting population we asked about how many years they have been hunting in Oklahoma, how they would rate themselves as a hunter, and what characteristics contribute to a successful hunt (this question was too difficult to ask over the phone so only those that responded via mail were presented with this question). On average, respondents had been hunting in Oklahoma for 24.88 years. There were differences between both age (Table B2) and how people rated themselves as a hunter (Table B3) by what they think led to a successful hunt. Enjoying time spent with family/friends was consistent across all self-ranked hunting prowess as the top factor for a successful hunt. The differences were that “seeing the species I intended to hunt” was slightly higher for intermediate and advanced hunters while “seeing any wildlife” was higher for beginners. Harvesting an animal was more important for advanced hunters while favorable weather for being outside was more important for beginner and intermediate hunters. There was more consistency in importance ranking for beginners while advanced hunter rankings seemed to cluster toward the middle of the importance scale. Clustering in the middle of the importance scale means that there is more diversity in what people selected as important. This could mean that there was more diversity in what they believe makes a hunt successful, while beginners strongly believe enjoying time spent outside is important and harvesting an animal is not important.

Age also gave interesting differences. We binned ages into 20-year increments. Seeing the species they intended to hunt was way more important for those in the bin of 0-19 years of age than other year age classes. Those in age classes 20-39, 40-59, and 80-99 felt that enjoying time

with family/friends was most important. Hunters from 60-79 felt that being outside was most important. Favorable weather for being outside was least important in the three youngest age classes (0-19, 20-39, 40-59). Those hunters 60-79 felt that harvesting an animal was least important while those over 80 years old thought that taking a shot at the intended animal was least important.

Wildlife Management Area Visitation

We asked respondents if they visit Wildlife Department Wildlife Management Areas (WMAs) for reasons other than hunting. Forty-one percent of licensed hunters have visited a WMA for non-hunting related activities. Those that visited WMAs varied by license type ($P=0.03$). Forty-four percent of tribal license holders had used WMA's for non-hunting related activities while 42% of lifetime license holders, 40% of annual license holders, and 39% of senior license holders had (Figure B16) Although there are differences, this means that in all license categories, the majority had not visited a WMA for reasons other than hunting which opens up the opportunity to share with more license holders the wide array of activities available to participate in on WMAs. For those that said they had, we asked what months they typically visit WMAs for non-hunting activities and what recreational activities they use the areas for. The early summer months were most popular for visitation (Figure B17) and fishing was the activity most selected followed by camping, hiking, and boating (Figure B18).

Educational Interest and GoOutdoors App Preferences

We asked license holders if they use the GoOutdoors application on their smart phone. Thirty-four percent said that they do use this app currently, and there was a significant difference between license type and use of the app (Figure B19). There may have been confusion about which app we were asking about because several people were unsure if we meant the licensing app or a different app when asking this question over the phone. We asked those that do use the app what features they could see as being beneficial to add to the app in the future. Overall, people were split on what they think would be beneficial to add. Through comments made during phone interviews it seemed like people would use it if it were there, but don't really have a strong opinion one way or the other. People said that they could see it being beneficial to someone else so they would be fine adding it to the app even if they wouldn't use it themselves. The most supported addition was a common questions and answers section (73%). The second most desired addition was a waterfowl identification section (62%). Fifty-nine percent thought a how-to section on hunting would be nice compared to 57% that thought a fishing how-to section would be good. Fifty-eight percent thought instructional videos would be good followed by 57% that would like employee contact information and 55% that would like Outdoor Oklahoma short clips (Figure B20). Open-ended responses show that people thought a sunrise/sunset table would be good as well as a link to regulations for different seasons.

Use of OLAP land

Annually, we ask hunters if they hunt on their own private land vs. public land, but land that is enrolled in the Oklahoma Land Access Program (OLAP) does not fall into either of those categories. There was a desire from the Wildlife Conservation Commission to better understand the number of users that hunt OLAP properties. Overall, out of all active resident hunters in Oklahoma, 5% used OLAP (Figure B20). This means that there is an opportunity to further encourage users to use these areas to hunt.

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 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. Next year's survey should consider how to include the tribal licenses within our existing sampling scheme.

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 2020-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 ($n = 2,371$) 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 2020-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. In terms of question design, we also need to keep in mind the phone interview portion of the data collection. This should force us to create efficient questions that make sense to be asked over the phone. Check all that apply questions are difficult to ask quickly over the phone.

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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, 2020.

LICENSE TYPE	Population		Sampled		Completed	
	Number	Percent	Number	Percent	Number	Percent
Lifetime						
Hunting	40,576	10.7	472	9.3	198	9.6
Combination	118,588	31.2	1,519	29.9	643	31.2
Hunting Over 60	604	0.2	7	0.1	2	0.1
Combination Over 60	1,941	0.5	21	0.4	10	0.5
<i>Subtotal</i>	<i>161,709</i>	<i>42.6</i>	<i>2,019</i>	<i>39.8</i>	<i>853</i>	<i>41.4</i>
Senior Citizen						
Hunting	2,600	0.7	42	0.8	21	1.0
Combination	124,907	32.9	1,692	33.4	483	23.4
<i>Subtotal</i>	<i>127,507</i>	<i>33.6</i>	<i>1,734</i>	<i>34.2</i>	<i>504</i>	<i>24.4</i>
Annual						
Hunting	38,096	10.0	598	11.8	309	15.0
Hunting Fiscal Year (FY)	4,399	1.2	66	1.3	43	2.1
Combination	20,058	5.3	247	4.9	136	6.6
Combination FY	2,713	0.7	39	0.8	21	1.0
Youth Hunting	3,699	1.0	72	1.4	31	1.5
Youth Hunting FY	417	0.1	7	0.1	1	0.0
Youth Combination	1,751	0.5	19	0.4	9	0.4
Youth Combination FY	603	0.2	11	0.2	7	0.3
<i>Subtotal</i>	<i>71,736</i>	<i>18.9</i>	<i>1,059</i>	<i>20.9</i>	<i>557</i>	<i>27.0</i>
Five-Year						
Hunting	5,116	1.3	93	1.8	45	2.2
Combination	13,690	3.6	167	3.3	103	5.0
<i>Subtotal</i>	<i>18,806</i>	<i>5.0</i>	<i>260</i>	<i>5.1</i>	<i>148</i>	<i>7.2</i>
Tribal						
Choctaw	17,119	12.2	500	0.5	217	70.2
Cherokee	123,077	87.8	500	0.5	92	29.8
<i>Subtotal</i>	<i>140,196</i>		<i>1,000</i>		<i>309</i>	
Total	519,954		6,072		2,371	

Table A2. Statewide hunter and game harvest estimates and statistics by species/subspecies in Oklahoma, 2020.

Species/Season	Sample	Mean Bag Per Hunter	Mean Days Hunted	Mean Daily Bag	Number of Hunters	Number of Days Hunted	Total Harvest	95% Confidence Interval for Total Harvest		
Crow	39	17.84	6.28	2.90	8,533	53,691	152,596	55,216	-	249,977
Dove	316	16.79	4.64	4.12	69,298	321,250	1,163,628	1,003,776	-	1,323,480
Furbearers	145	.	.	.	31,798 ^a	.	277,192 ^b	.	-	.
Coyote	120	6.04	21.20	0.60	26,316	557,892	158,991	106,275	-	211,706
Bobcat	38	1.50	15.16	0.13	8,333	126,351	12,500	5,296	-	19,704
Raccoon	46	8.93	29.52	0.62	10,088	297,815	90,131	62,886	-	117,377
Beaver	9	6.89	19.00	0.53	1,974	37,500	13,596	4,583	-	22,610
Gray Fox	3	2.00	1.00	2.50	658	658	1,316	26	-	2,605
Red Fox	3	0.67	60.00	0.01	658	39,474	439	9	-	868
Otter	1	1.00	1.00	1.00	219	219	219	.	-	.
Pheasant	45	1.84	3.95	0.78	9,868	39,025	18,202	12,739	-	23,664
Quail	95	7.70	5.32	1.74	20,833	110,887	160,460	81,143	-	239,778
Rabbits	83	.	.	.	16,22 ^a	.	135,682 ^b	.	-	.
Cottontail	77	6.71	8.31	1.04	16,886	140,266	113,313	50,795	-	175,832
Jackrabbit	6	2.60	11.67	1.07	1,316	15,351	3,421	1,508	-	5,334
Swamp Rabbit	13	1.46	5.92	0.41	2,851	16,868	4,167	1,667	-	6,667
Squirrels	174	.	.	.	38,158	.	525,383 ^b	.	-	.
Fox Squirrel	125	9.85	13.74	1.25	27,412 ^a	376,747	269,921	185,521	-	354,322
Gray Squirrel	117	9.96	10.95	1.25	25,658	280,861	255,462	180,211	-	330,714
Turkeys	304	.	.	.	66,666 ^a	.	20,531 ^b	.	-	.
Fall Turkey	86	0.12	6.25	0.06	18,860	117,872	2,193	908	-	3,478
Spring Turkey	270	0.31	5.42	0.09	59,210	321,076	18,338	13,945	-	22,730
Woodcock	5	2.80	2.40	1.00	1,096	2,632	3,070	0	-	6,358
Feral Swine	359	10.86	36.73	0.66	78,725	2,891,518	855,169	638,625	-	1,074,713

^aEstimated number of hunters that hunted at least one species/subspecies within a given season.

^bEstimated total harvest within a given season.

Table A3. Hunter and game harvest estimates and statistics for all public hunting land in Oklahoma, 2020.

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	1	1.00	1.00	1.00	219	219	219	0.1	. - .
Dove	59	11.95	4.73	3.35	12,939	61,164	154,582	13.3	93,382 - 215,781
Pheasant	15	0.93	2.93	0.39	3,289	9,649	3,070	16.9	1,134 - 5,006
Quail	30	4.50	4.03	1.07	6,579	26,535	29,605	18.4	16,149 - 43,062
Rabbits: Cottontail	24	5.81	9.82	0.82	5,263	51,674	30,576	27.0	7,180 - 53,973
Jackrabbit	2	3.00	4.00	3.00	439	1,754	1,316	38.5	. - .
Swamp Rabbit	7	1.71	5.43	0.34	1,535	8,333	2,632	63.2	693 - 4,570
Squirrels: Fox	28	9.29	10.11	1.10	6,140	62,061	57,017	21.1	12,497 - 101,538
Gray	33	10.48	9.55	1.96	7,237	69,079	75,877	29.7	24,490 - 127,263
Turkey: Fall	21	0.05	3.62	0.01	4,605	16,667	219	10.0	0 - 649
Spring	64	0.13	5.18	0.06	14,035	72,665	1,754	9.6	608 - 2,901
Woodcock	2	0.50	1.00	0.50	439	439	219	7.1	0 - 649

Table A4. Statewide trends in estimated harvest and estimated number of hunters in Oklahoma, 1986-2020.

	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
	2020	8,553	17.84	6.28	2.90	152,596	55,216	-	249,977

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
	2020	69,298	16.79	4.64	4.12	1,163,628	1,003,776	–	1,323,480

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
	2020	9,868	1.84	3.95	0.78	18,202	12,739	–	23,664

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
	2020	20,833	7.70	5.32	1.74	160,460	81,143	–	239,778

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		
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
	2020	16,886	6.71	8.31	1.04	113,313	50,795	-	175,832

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
	2020	1,316	2.60	11.67	1.07	3,421	1,508	-	5,334

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
	2020	2,851	1.46	5.92	0.41	4,167	1,667	-	6,667

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
	2020	27,412	9.85	13.74	1.25	269,921	185,521	-	354,322

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
	2020	25,658	9.96	10.95	1.26	255,462	180,211	-	330,714

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
	2020	18,860	0.12	6.25	0.06	2,193	908	-	3,478

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
	2020	59,210	0.31	5.42	0.09	18,338	13,945	-	22,730

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
	2020	1,096	2.80	2.40	1.00	3,070	0	-	6,358

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		
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
	2020	26,316	6.04	21.20	0.60	158,991	106,275	-	211,706
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
	2020	8,333	1.50	15.16	0.13	12,500	5,296	-	19,704
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
	2020	10,088	8.93	29.52	0.62	90,131	62,886	-	117,377

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		
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
	2020	1,974	6.89	19.00	0.53	13,596	4,583	-	22,610
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
	2020	658	2.00	1.00	2.50	1,316	26	-	2,605
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
	2020	658	0.67	60.00	0.01	439	9	-	868

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
	2020	219	1.00	1.00	1.00	219	.	-	.
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
Pronghorn	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

^aConfidence 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, 1997-2020.

Year	<u>Total</u> Mean Days^a	<u>Archery</u> Mean Days	<u>Muzzleloader</u> Mean Days	<u>Youth</u> Mean Days	<u>Rifle</u> Mean Days	<u>Holiday</u> 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
2020	17.4	18.6	4.4	2.6	5.8	2.7

^aNumber 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.

^bHoliday antlerless deer gun season began in 2001.

Table A6. Mean number of deer harvested by deer hunters in each deer season in Oklahoma, 2001-2020.

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
2020	0.91	0.49	0.42	0.23	0.24	0.25	0.12	0.20	0.44	0.30	0.21	0.18

Crow

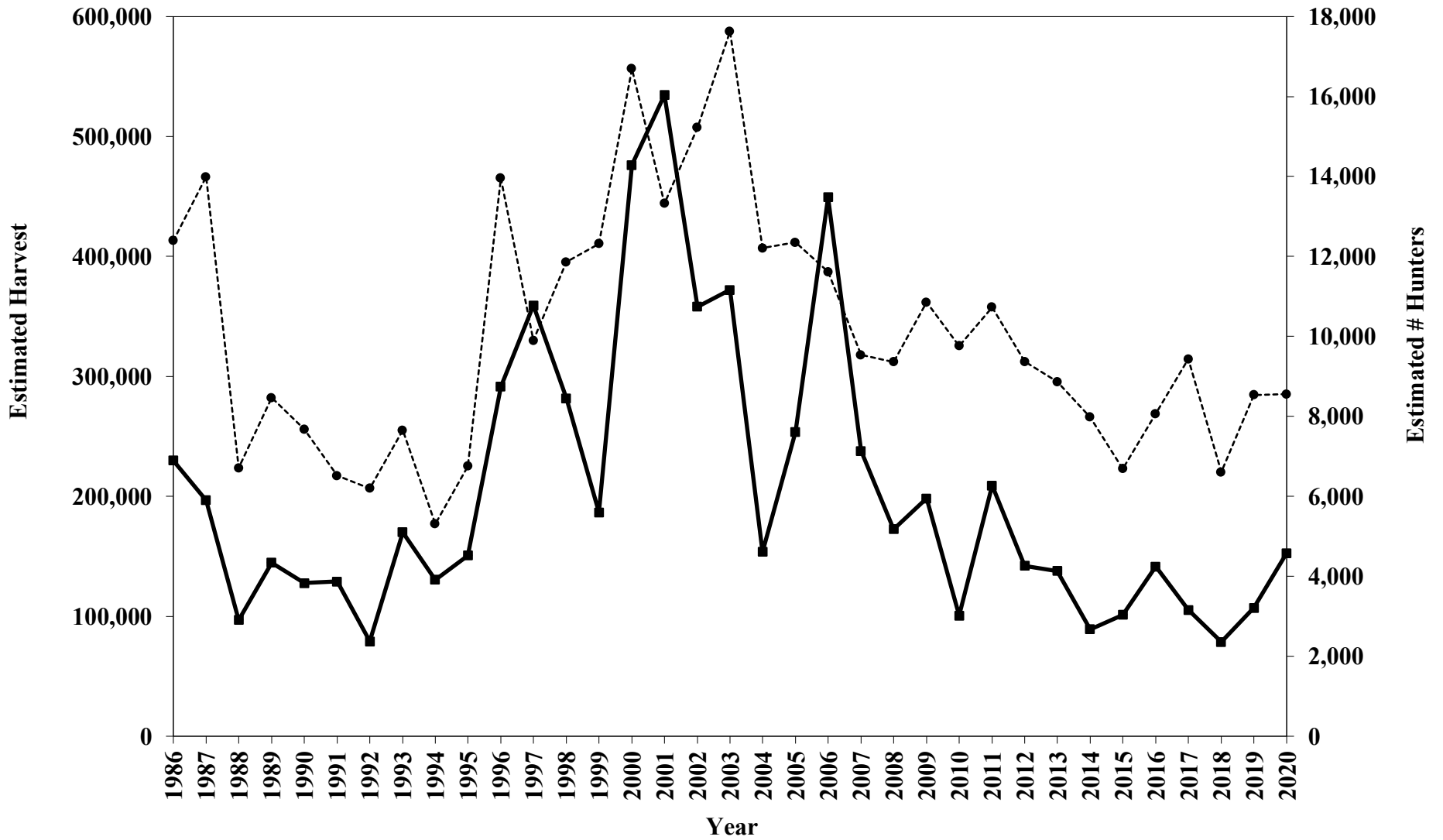


Figure A1. Statewide trends in estimated crow harvest and estimated number of crow hunters in Oklahoma, 1986-2020.

Mourning Dove

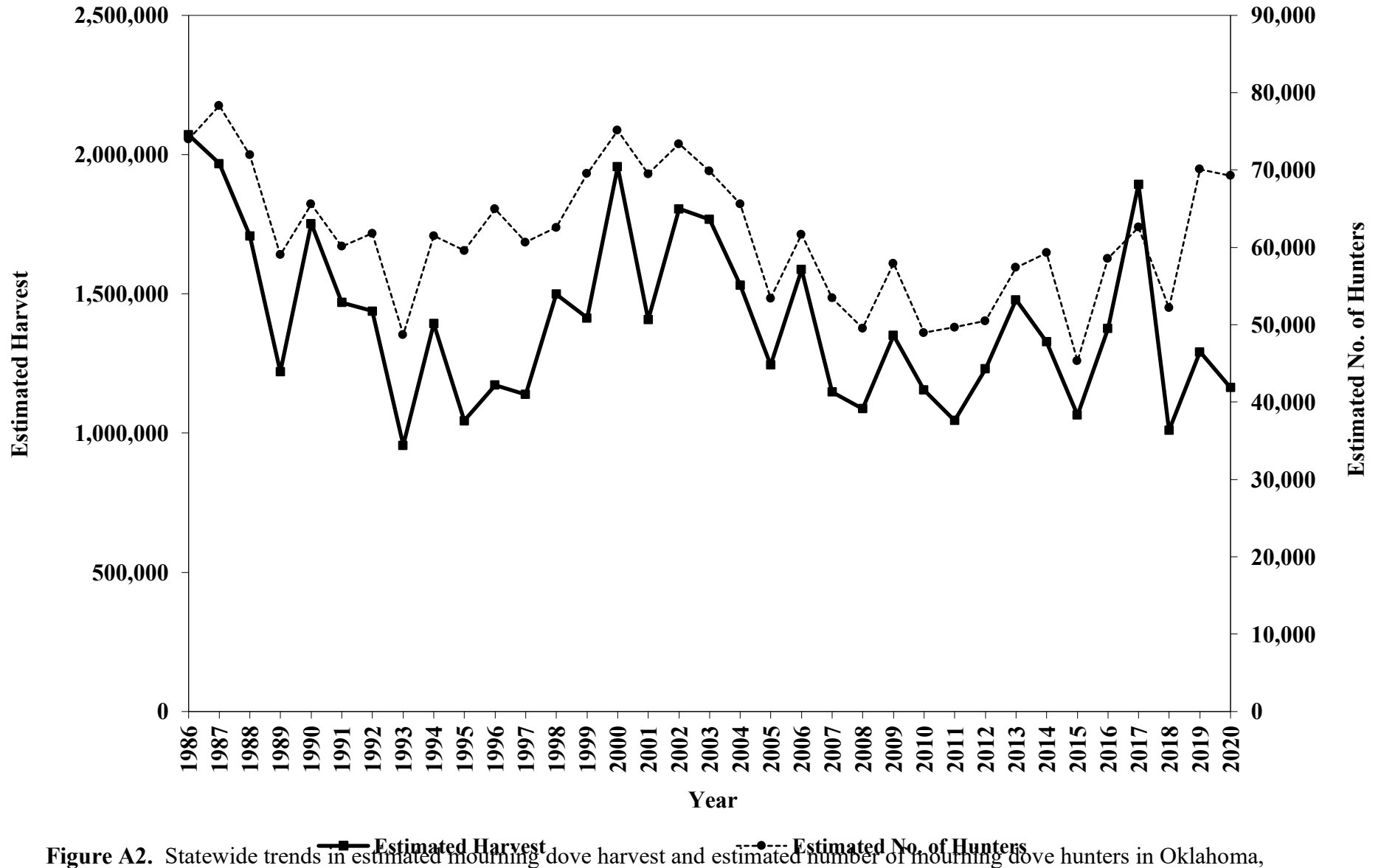


Figure A2. Statewide trends in estimated mourning dove harvest and estimated number of mourning dove hunters in Oklahoma, 1986-2020.

Ring-necked Pheasant

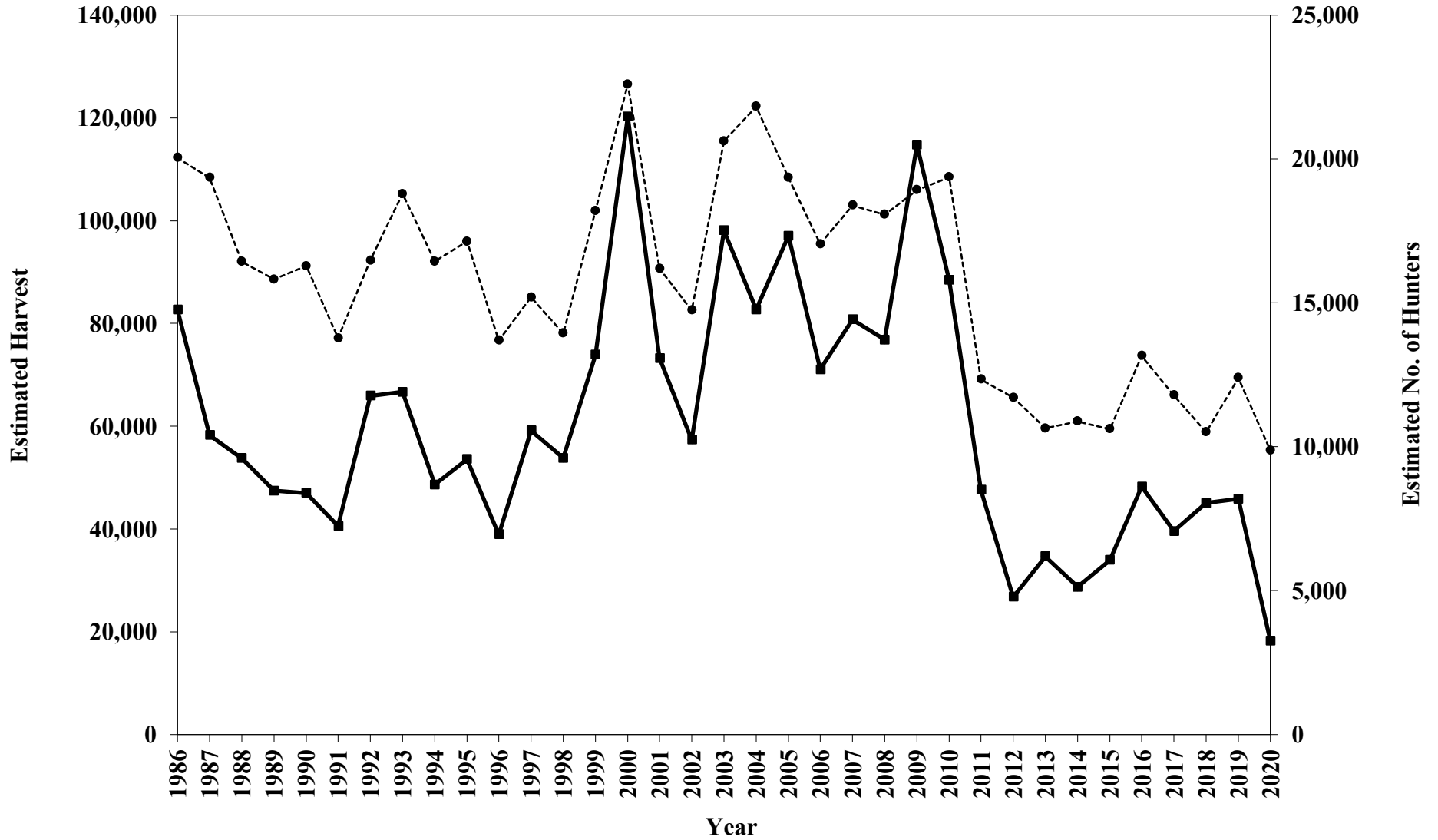


Figure A3. Statewide trends in estimated ring-necked pheasant harvest and estimated number of ring-necked pheasant hunters in Oklahoma, 1986-2020.

Quail

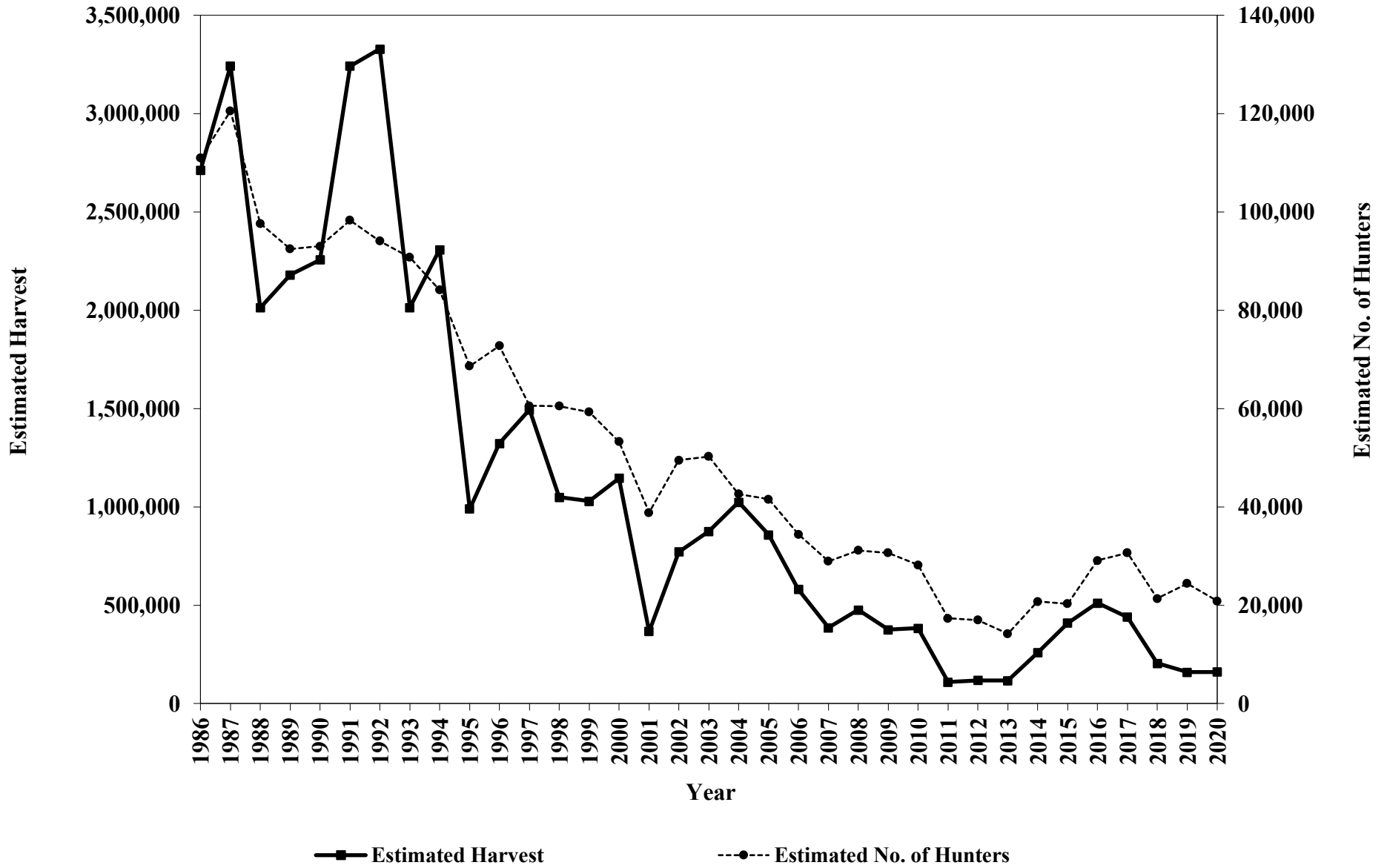


Figure A4. Statewide trends in estimated quail harvest and estimated number of quail hunters in Oklahoma, 1986-2020.

Cottontail Rabbit

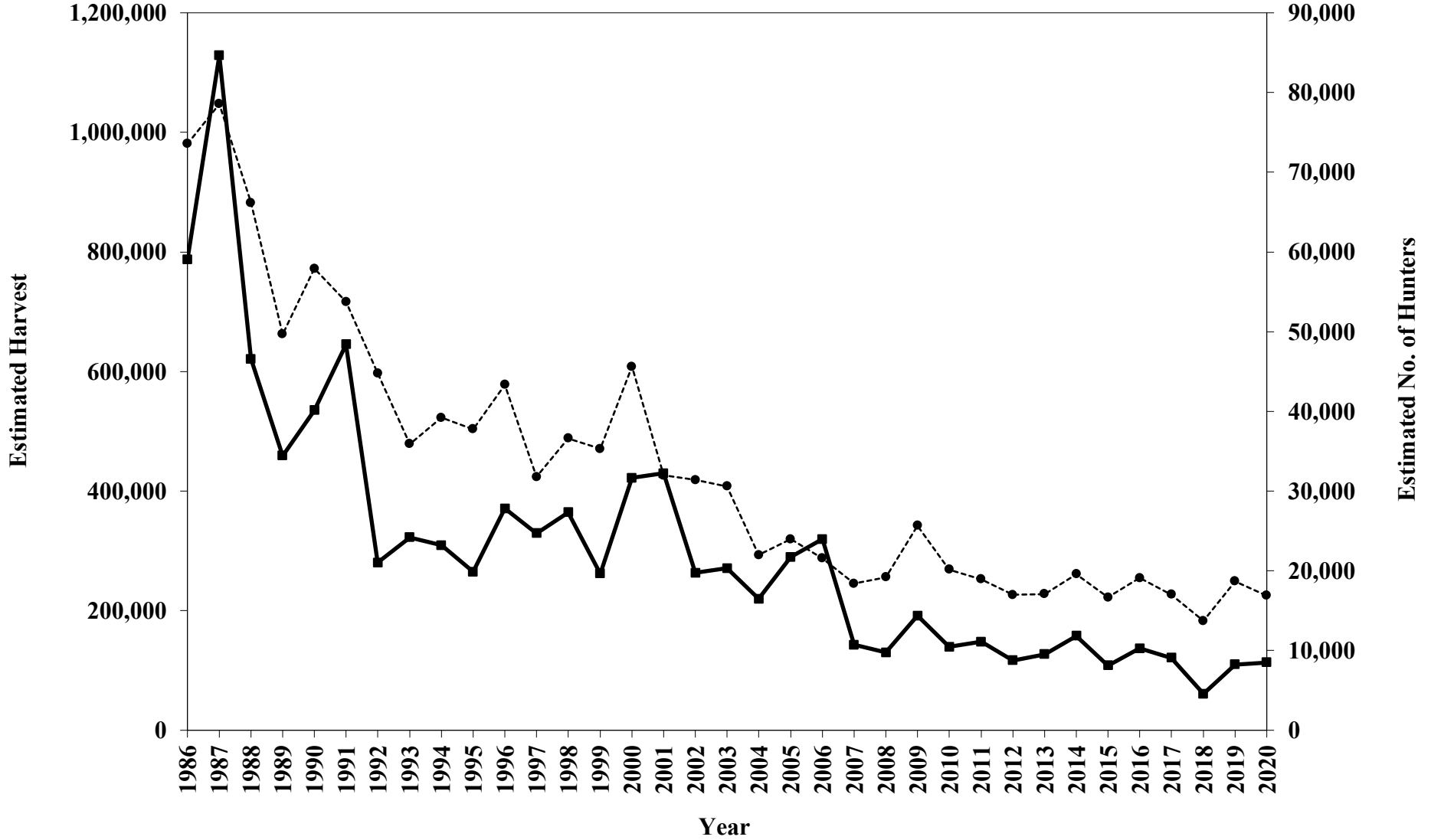


Figure A5. Statewide trends in estimated cottontail rabbit harvest and estimated number of cottontail rabbit hunters in Oklahoma, 1986-2020.

Jackrabbit

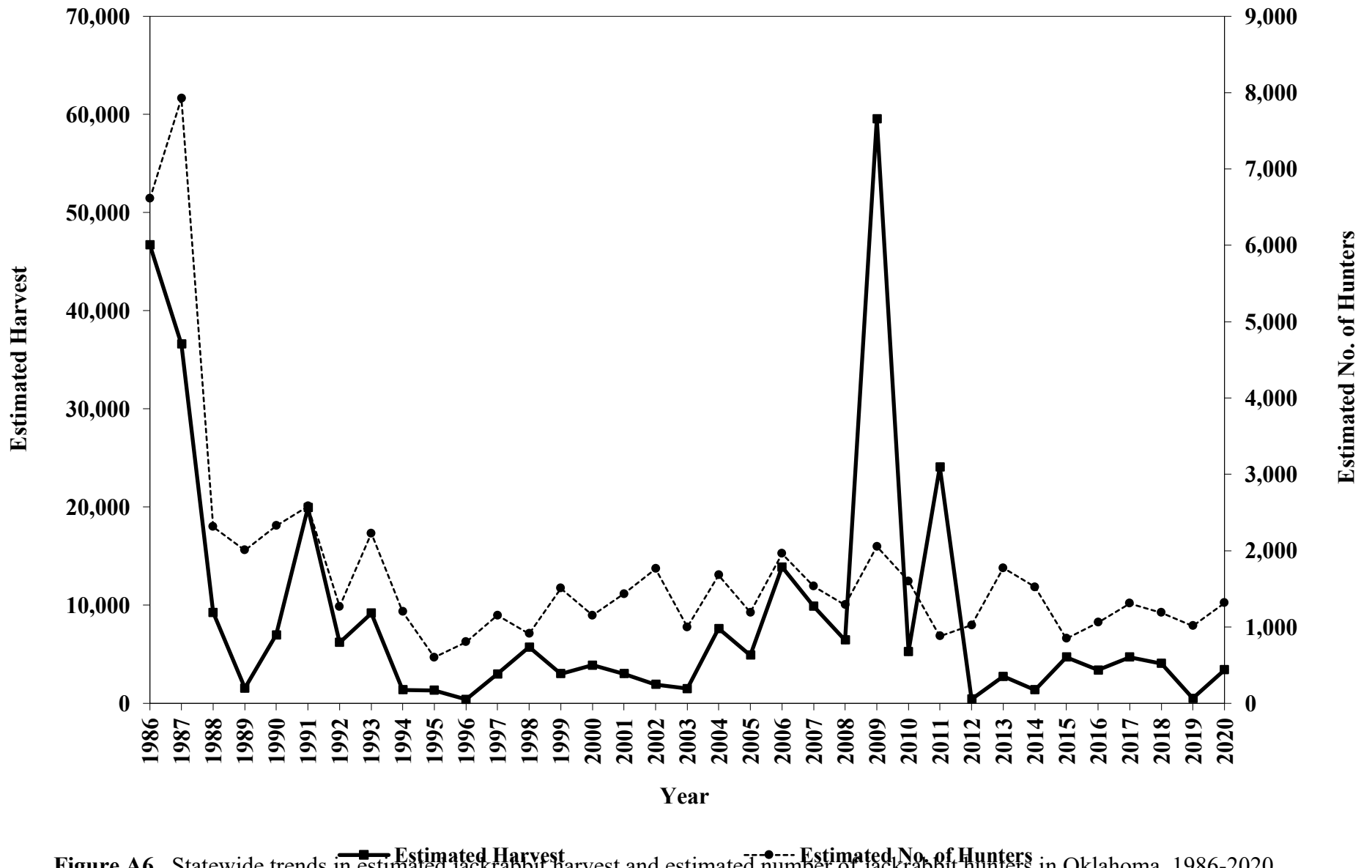


Figure A6. Statewide trends in estimated jackrabbit harvest and estimated number of jackrabbit hunters in Oklahoma, 1986-2020.

Swamp Rabbit

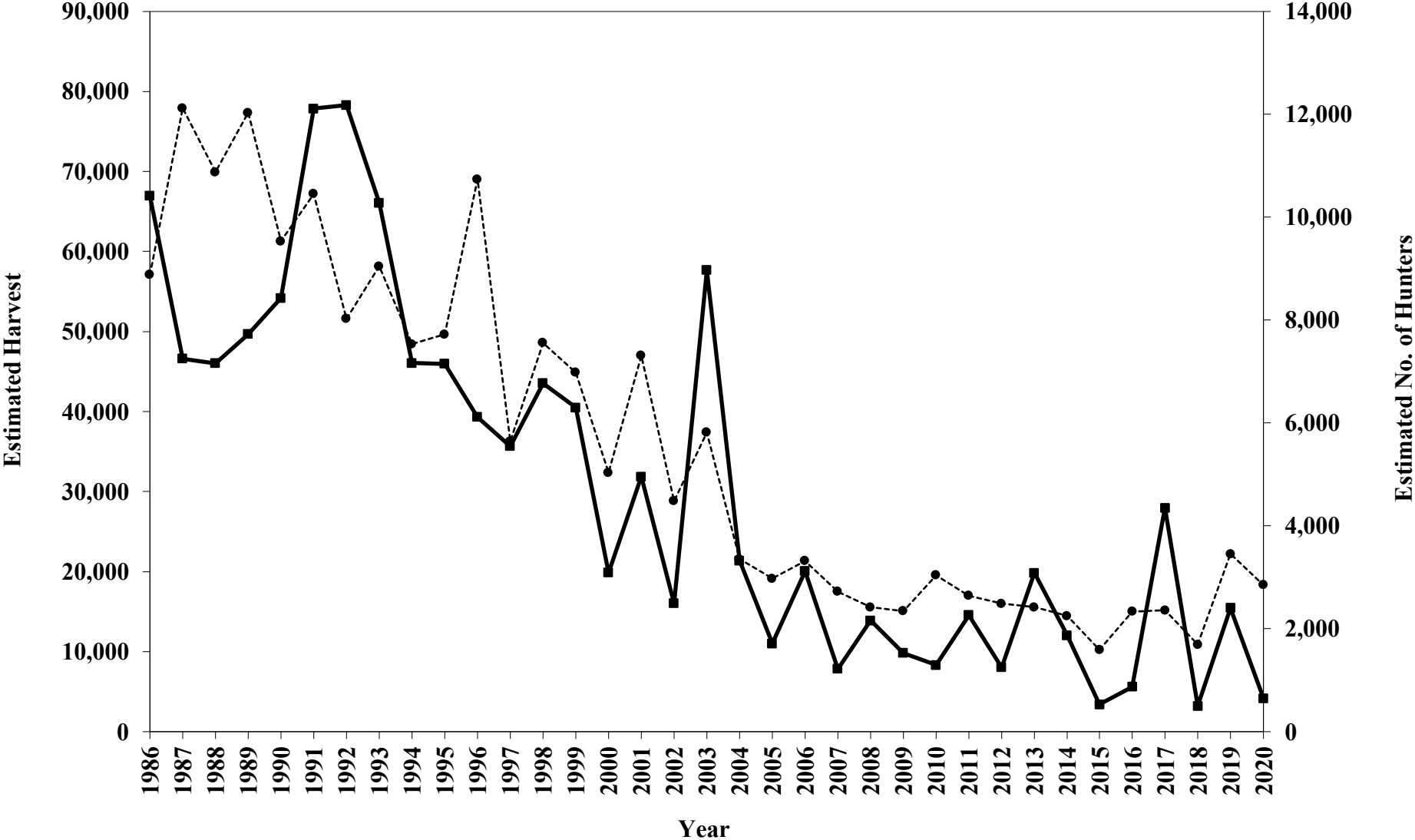


Figure A7. Statewide trends in estimated Swamp Rabbit harvest and estimated number of hunters in Oklahoma, 1986-2020.

Fox Squirrel

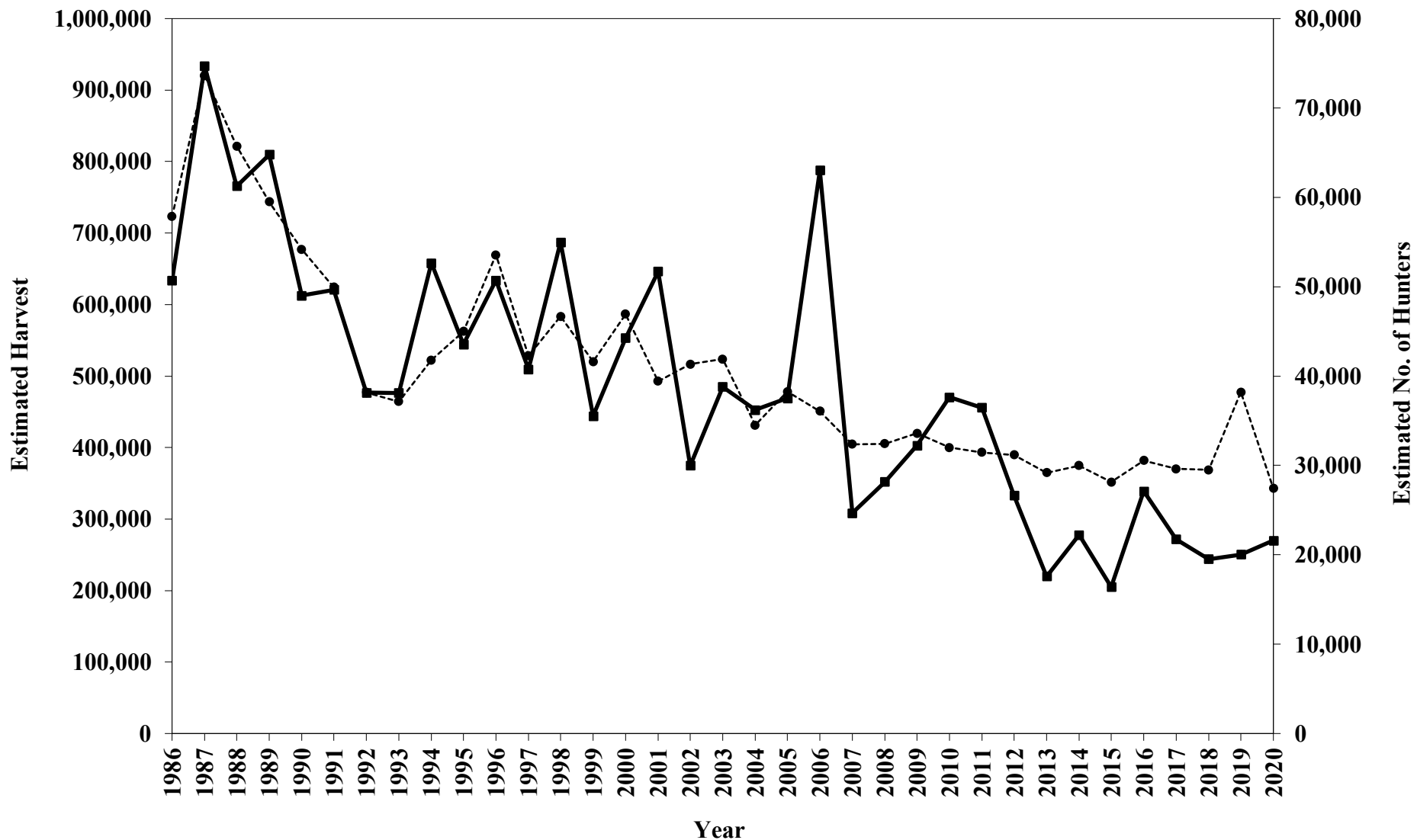


Figure A8. Statewide trends in estimated fox squirrel harvest and estimated number of fox squirrel hunters in Oklahoma, 1986-2020.

Gray Squirrel



Figure A9. Statewide trends in estimated gray squirrel harvest and estimated number of gray squirrel hunters in Oklahoma, 1986-2020.

Fall Turkey

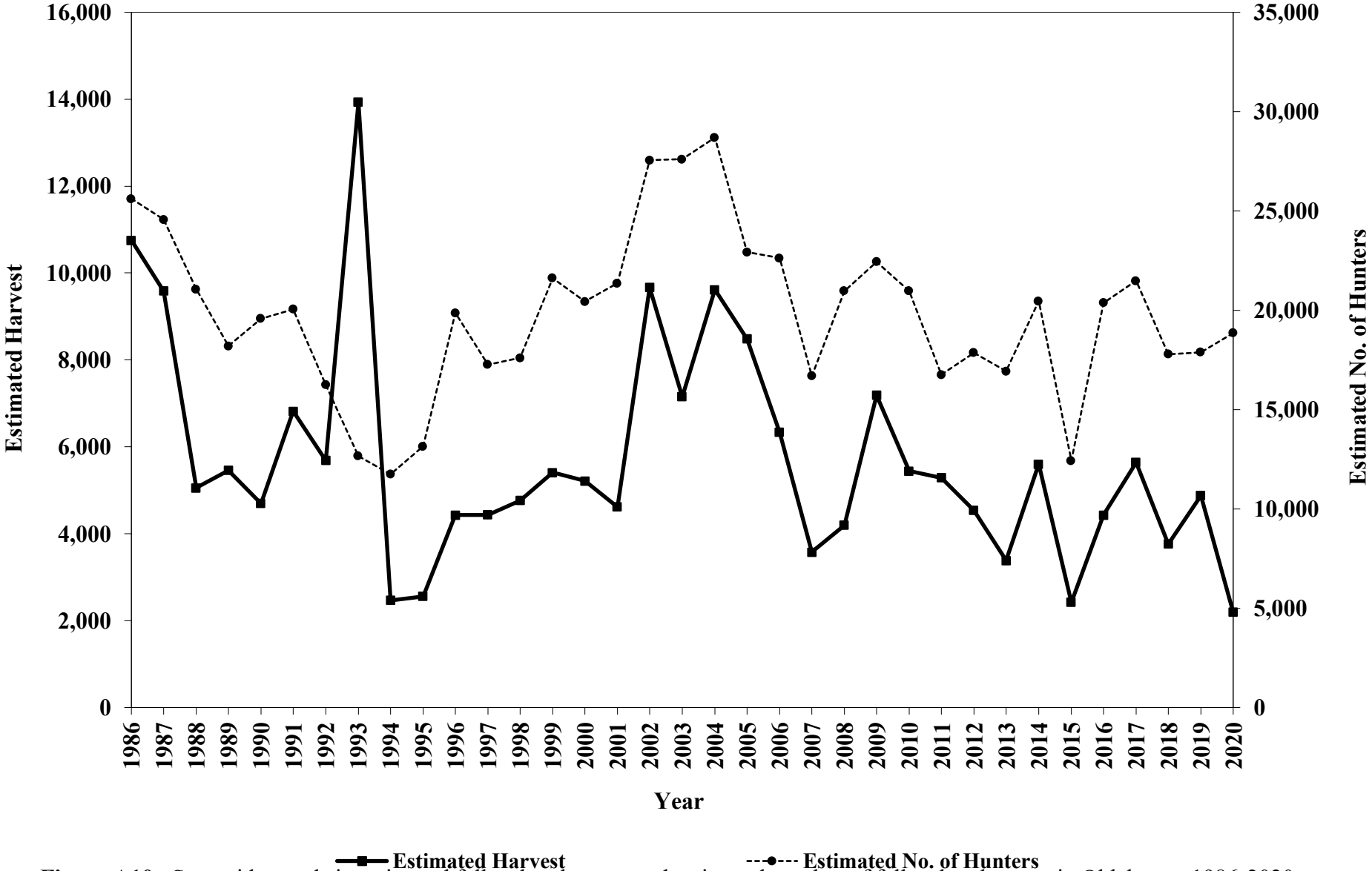


Figure A10. Statewide trends in estimated fall turkey harvest and estimated number of fall turkey hunters in Oklahoma, 1986-2020.

Spring Turkey



Figure A11. Statewide trends in estimated spring turkey harvest and estimated number of spring turkey hunters in Oklahoma, 1986-2020.

American Woodcock

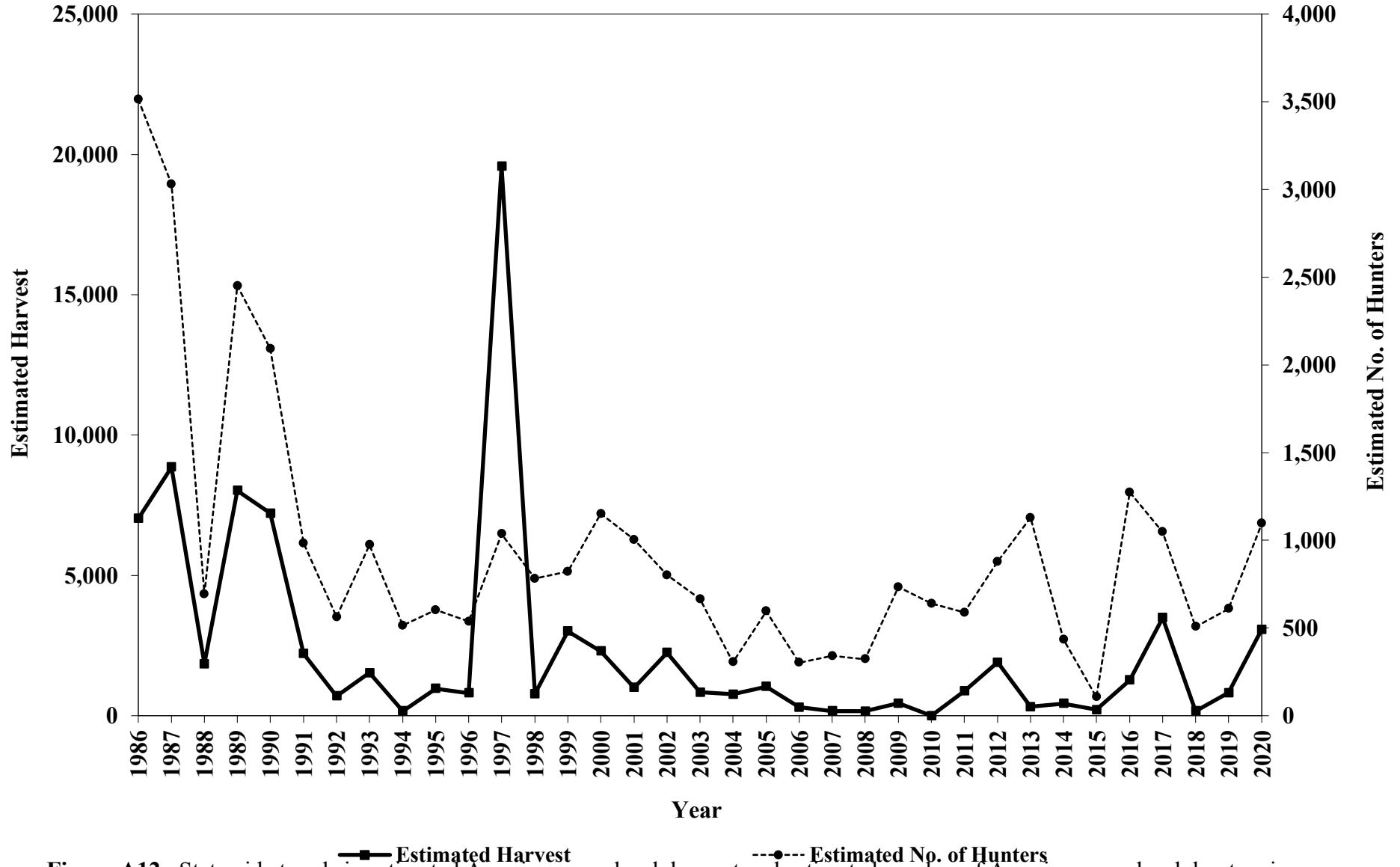


Figure A12. Statewide trends in estimated American woodcock harvest and estimated number of American woodcock hunters in Oklahoma, 1986-2020.

Coyote

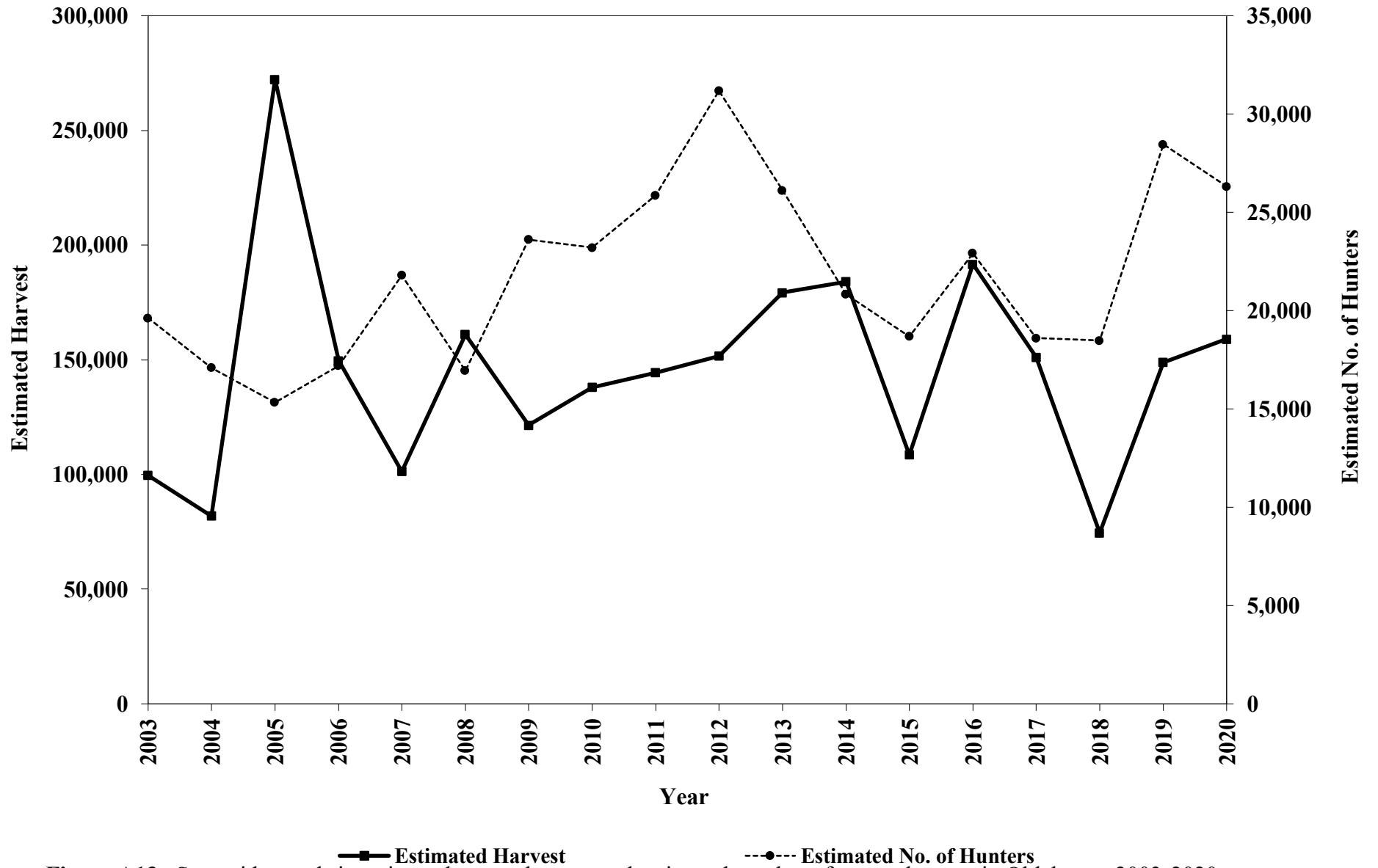


Figure A13. Statewide trends in estimated coyote harvest and estimated number of coyote hunters in Oklahoma, 2003-2020.

Bobcat

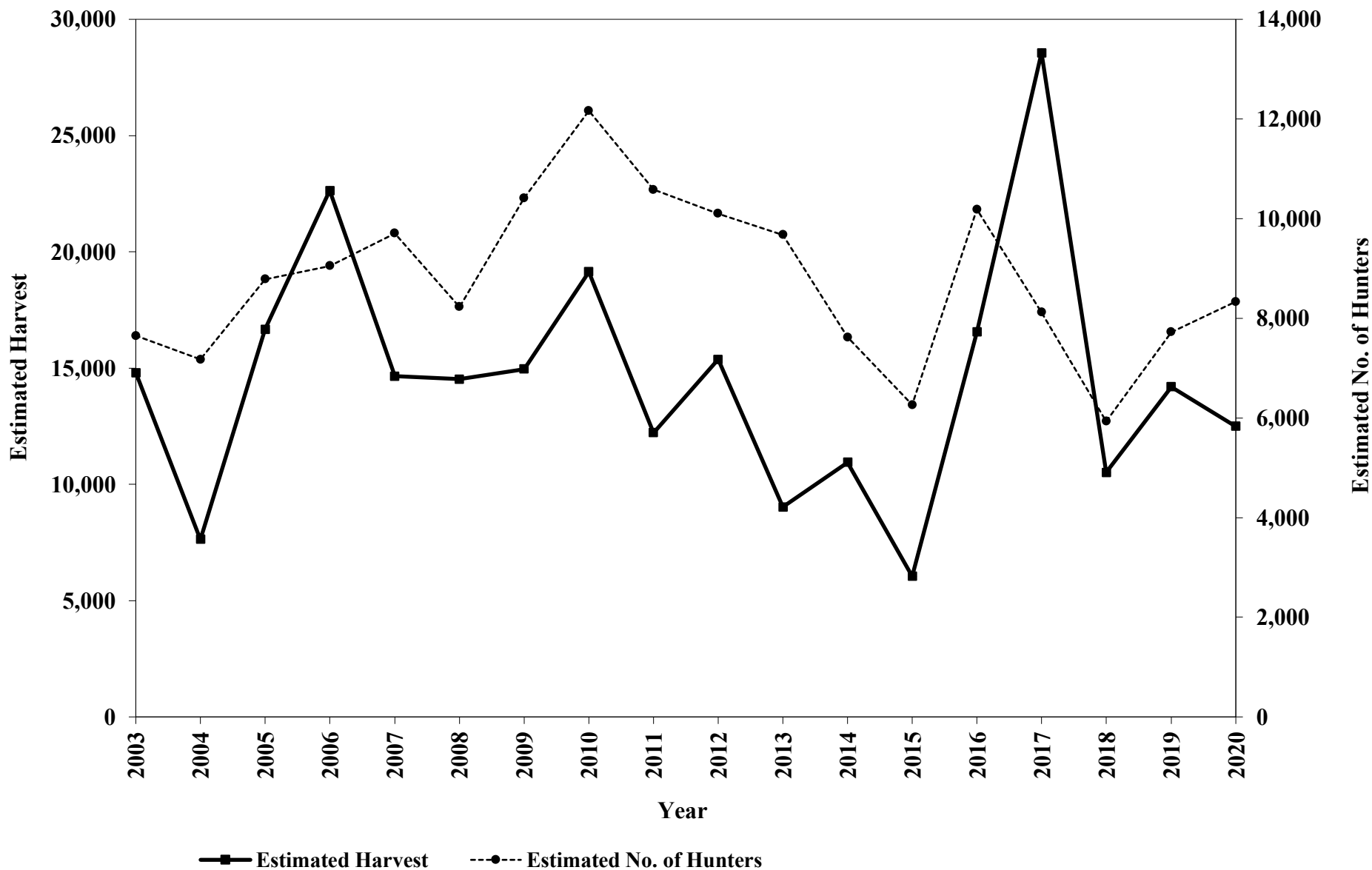


Figure A14. Statewide trends in estimated bobcat harvest and estimated number of bobcat hunters in Oklahoma, 2003-2020.

Raccoon

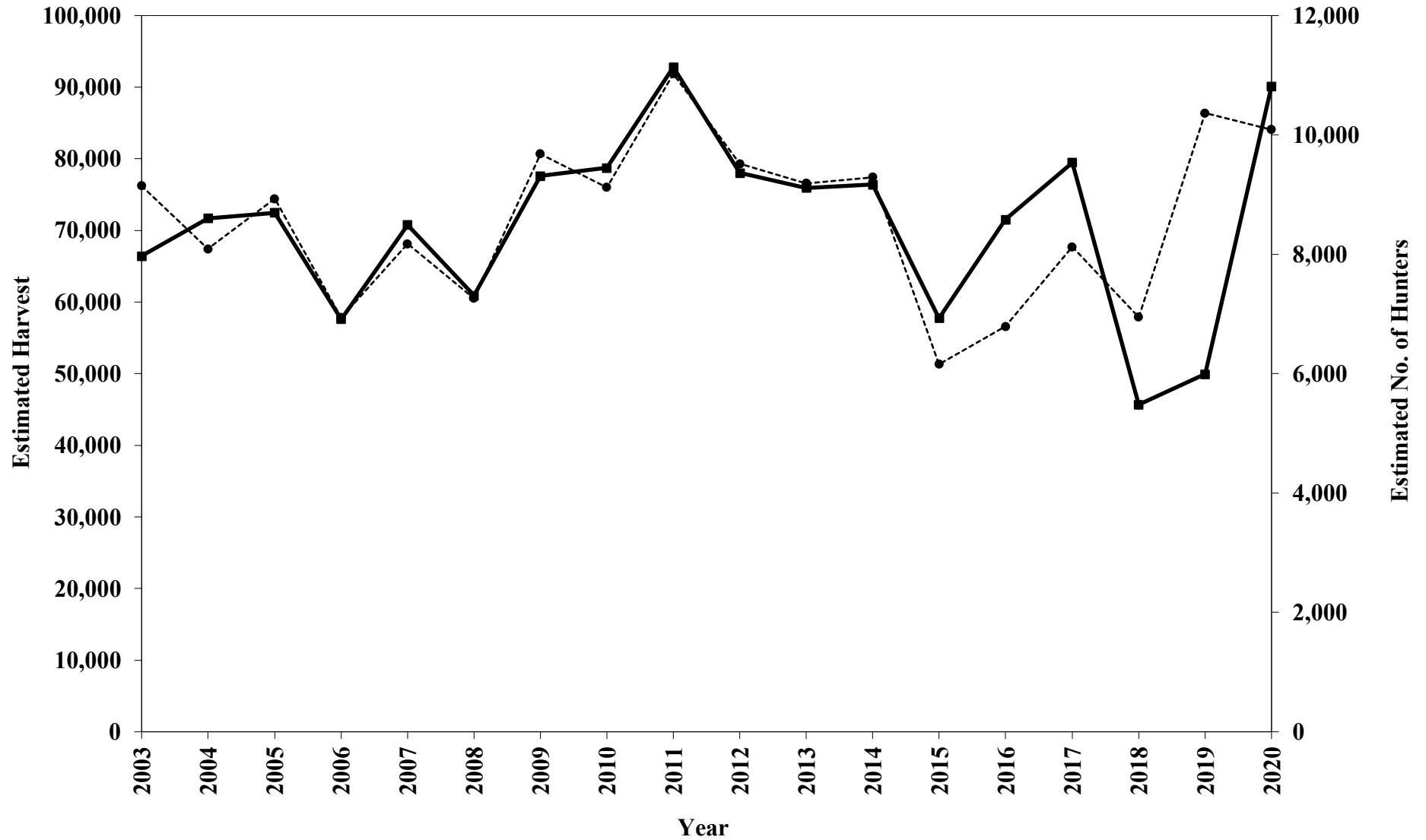


Figure A15. Statewide trends in estimated raccoon harvest and estimated number of raccoon hunters in Oklahoma, 2003-2020.

Beaver

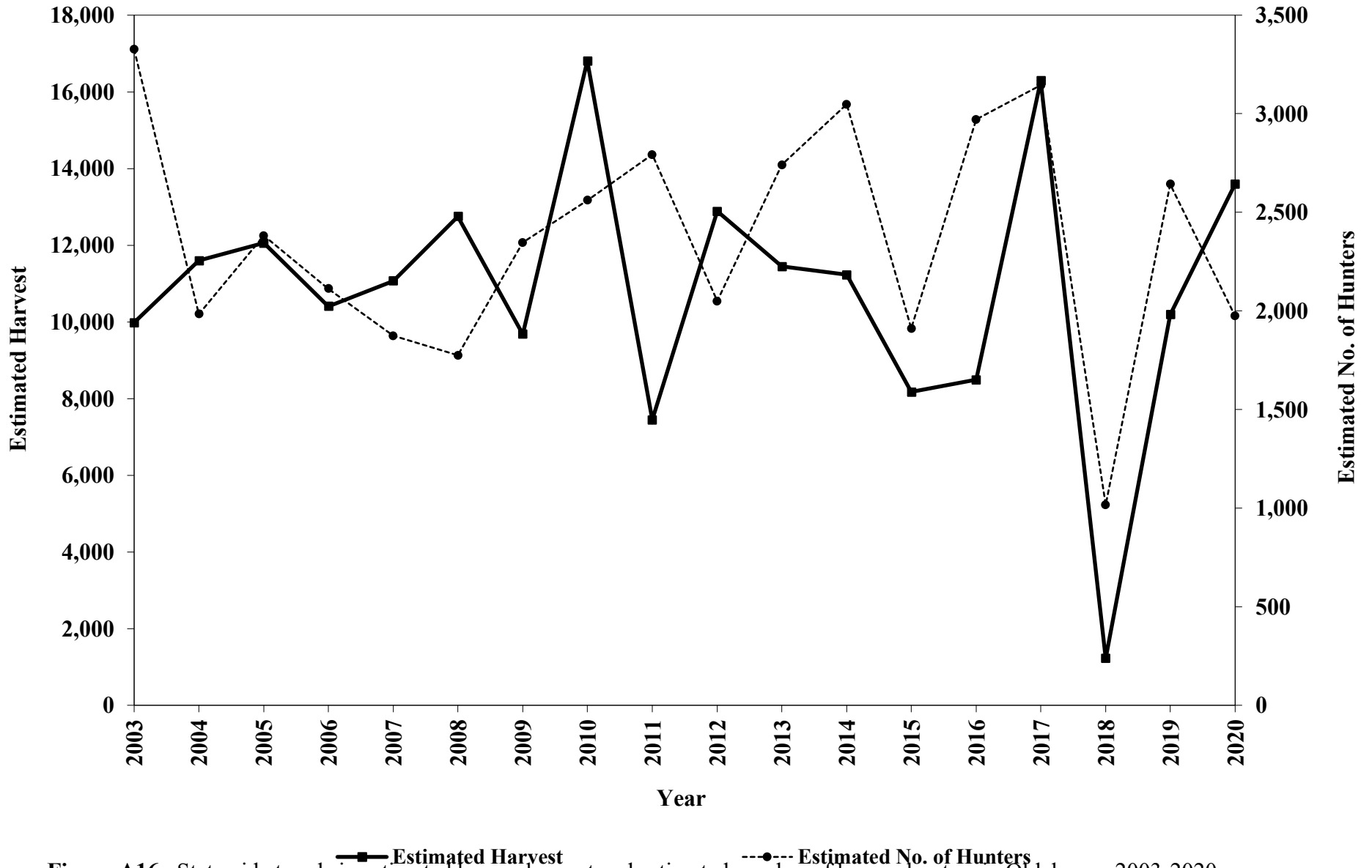


Figure A16. Statewide trends in estimated beaver harvest and estimated number of beaver hunters in Oklahoma, 2003-2020.

Gray Fox

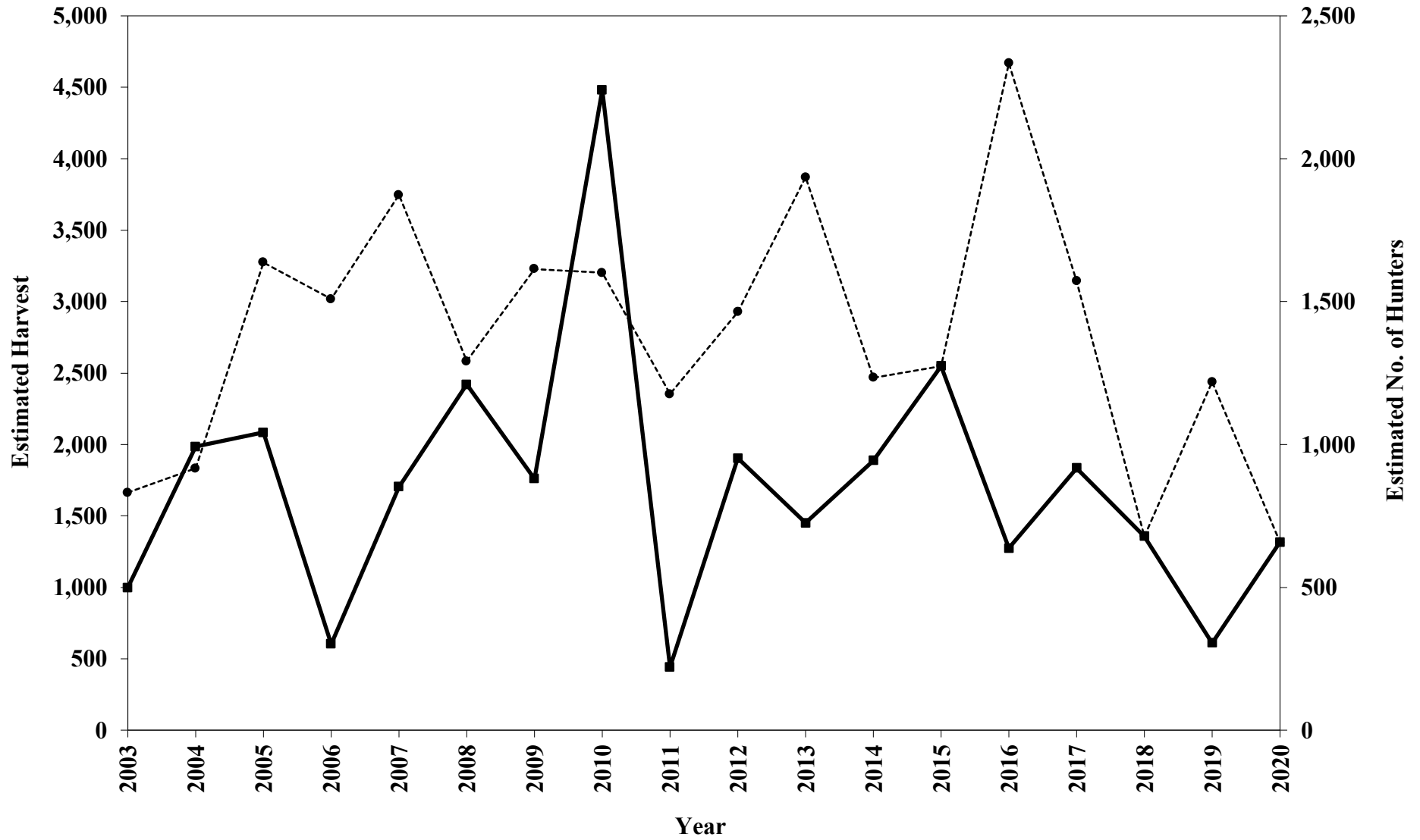


Figure A17. Statewide trends in estimated gray fox harvest and estimated number of gray fox hunters in Oklahoma, 2003-2020.

Red Fox

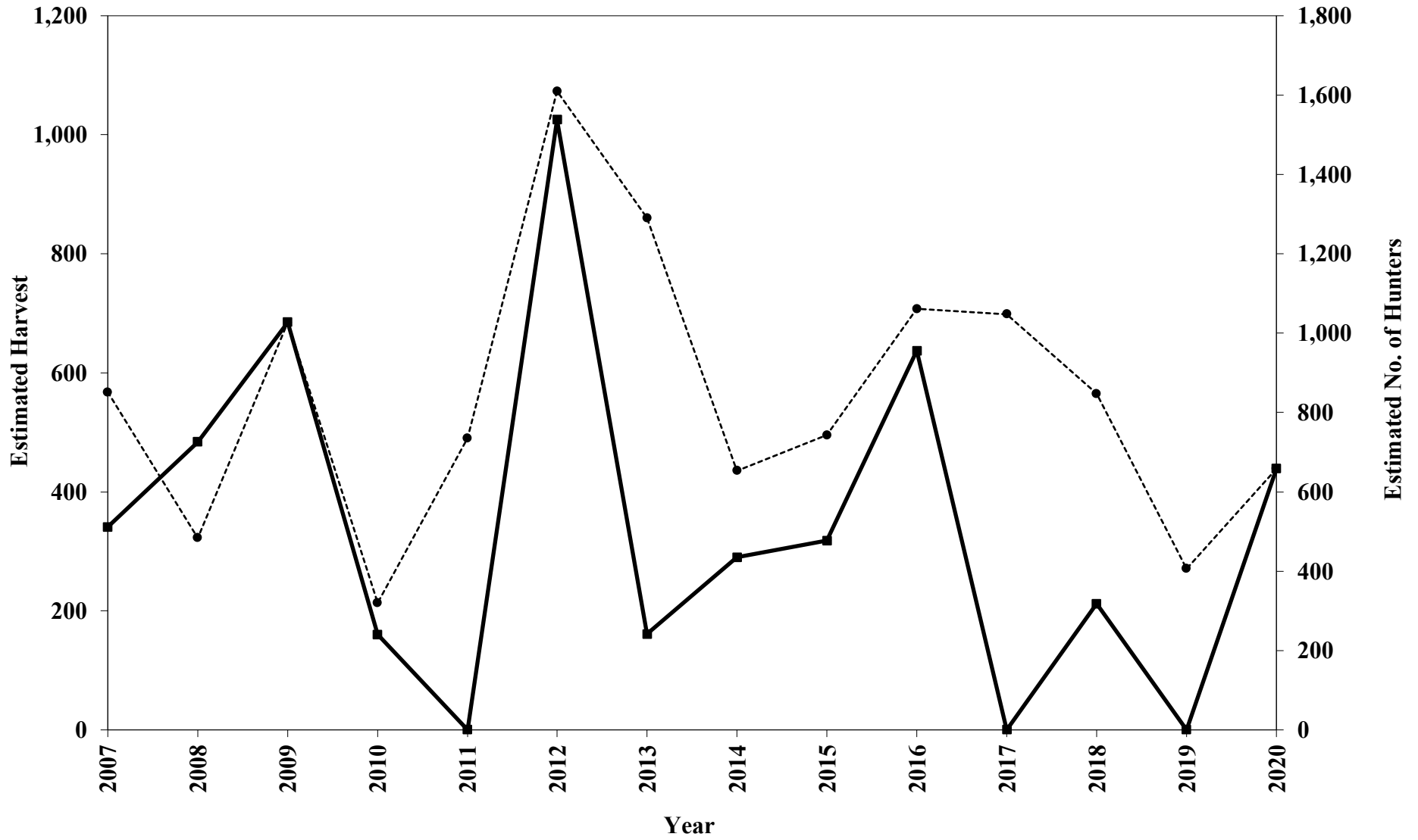


Figure A18. Statewide trends in estimated red fox harvest and estimated number of red fox hunters in Oklahoma, 2007-2020.

River Otter

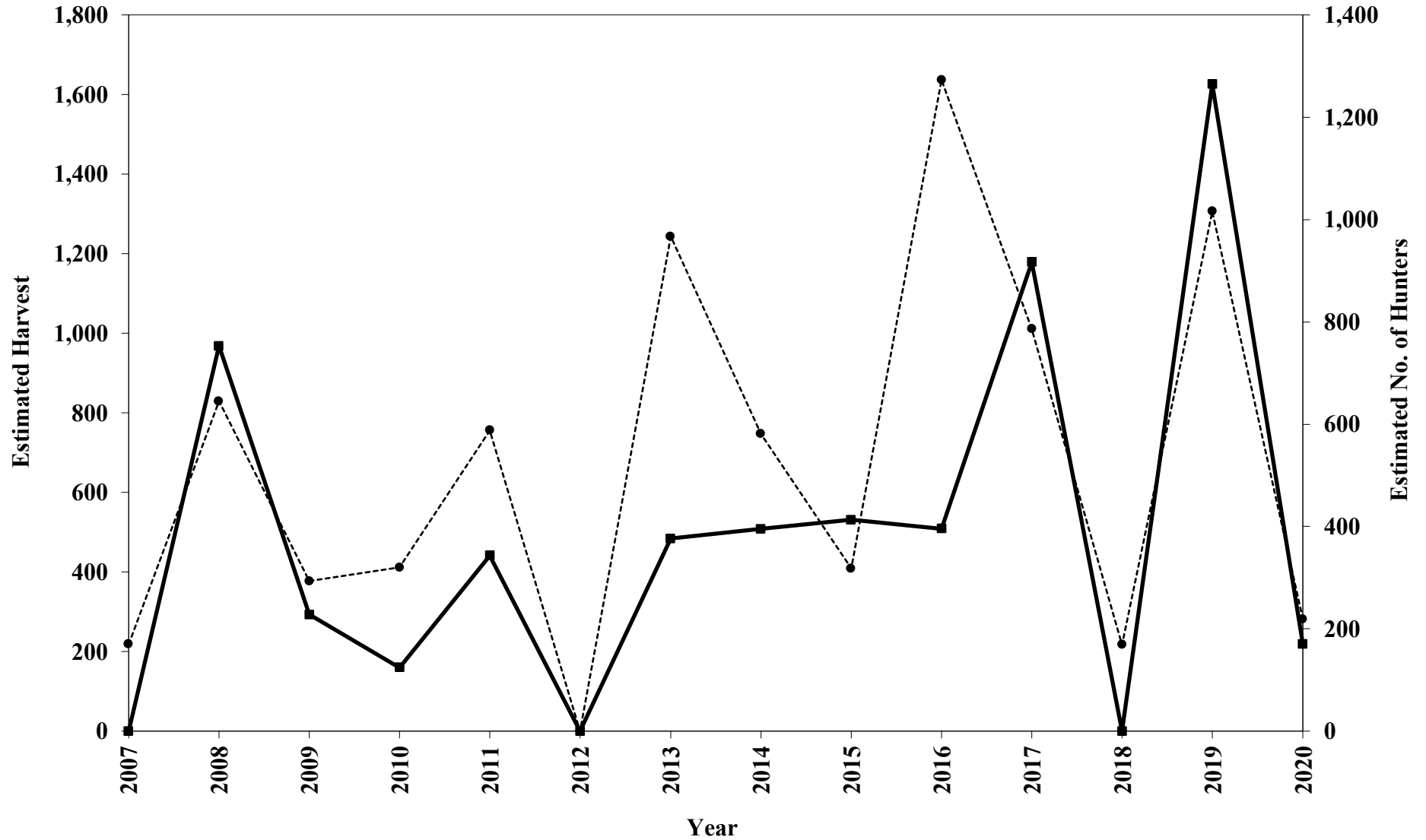


Figure A19. Statewide trends in estimated river otter harvest and estimated number of river otter hunters in Oklahoma, 2007-2020.

APPENDIX B

Human Dimensions Issues – Tables and Graphs

Table B1. Rate of participation in specific 2020 hunting seasons by all license holders, and by license type. (*Small sample size.)

Hunting Season	Total Sample		Participation by License Type					
	Participation		Lifetime		Annual/Five-Year		Senior	
	(n = 2,371)		(n = 853)		(n = 705)		(n = 504)	
	Season n	Percent	Season n	Percent	Season n	Percent	Season n	Percent
Any Hunting	1,386	58.5	638	74.8	532	75.5	102	20.2
Deer (Overall)	1,215	51.2	586	68.7	446	63.3	80	15.9
Gun	1,037	43.7	510	59.8	367	52.1	68	13.5
Primitive Firearms	472	19.9	315	36.9	101	14.3	23	4.6
Archery	684	28.8	382	44.8	225	31.9	26	5.2
Special Antlerless	245	10.3	134	15.7	84	11.9	12	2.4
Youth Season	33	1.4	13	1.5	18	2.6	0	0.0
Turkey (Overall)	304	12.8	195	22.9	66	9.4	16	3.2
Spring Turkey	270	11.4	184	21.6	51	7.2	13	2.6
Fall Turkey	86	3.6	44	5.2	26	3.7	7	1.4
Dove	316	13.3	172	20.2	113	16.0	17	3.4
Feral Swine	359	15.1	194	22.7	119	16.9	16	3.2
Ducks	208	8.8	106	12.4	85	12.1	4	0.8
Geese	103	4.3	56	6.6	36	5.1	2	0.4
Squirrel (Overall)	174	7.3	79	9.3	47	6.7	23	4.6
Fox Squirrel	125	5.3	62	7.3	29	4.1	18	3.6
Gray Squirrel	117	4.9	56	6.6	30	4.3	12	2.4
Quail	95	4.0	50	5.9	28	4.0	10	2.0
Furbearers (Overall)	145	6.1	85	10.0	40	5.7	9	1.8
Coyote	120	5.1	72	8.4	33	4.7	6	1.2
Raccoon	46	1.9	28	3.3	11	1.6	4	0.8
Bobcat	38	1.6	30	3.5	6	0.9	1	0.2
Beaver*	9	0.4	6	0.7	3	0.4	0	0.0
Gray Fox*	3	0.1	2	0.2	1	0.1	0	0.0
Red Fox*	3	0.1	0	0.0	3	0.4	0	0.0
Otter*	1	0.0	0	0.0	1	0.1	0	0.0
Rabbit (Overall)	83	3.5	32	3.8	32	4.5	9	1.8
Cottontail Rabbit	77	3.2	30	3.5	29	4.1	8	1.6
Swamp Rabbit*	13	0.5	4	0.5	4	0.6	2	0.4
Jackrabbit*	6	0.3	2	0.2	3	0.4	0	0.0
Pheasant	45	1.9	26	3.0	14	2.0	2	0.4
Crow	39	1.6	26	3.0	6	0.9	2	0.4
Woodcock*	5	0.2	2	0.2	2	0.3	0	0.0

Table B1 (continued). Rate of participation in specific 2020 hunting seasons by all license holders, and by license type. (*Small sample size.)

Hunting Season	Tribal Partnership Licenses (n = 309)	
	Season <i>n</i>	Percent
Any Hunting	114	36.9
Deer (Overall)	103	33.3
Gun	92	29.8
Primitive Firearms	33	10.7
Archery	51	16.5
Special Antlerless	15	4.9
Youth Season*	2	0.6
Turkey (Overall)	27	8.7
Spring Turkey	22	7.1
Fall Turkey	9	2.9
Dove	14	4.5
Feral Swine	30	9.7
Ducks	13	4.2
Geese*	9	2.9
Squirrel (Overall)	25	8.1
Fox Squirrel	16	5.2
Gray Squirrel	19	6.1
Quail*	7	2.3
Furbearers (Overall)*	11	3.6
Coyote*	9	2.9
Raccoon*	3	1.0
Bobcat*	1	0.3
Beaver*	0	0.0
Gray Fox*	0	0.0
Red Fox*	0	0.0
Otter*	0	0.0
Rabbit (Overall)	10	3.2
Cottontail Rabbit	10	3.2
Swamp Rabbit*	3	1.0
Jackrabbit*	1	0.3
Pheasant*	3	1.0
Crow*	5	1.6
Woodcock*	1	0.3

"Did you hunt in Oklahoma during 2020?"

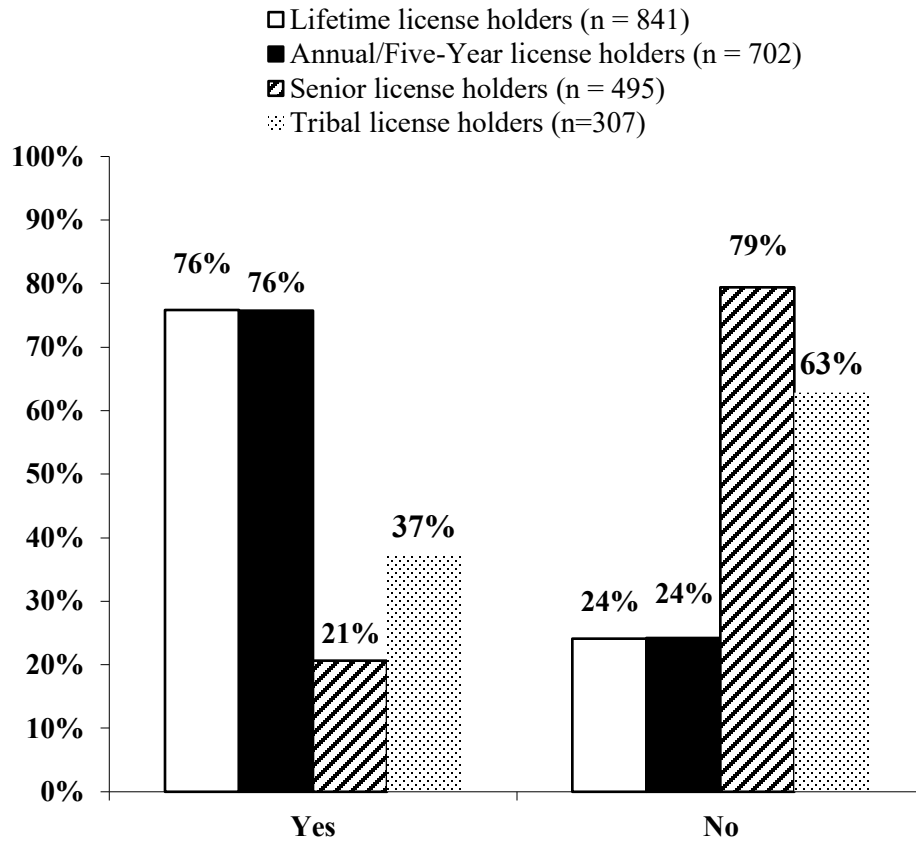


Figure B1. Distribution of hunting license holder participation in hunting activities during 2020, by license category. Both hunting and combination-hunting-and-fishing licenses were included in all license categories (n = 2,345).

Type of Land Used for Hunting in Oklahoma during 2020, by Season

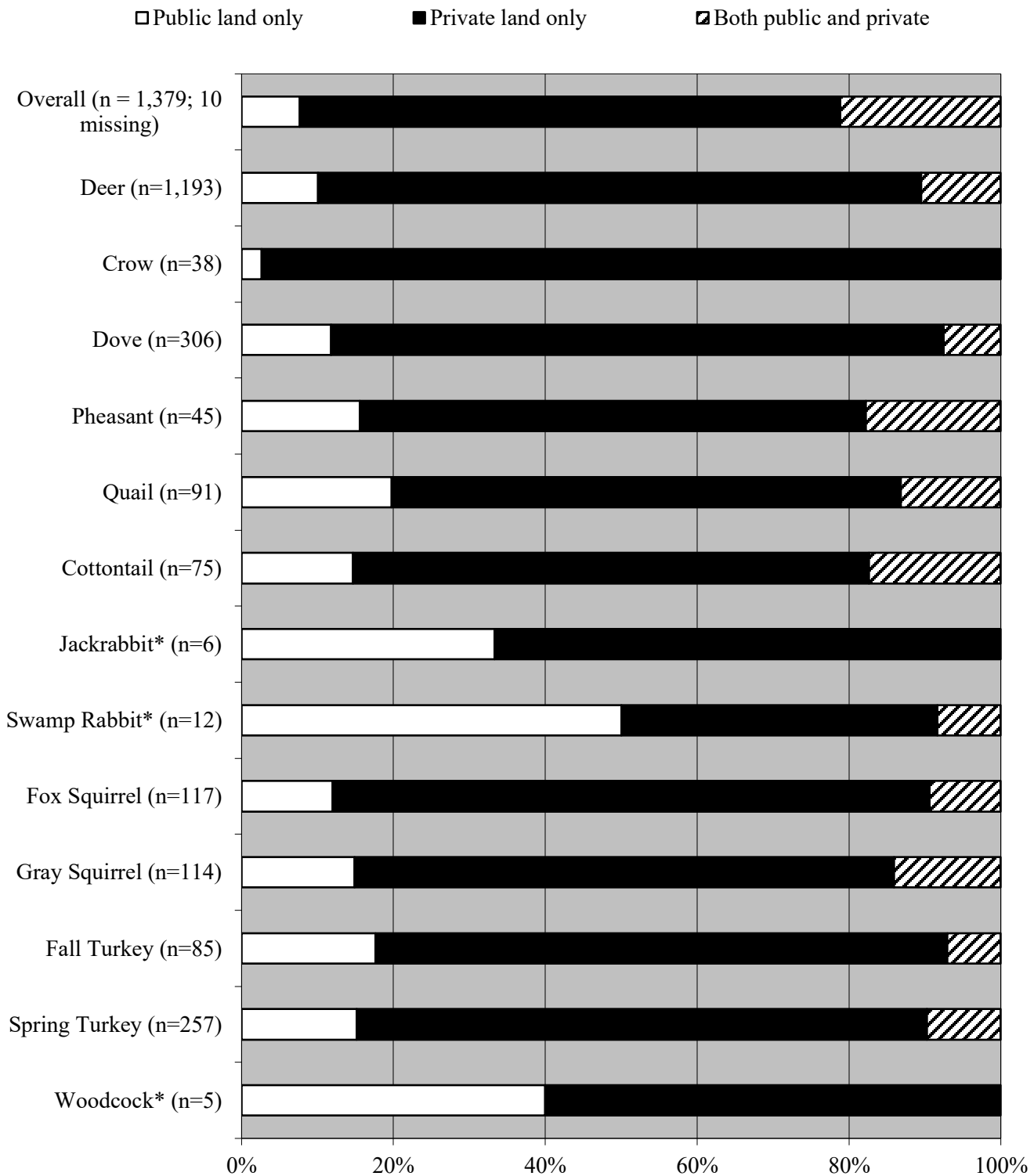


Figure B2. Distribution of land use for specific hunting seasons during 2020. Sample sizes and missing data vary for each species. *Small sample size.

“Did you use public land for any portion of your hunting in Oklahoma during 2020?”

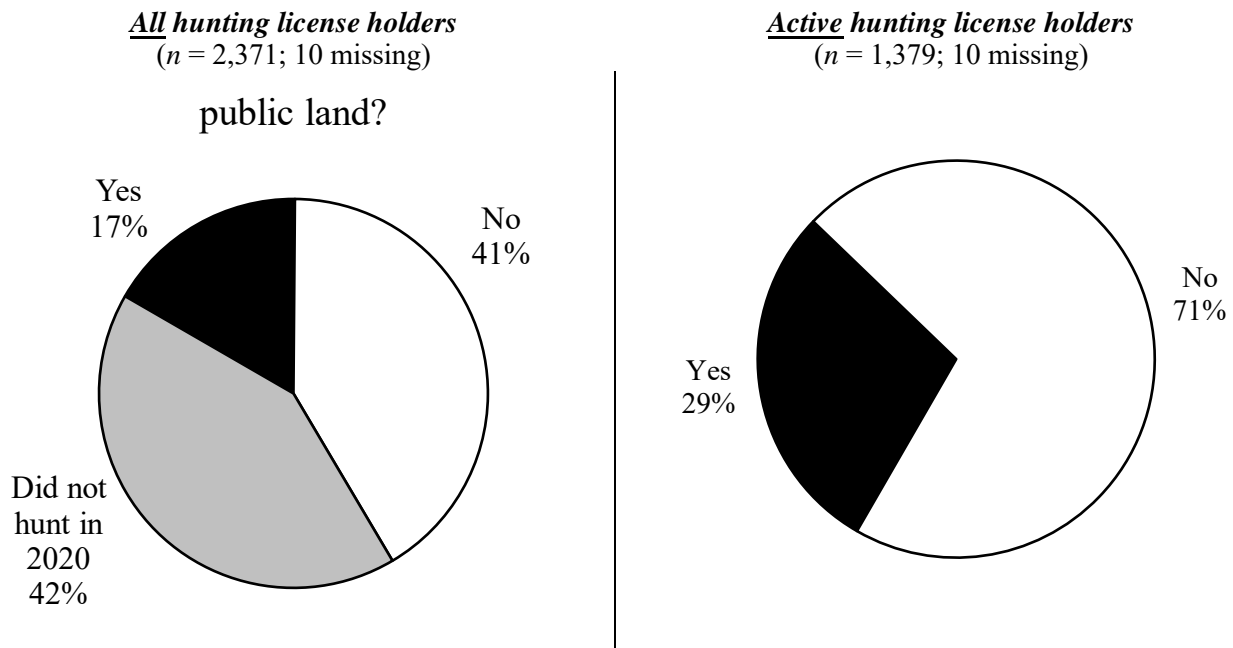


Figure B3. Distribution of hunting license holder use of public land during the 2020 hunting season.

[Asked of hunters who used public land:]
“Overall, how important to your hunting experience is public land?”

■ Very important □ Somewhat important ■ Not important at all

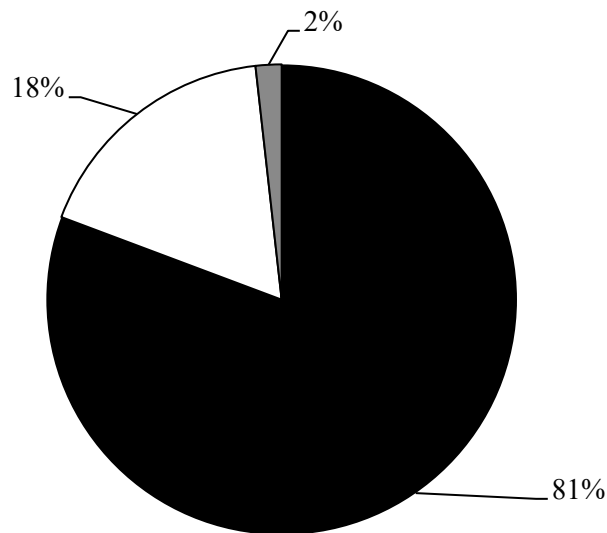


Figure B4. Importance of public land, by 2020 public land hunters (n = 394; excludes 3 respondents who selected “No opinion/Don’t know”).

“Please check the box for each part of Oklahoma where you hunted on public land during 2020, based on the major highways:”

Active hunters 2020 (n = 1,385)

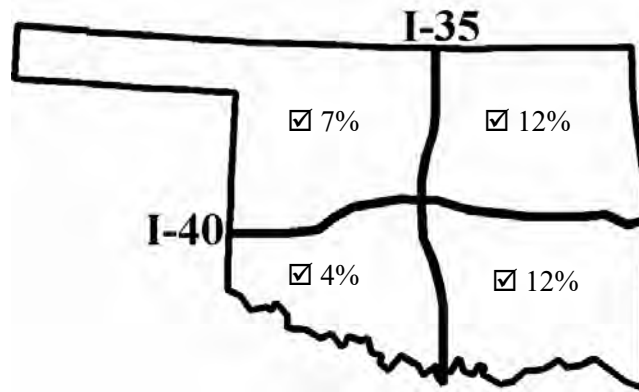


Figure B5. Use of public land located in each region, by active hunting license holders in 2020.

Participation in Specific Deer Seasons

2020-season deer hunters (n = 1,215)

(*Senior citizen license holders excluded for Youth Season as they could not possibly be an active hunter in the youth season.)

Multiple responses allowed

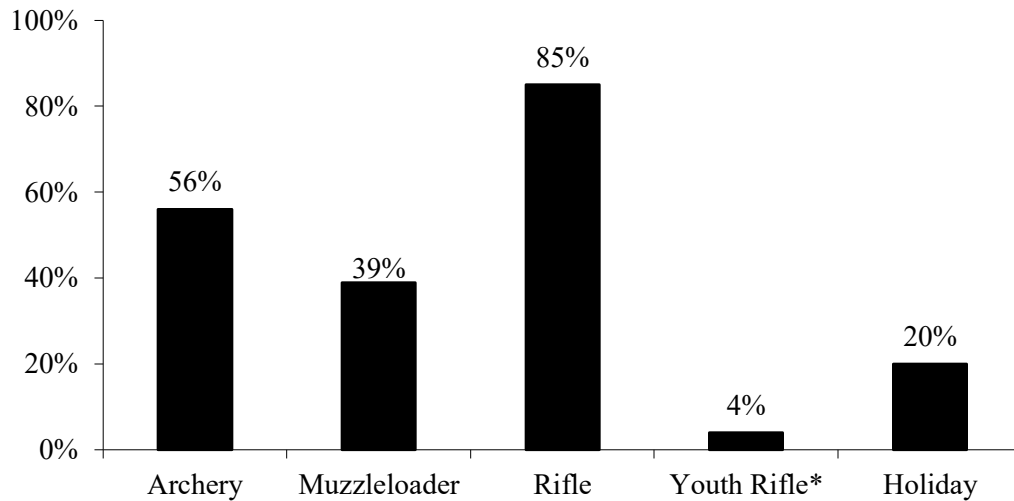


Figure B6. Participation in individual deer seasons, by 2020-season deer hunters.

Patterns of Participation: Number of Deer Seasons
2020-season deer hunters (n = 1,193)

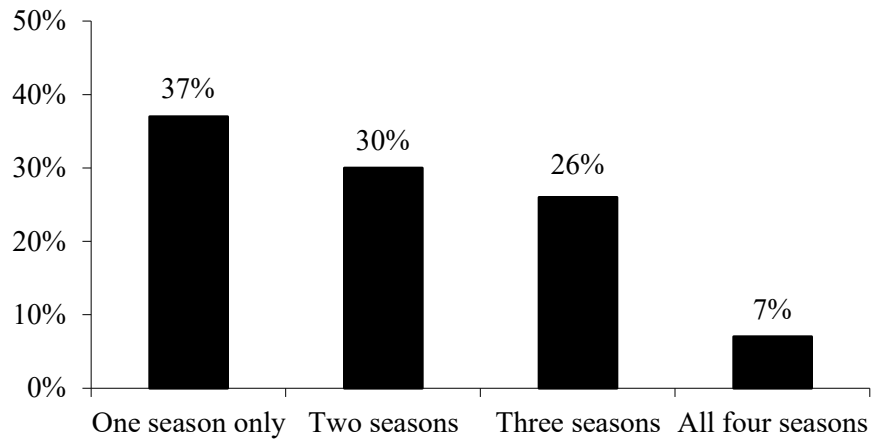


Figure B7. Number of deer seasons (archery, primitive, gun and holiday season; youth season excluded) participated in by 2020-season deer hunters.

Patterns of Participation: Specific Deer Seasons
2020-season deer hunters (n = 1,215)

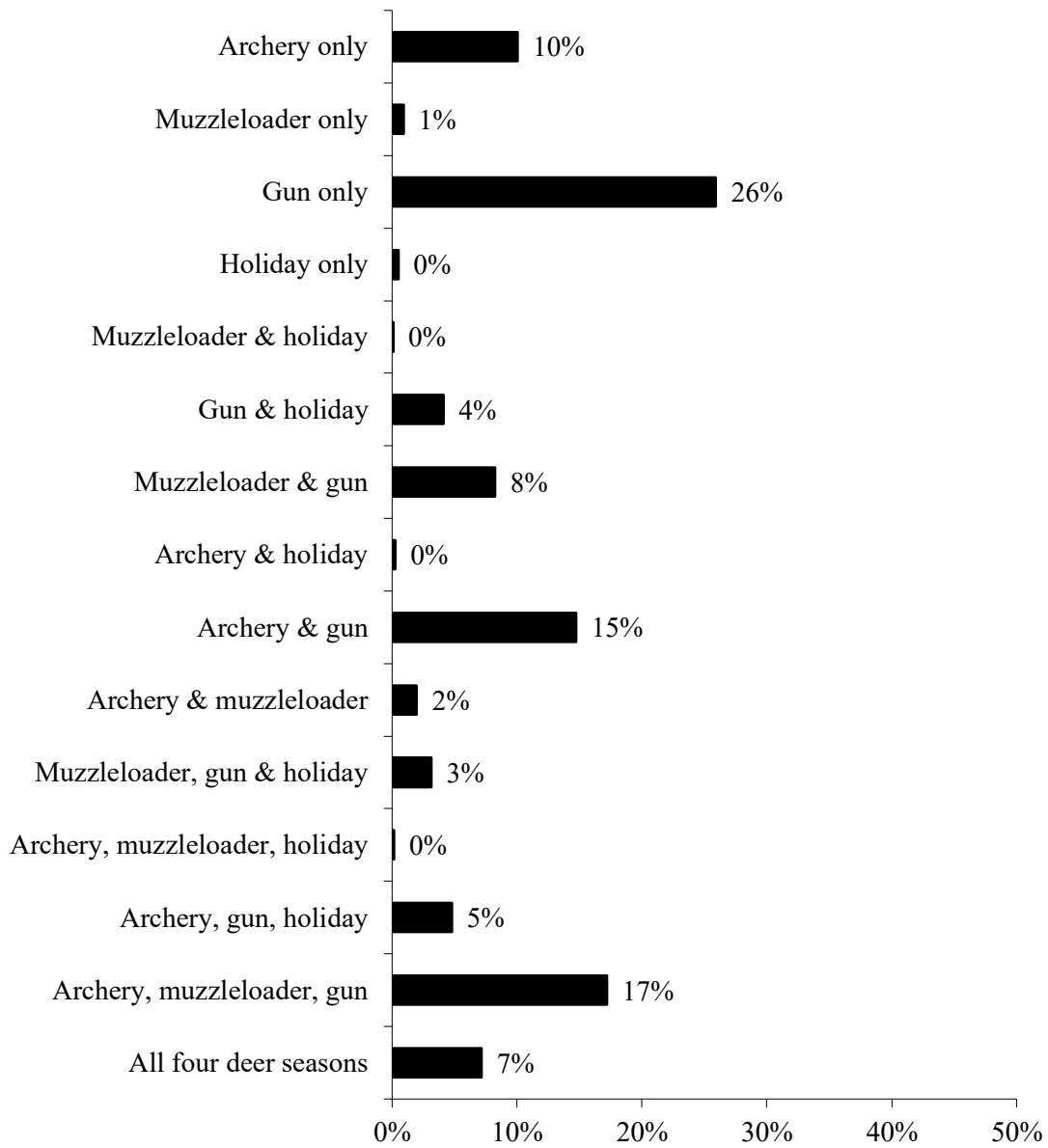


Figure B8. Specific deer seasons (archery, primitive, gun and holiday antlerless season; youth season excluded) participated in by 2020-season deer hunters.

Other Deer Hunting by Youth Season Participants
2020 youth deer season hunters (n = 33)

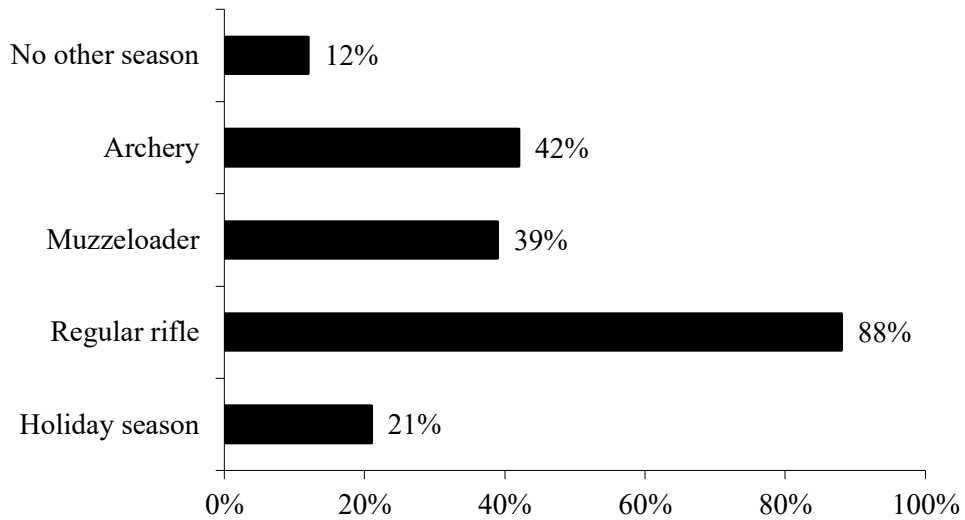


Figure B9. Participation in other deer seasons by 2020 youth deer season hunters.

Total Number of Deer Harvested Per Hunter
2020-season deer hunters (n = 1,213)

- **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

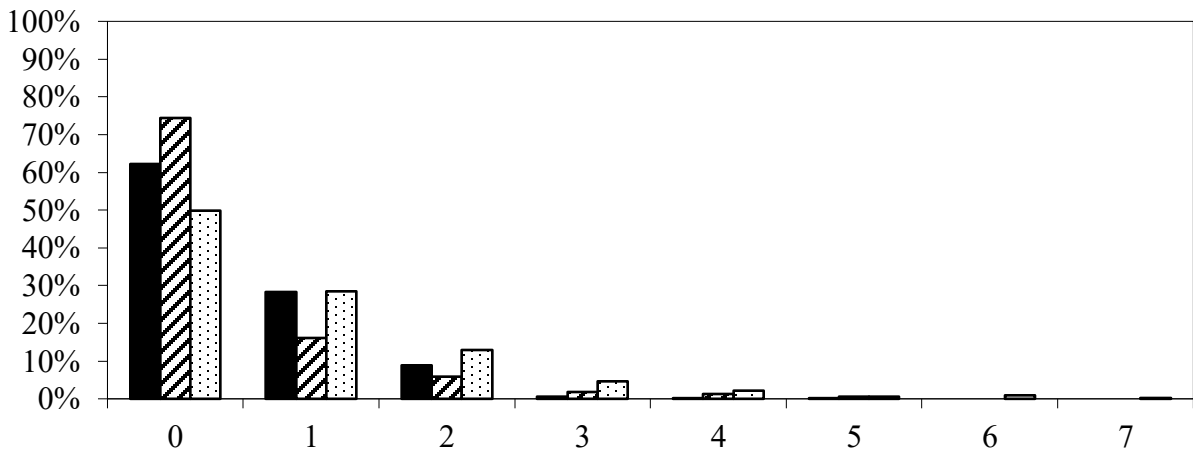


Figure B10. Total number of deer harvested per hunter across all 2020 seasons: archery, muzzleloader, gun, youth, and the holiday antlerless season.

"How much of your archery hunting was done with a crossbow?"

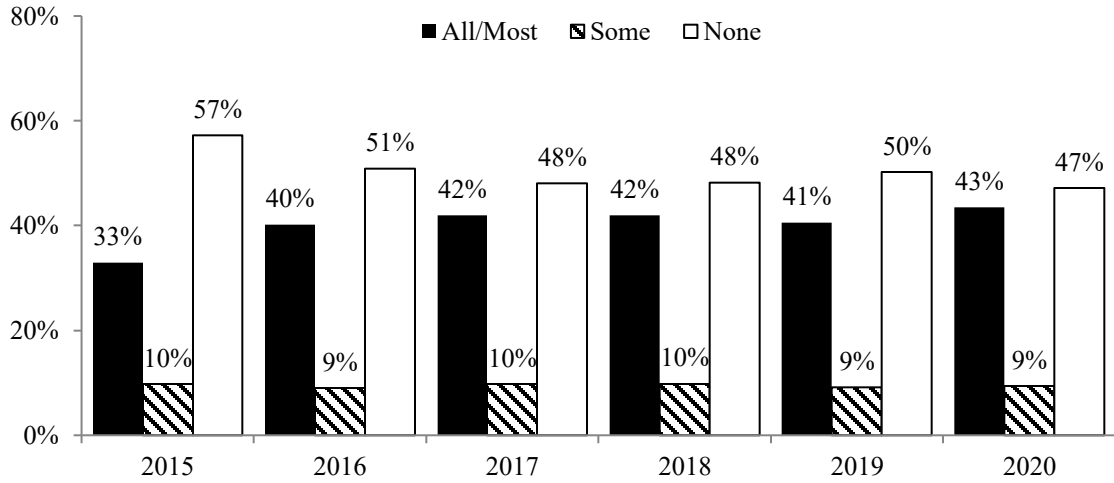


Figure B11. Crossbow use by 2015 archery deer hunters ($n = 780$); 2016 ($n = 470$); 2017 ($n = 376$); 2018 ($n = 600$); 2019 ($n=731$); 2020 ($n=681$).

**Reasons for Not Hunting by
Inactive Hunting License Holders**
Did not hunt in 2020, $n=922$, missing=36

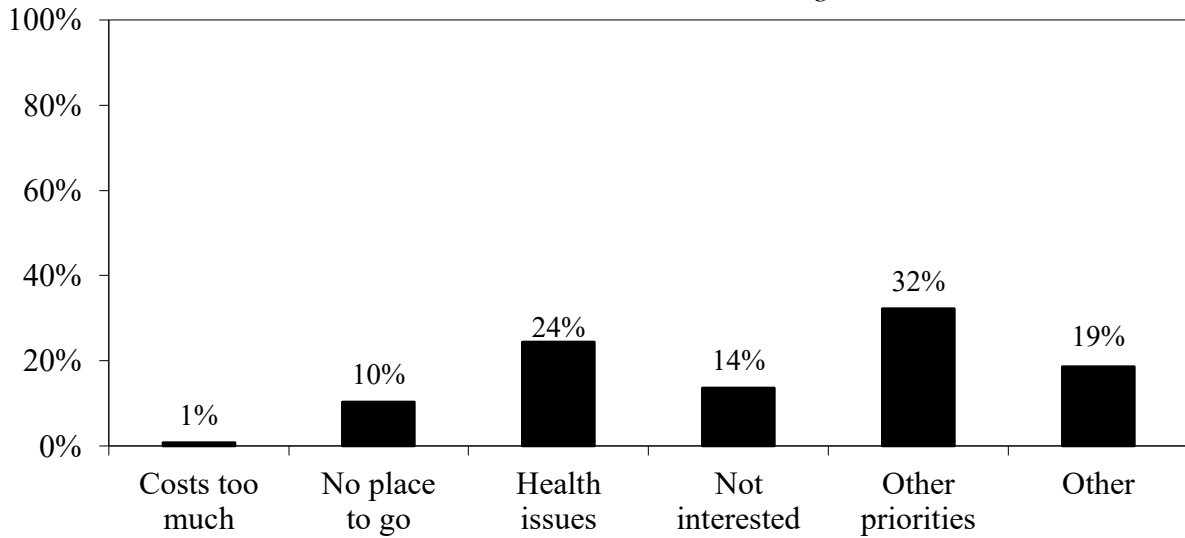


Figure B12. Barriers to hunting participation, by hunting license holders who were inactive in 2020

Effect of Covid-19 Pandemic on Hunting Activity
 Asked of all licensed hunters (n=2,125)

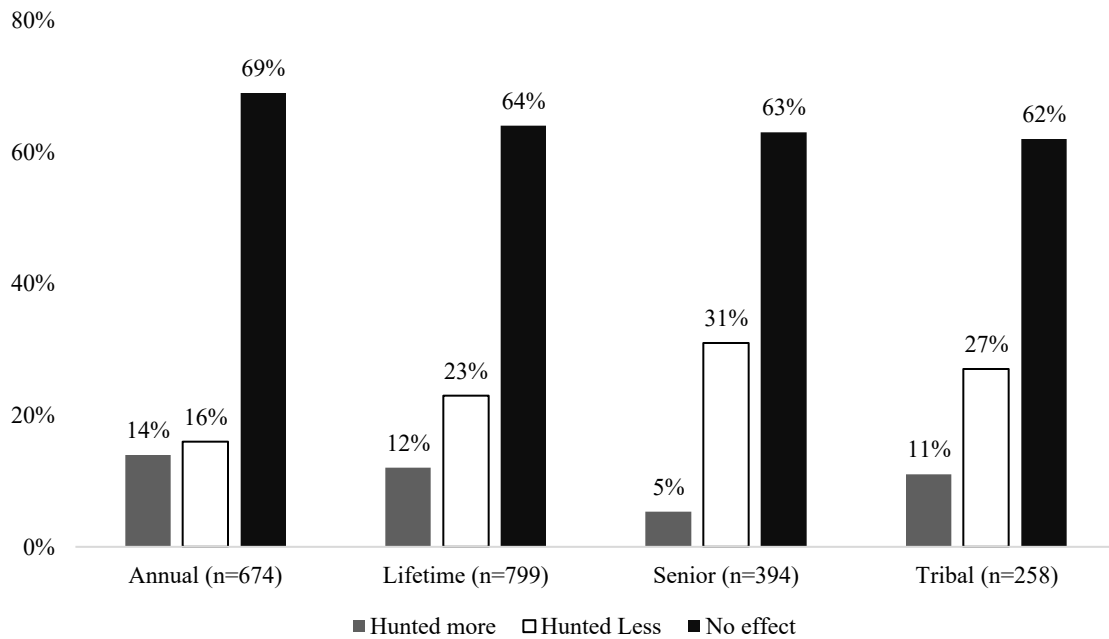


Figure B13. Effect of Covid-19 on hunting participation, by license type

Access to land compared to five years ago
 Asked of all licensed hunters (n=2,038)

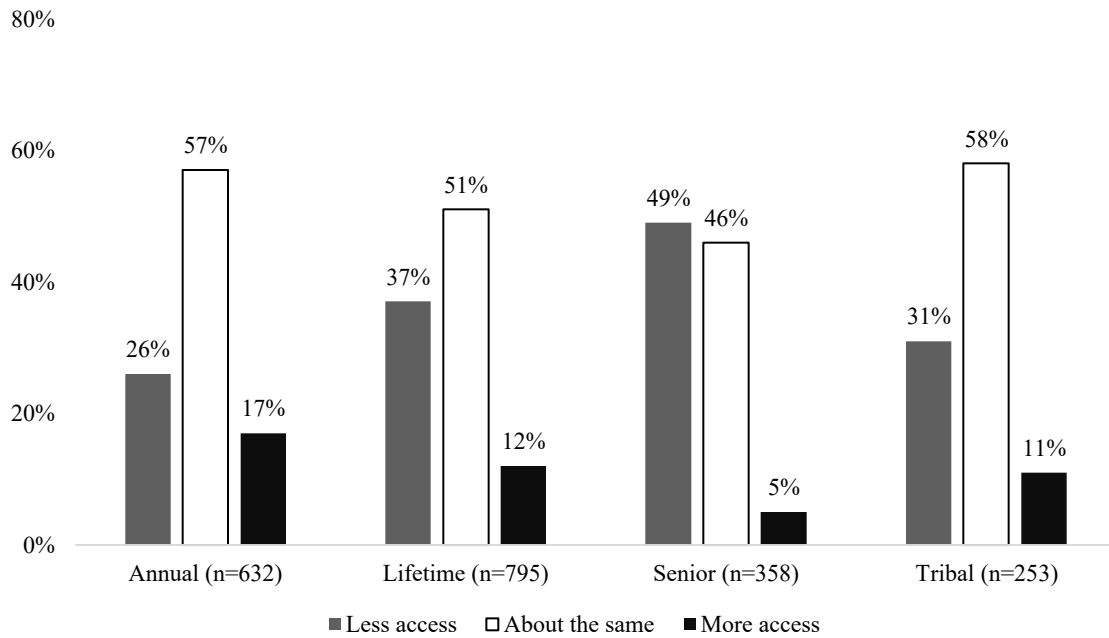


Figure B14. Access to land compared with five years ago, by both license type

Support for allowing foraging on public lands in Oklahoma
Data displayed is only active hunters (n=1,338)

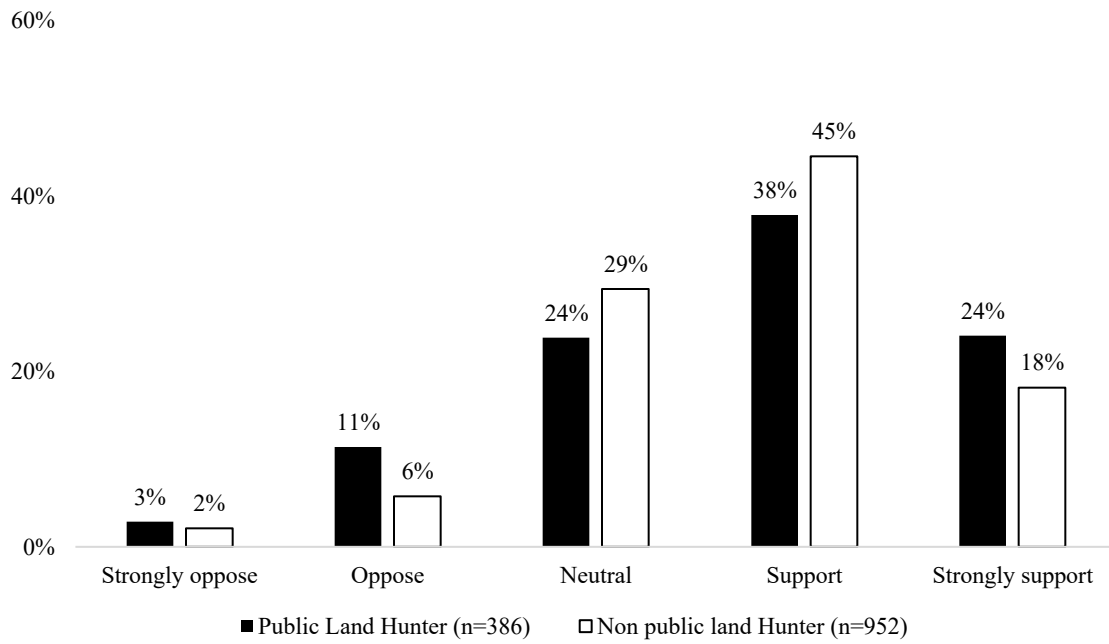


Figure B15. Support for allowing foraging by public land by if they used public land for any portion of their hunting in 2020.

Table B2. What contributes to a successful hunt by how they self-rated their skill in hunting (Average of responses is displayed, closer to 1 is more important, 7 is less important) (n=899)

Rate		
Beginner (n=112)	Enjoying the time spent with family/friends	2.775
	Being outside	3.099
	Seeing any wildlife	3.116
	Seeing the species I intended to hunt	3.427
	Favorable weather for being outside	3.550
	Taking a shot at the intended animal	4.645
	Harvesting an animal	5.255
Intermediate (n=408)	Enjoying the time spent with family/friends	2.978
	Being outside	3.020
	Seeing any wildlife	3.456
	Seeing the species I intended to hunt	3.191
	Favorable weather for being outside	4.401
	Taking a shot at the intended animal	4.452
	Harvesting an animal	4.478
Advanced (n=379)	Enjoying the time spent with family/friends	2.905
	Being outside	2.928
	Seeing any wildlife	3.280
	Seeing the species I intended to hunt	3.143
	Favorable weather for being outside	4.534
	Taking a shot at the intended animal	4.401
	Harvesting an animal	4.353

Table B3. What contributes to a successful hunt by age of hunter (Average of responses is displayed, closer to 1 is more important, 7 is less important) (n=918)

AGE (bin)	Enjoying the time spent with family/friends	Being outside	Seeing any wildlife	Seeing the species I intended to hunt	Favorable weather for being outside	Taking a shot at the intended animal	Harvesting an animal
0-19 years (n=39)	3.2	3.4	3.3	2.8	4.5	4.3	4.5
20-39 years (n=145)	2.7	3.5	3.4	3.2	4.8	4.5	4.4
40-59 years (n=291)	2.8	3.0	3.6	3.1	4.6	4.5	4.5
60-79 years (n=390)	3.0	2.7	3.1	3.2	3.9	4.3	4.6
80 years and over (n=53)	3.1	3.3	3.5	3.8	4.4	4.6	4.4

Visitation to a WMA for non-hunting related activities
 Asked of all licensed hunters(n=2,059)

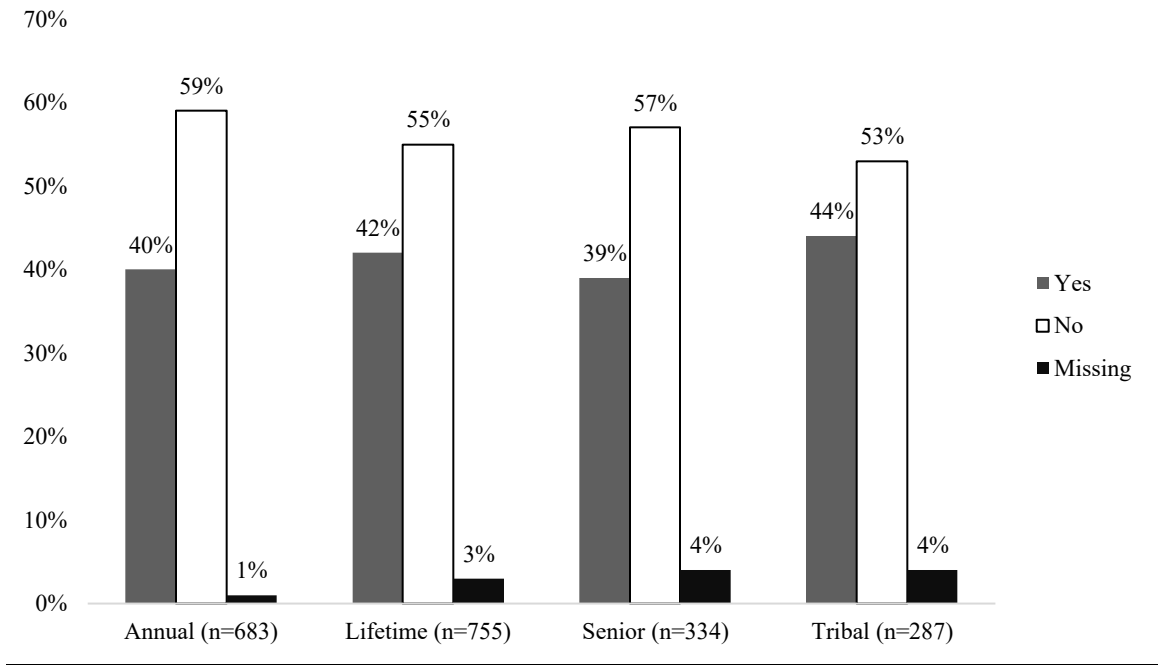


Figure B16. Have you visited a WMA for non-hunting related activities?

What months do you visit WMAs for non-hunting related activities?
 Asked of those that said they did visit for non-hunting activities (n=848)

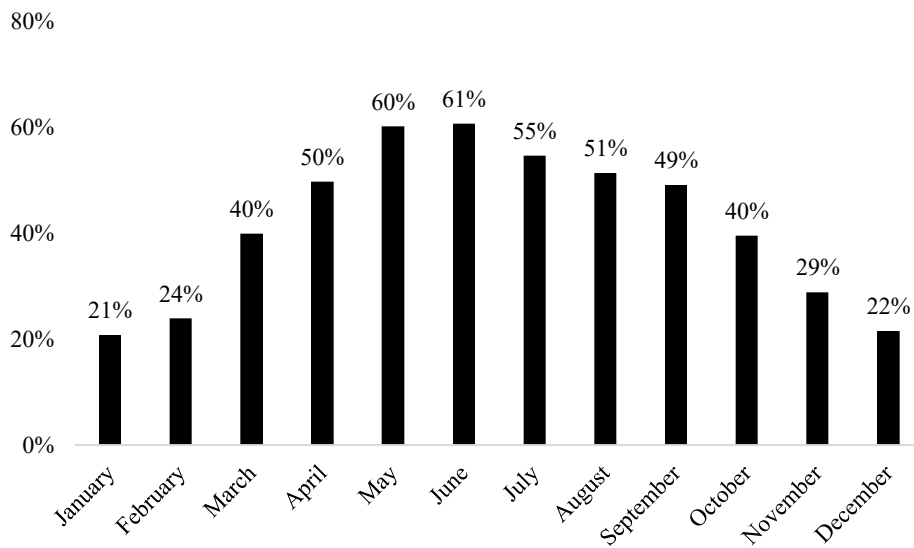


Figure B17. What months have you visited for non-hunting activities?

What non-hunting activities do you participate in on WMAs?
 Asked of those that said they did visit for non-hunting activities (n=1,079)

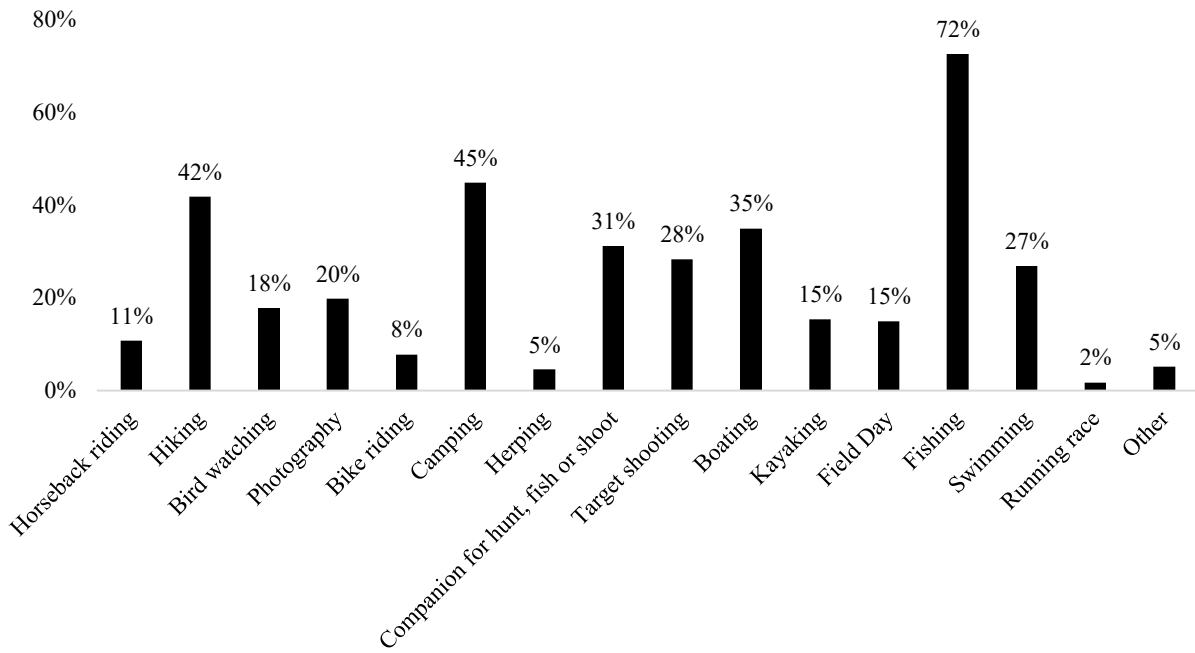


Figure B18. What non-hunting activities have you done?

Use of the Go Outdoors mobile app by license type
 Asked of all hunting license holders (n=2,267)

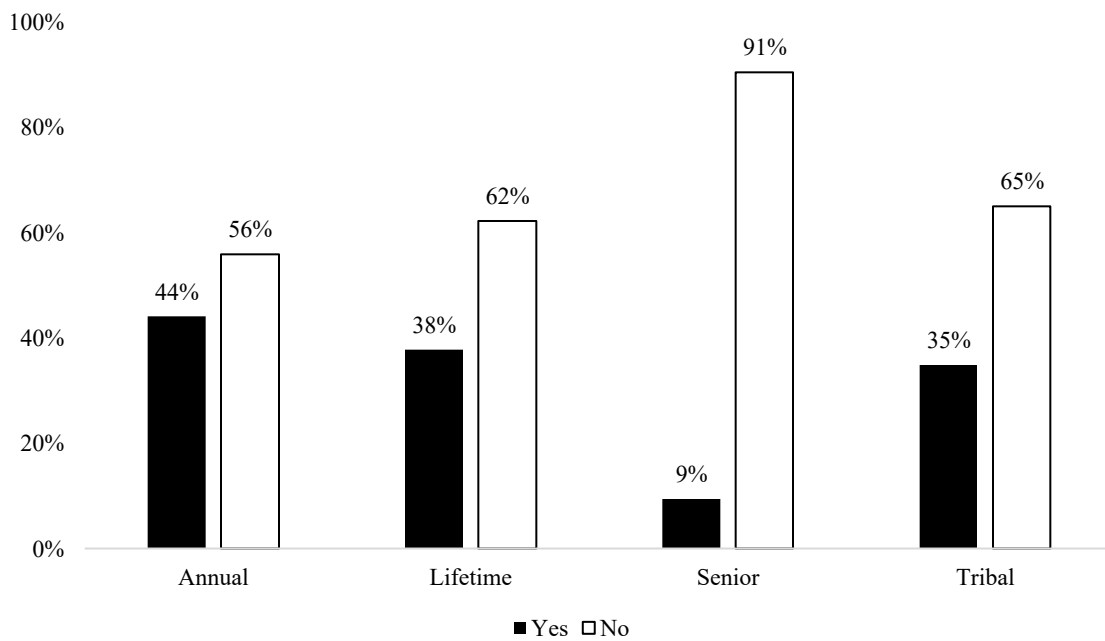


Figure B19. Do you use the Go Outdoors app?

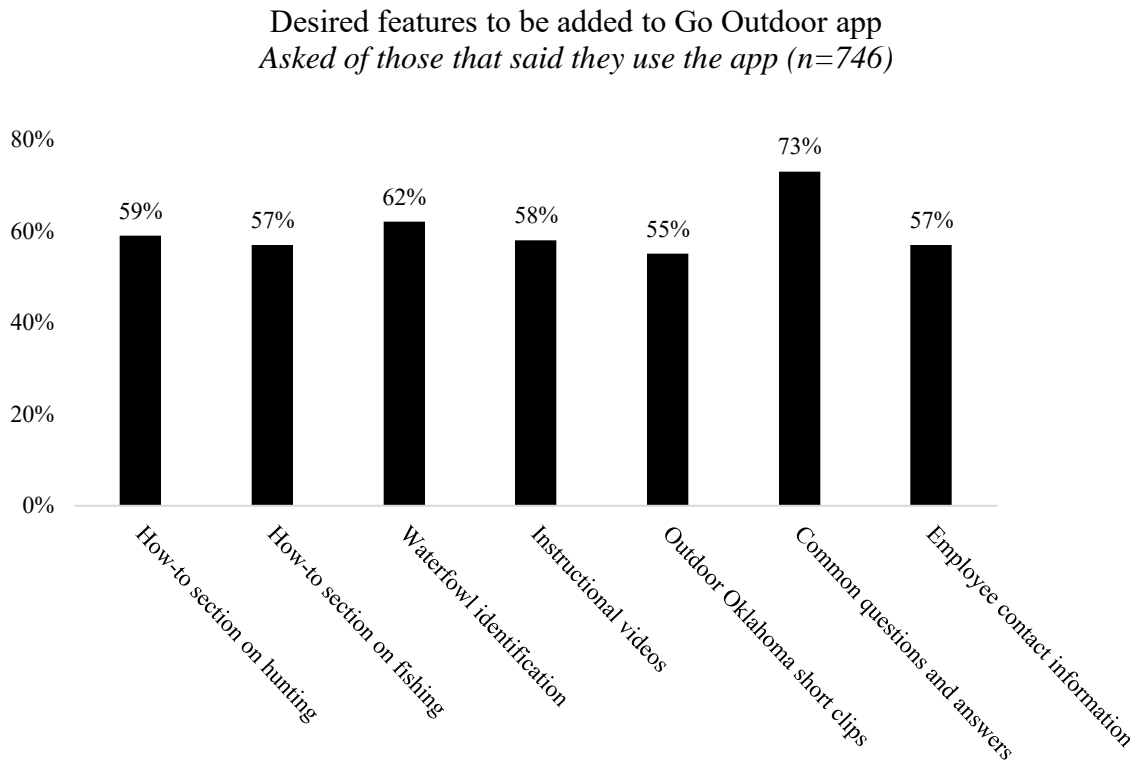


Figure B19. What features would you like added to the Go Outdoors app?

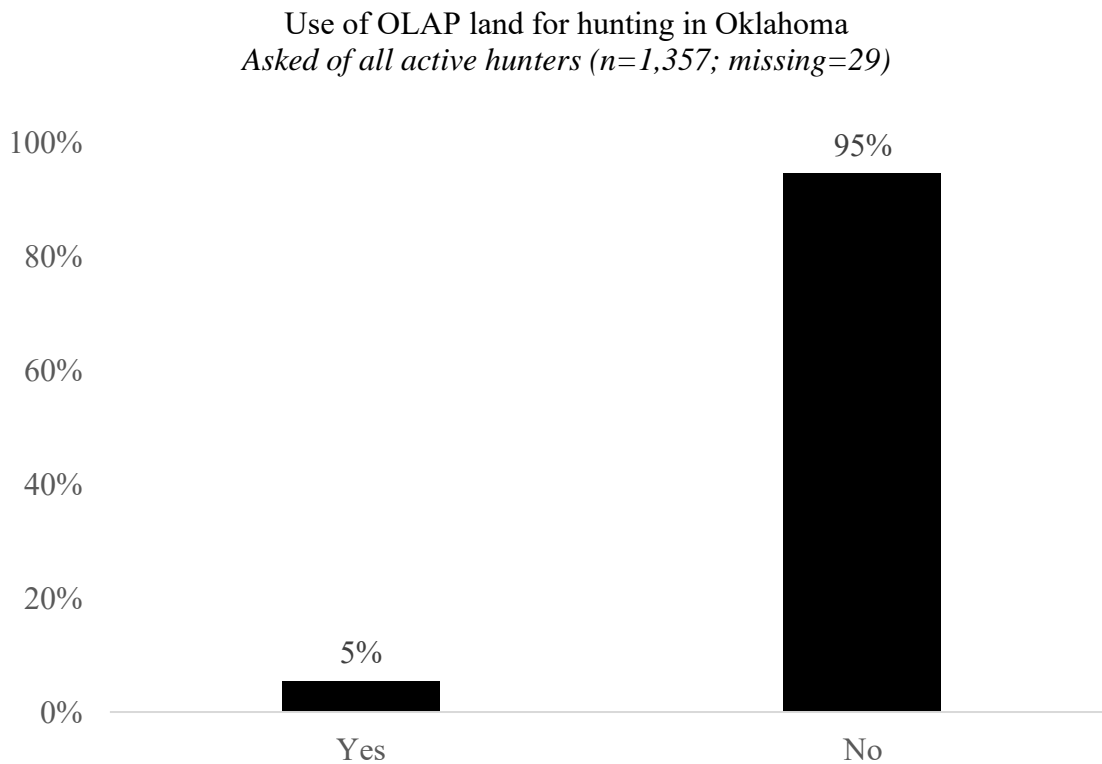


Figure B20: Was any of the land that you hunted on in 2020 part of the Oklahoma Land Access Program (OLAP)

APPENDIX C
Survey Instrument



2020-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 2020 (if any) and the game you harvested. We need your help with this survey even if you did not hunt. Your answers will help us improve wildlife conservation in Oklahoma.

As a token of our appreciation, every 10th hunter to return their completed survey will receive a free subscription to *Outdoor Oklahoma* magazine. 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 Betsy York at (405) 401-7532 or betsy.york@odwc.ok.gov. Your help in this project is greatly appreciated, and we look forward to learning about your 2020 hunting experiences!

Sincerely,

Betsy York
Human Dimensions Specialist

1. Did you hunt in Oklahoma during 2020?

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

No → 1a. What was the main reason you did not hunt last year?

- | | | |
|---|---|---------------------------------|
| <input type="checkbox"/> Costs too much | <input type="checkbox"/> No place to go | <input type="checkbox"/> Health |
| <input type="checkbox"/> Not interested | <input type="checkbox"/> Other priorities | <input type="checkbox"/> Other |

If you did not hunt in 2020, please skip to question #28.

Public Land

2. Did you use public land for any portion of your hunting in Oklahoma during 2020?

(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-ex. OLAP)

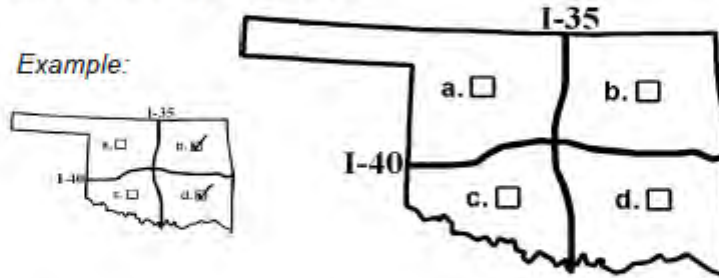
- No → If no, please go to question #6 below.
- Yes

3. Considering all Oklahoma hunting seasons in 2020, 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 each part of Oklahoma where you hunted on public land during 2020, based on the major highways:



5. Overall, how important to your hunting experience is public land?

- Very important
- Somewhat important
- Not important at all

OLAP

The Oklahoma Land Access Program (OLAP) allows the Wildlife Department to lease land from private landowners for hunting access.

6. Was any of the land that you hunted on in 2020 part of the Oklahoma Land Access Program (OLAP)?

- Yes
- No

Hunting in Oklahoma During 2020

Please complete the box for each season you hunted in Oklahoma during 2020 (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 2020? 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 public land at all during 2020:

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 2020? 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 public land at all during 2020:

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 2020? 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 public land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020? 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 **public** land at all during spring 2020:

- 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 2020? 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 **public** land at all during fall 2020:

- 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 2020? 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 **public** land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020? 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 public land at all during 2020:

- 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 2020?
 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? |
|-------------------------------------|-------------------|------------------------------|
| <input type="checkbox"/> Coyote → | _____ | → _____ |
| <input type="checkbox"/> Bobcat → | _____ | → _____ |
| <input type="checkbox"/> Raccoon → | _____ | → _____ |
| <input type="checkbox"/> Beaver → | _____ | → _____ |
| <input type="checkbox"/> Otter → | _____ | → _____ |
| <input type="checkbox"/> Gray fox → | _____ | → _____ |
| <input type="checkbox"/> Red fox → | _____ | → _____ |

20. Migratory Game Birds



- b. Did you hunt any of the following migratory game birds in Oklahoma during 2020? *(If not, skip to next box.)*

- | c. Which did you hunt | c. How many days? | d. How many did you harvest? |
|---|-------------------|------------------------------|
| <input type="checkbox"/> Ducks → | _____ | → _____ |
| <input type="checkbox"/> Geese → | _____ | → _____ |
| <input type="checkbox"/> Sandhill Crane → | _____ | → _____ |

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



a. Did you target free-ranging feral swine in Oklahoma during 2020? (If not, skip to question 23.) Yes No

b. Land used to target feral swine? Public Private Both

c. How many days? _____

d. How many did you harvest? _____

e. County you were in most often? _____

Deer Hunting in 2020 _____

22. Deer

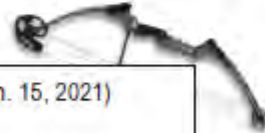


a. Did you hunt deer in Oklahoma during 2020?
 Yes No → (If you did not hunt deer during 2020, please skip to question 28.)

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

c. Land used for deer hunting? Public Private Both

23. Deer: Archery Season



a. Did you hunt deer during archery season? (Oct. 1, 2020 - Jan. 15, 2021)
 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



24. Deer: Muzzleloader Season

- a. Did you hunt deer during muzzleloader season? (Oct. 24 – Nov. 1)
 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

25. Deer: Youth Gun Season

- a. Did you participate in the youth deer gun season in October as a youth hunter? (Oct. 16 – 18) *(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



26. Deer: Regular Gun Season

- a. Did you hunt deer during the regular gun season? (Nov. 21 – Dec. 6)
 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

27. Deer: Holiday Antlerless Gun Season

- a. Did you hunt deer during the holiday antlerless deer gun season? (Dec. 18 - 31)
 Yes No
- b. How many days did you hunt during holiday season? _____
- c. How many does did you harvest? _____

Wildlife Management in Oklahoma

28. How many years have you been hunting in Oklahoma? _____

29. How would you rate yourself as a hunter?

- Beginner
- Intermediate
- Advanced

30. How has your access to private land for hunting changed over the last five years?

- Less access than five years ago
- About the same as five years ago
- More access than five years ago

31. Please rank the following factors (1-7) in terms of how much they contribute to a successful hunt in your mind. Number one (1) would be most important with number seven (7) being least important

- ___ Harvesting an animal
- ___ Seeing the species I intended to hunt
- ___ Being outside
- ___ Taking a shot at the intended animal
- ___ Seeing any wildlife
- ___ Enjoying the time spent with family/friends
- ___ Favorable weather for being outside

Example:

- 6 Harvesting an animal
- 4 Seeing the species I intended to hunt
- 7 Being outside
- 1 Taking a shot at the intended animal
- 2 Seeing any wildlife
- 3 Enjoying the time spent with family/friends
- 5 Favorable weather for being outside

32. Do you support or oppose the Wildlife Department opening up the opportunity to forage for food (mushrooms, sand plums, etc.) on Wildlife Management Areas?

- Strongly oppose
- Oppose
- Neutral
- Support
- Strongly support

33. Why did you purchase a hunting license?

Check all that apply.

- To hunt
- For a reason other than hunting (visit WMA's, support conservation, etc.)

34. Has the Covid-19 pandemic influenced the frequency of your hunting?

- Yes, I have hunted more than in previous years
- Yes, I have hunted less than in previous years
- No, I hunted the same amount as in previous years.

35. What non-hunting activities do you participate in on Wildlife Management Areas?

None and/or I do not visit Wildlife Management Areas

- | | |
|---|--|
| <input type="checkbox"/> Horseback riding | <input type="checkbox"/> Target shooting |
| <input type="checkbox"/> Hiking | <input type="checkbox"/> Boating |
| <input type="checkbox"/> Bird watching | <input type="checkbox"/> Kayaking |
| <input type="checkbox"/> Photography | <input type="checkbox"/> Field Day |
| <input type="checkbox"/> Bike riding | <input type="checkbox"/> Fishing |
| <input type="checkbox"/> Camping | <input type="checkbox"/> Swimming |
| <input type="checkbox"/> Herping | <input type="checkbox"/> Running race |
| <input type="checkbox"/> Companion for hunting, fishing
or target shooting | <input type="checkbox"/> Other: _____ |

36. What months have you visited a WMA for activities other than hunting?

Please check here if you do not visit WMAs

- | | |
|-----------------------------------|------------------------------------|
| <input type="checkbox"/> January | <input type="checkbox"/> July |
| <input type="checkbox"/> February | <input type="checkbox"/> August |
| <input type="checkbox"/> March | <input type="checkbox"/> September |
| <input type="checkbox"/> April | <input type="checkbox"/> October |
| <input type="checkbox"/> May | <input type="checkbox"/> November |
| <input type="checkbox"/> June | <input type="checkbox"/> December |

37. The Wildlife Department is working to provide more educational information through articles and how-to videos. Which of the following topics would interest you?

Check all that apply.

- | | |
|--|--|
| <input type="checkbox"/> Fishing | <input type="checkbox"/> Bird Watching |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Boating |
| <input type="checkbox"/> Law Enforcement | <input type="checkbox"/> Research Projects |
| <input type="checkbox"/> Public Land | <input type="checkbox"/> Regulations |
| <input type="checkbox"/> Wildlife | <input type="checkbox"/> Legislative Updates |
| <input type="checkbox"/> Camping | <input type="checkbox"/> Other |
| <input type="checkbox"/> Hiking | |

38. What are the best ways to connect with you about important news from the Wildlife Department?

Check all that apply.

- Email messages
- Notifications on your cell phone from the Go Outdoors App (push notification)
- Text message
- Social media (Facebook, Twitter, Instagram)
- Outdoor Oklahoma* magazine
- Outdoor Oklahoma TV show
- Public meeting
- Wildlife Department website

40. Do you use the Go Outdoors Oklahoma mobile app? Yes No

If yes, what functions would you like to see added to the App?

- "How to" section on hunting
- "How to" section on fishing
- Waterfowl identification
- Instructional Videos
- Outdoor Oklahoma short clips
- Common Questions and Answers
- Employee Contact Information
- Other: _____

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



Dear Fellow Hunter,

In the past few weeks you received a survey from the Oklahoma Department of Wildlife Conservation. You were selected as part of a small pool of hunters in the state with a unique opportunity to shape how we manage your wildlife in Oklahoma. It should only take about 15 minutes out of your busy schedule to give us your ideas and concerns. And don't forget, every 10th hunter to fill out this survey will be given a one year subscription to *Outdoor Oklahoma* magazine! We look forward to receiving your completed survey.

Gratefully,

A handwritten signature in black ink, appearing to read "J.D. Strong".

J.D. Strong, Director
Oklahoma Department of Wildlife Conservation

Questions? Contact Betsey York (405-401-7532), betsey.york@odwc.ok.gov